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The Role of Food Reserves in Enhancing Food Security:

The Experience of Senegal

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About this working paper

This working paper is one of the products of a study conducted by DAI at the request of the European Commission as part of the advisory service ASiST managed by the unit in charge of rural development, food security and nutrition (C1) within the Directorate General for International Cooperation and Development (DEVCO).

The study has aimed at clarifying the potential role of food reserves in enhancing food and nutrition security in developing countries, and at making recommendations on how to use food reserves (in complement to other tools), taking into account the specificities on the context and the constraints of World Trade Organisation (WTO) disciplines.

The study was conducted based on i) an extensive review of the existing literature (both theoretical and empirical) and ii) 10 case studies analysing national or regional experiences in Africa, Asia and South America.

All the products of the study (including other working papers, a compilation of case study summaries, and a synthesis report) are available at: https://europa.eu/capacity4dev/hunger-foodsecurity-nutrition/discussions/how-can-food-reserves-best-enhance-food-and-nutrition-security-developing-countries.

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List of Abbreviations and Acronyms

ANSD	Agence Nationale de la Statistique et de la Démographie
CLM	Cellule de Lutte contre la Malnutrition
CNSA	Conseil National de la Sécurité Alimentaire
CSA	Commissariat à la Sécurité Alimentaire
CPSP	Caisse de péréquation et de stabilisation des prix (CPSP)
DAPSA	Direction de l'Analyse, de la Prévision et des Statistiques agricoles
DGPSN	Délégation Générale à la Protection Sociale et à la Solidarité Nationale
ESPS	Enquête Santé et Protection Sociale
FAO	Food and Agriculture Organisation
GOANA	Grande Offensive Agricole pour la Nourriture et l'Abondance
MAER	Ministère de l'Agriculture et de l'Equipement Rural
MARE	Ministry of Agriculture and Rural Equipment
NACE	Note d'Analyse du Commerce Extérieur
NGO	Non-Governmental Organisation
ONCAD	Office National de Commercialisation et d'assistance au développement
OSIRIZ	Rapport mensuel sur le marché mondial du riz
PAM	Programme Alimentaire Mondial
RGPHAE	Recensement Général de la Population et de l'Habitat, de l'Agriculture et de l'Elevage
SONADIS	Société Nationale de Distribution
SRDR	Service Régional de Développement Rural
SRV	Senegal River Valley
UNDP	United Nations Development Programme
VCB	Village Cereal Banks
WFP	World Food Programme

1. Introduction

The global crisis of food prices in 2007/2008 had a particular resonance in West Africa, culminating in violent riots in major capitals of the region. In Senegal, these events were a wake-up call for policymakers who seemed surprised by the extent of the vulnerability of the country's food security. Within days, rice prices soared and the news from Southeast Asia was hardly reassuring. Massive imports to the Philippines to guard against possible shortages, export restrictions imposed by India, and the residual nature of the global rice market constituted serious threats of disruption to rice supply in the country.

For decades, successive governments in Senegal often pursued conflicting food security policy objectives: to provide cheap food to urban consumers while guaranteeing high producer prices to farmers. During the agricultural programme of the 1960s and the 1970s, stabilisation policies were crafted around peanut production and marketing. Input provision, mechanisation strategies, and marketing of produce all evolved around peanuts. Domestic cereals (millet, sorghum, and maize) benefitted little from this policy. At the same time, imports of cheap food (rice and wheat) destined to urban dwellers was an essential part of the food security strategy.

The recurrent climate shocks from the 1970s disrupted the seemingly stable food security state prevalent in rural areas, where most rural households produced their own cereals (millet, sorghum, and maize) for auto-consumption and sold the surpluses in weekly markets and secondary cities. In general, food deficit households would rely on cash crops to fill the gap. Provision of food aid during the lean season would alleviate the situation of the most vulnerable households. In this context of chronic food deficits and recurrent shocks, the use of food reserves is of paramount importance. Since the droughts of the 1970s, the various agricultural policies have always incorporated elements related to the constitution of food reserves to meet the needs of vulnerable groups.

Rice has gained more space in cities and even in rural areas due to recurrent droughts and food shortages in the rural area on the one hand, and urbanisation and shifts in consumption patterns on the other. Government food security options relying more on availability and access (i.e. cheap imports of food products), heightened this imbalance and reinforced Senegal’s extraversion in terms of food consumption and supply.

The 2007/2008 price crisis was an awakening for policymakers. Their response focused primarily on price stabilisation, with limited success. Then they quickly moved towards longer term perspectives with the launch of the Great Agricultural Offensive for Food and Abundance (GOANA), which embedded a rice self-sufficiency programme.

The rest of this paper is organised as follows. The following section is a brief overview of the Senegalese food economy with a focus on two subthemes: food supply and demand, and food and nutrition security. Section 3 analyses government and other partners’ interventions in terms of food reserves and alternative tools. Section 4 analyses the impact of interventions. The final section presents the conclusions of the study.

2. The Senegalese Food Economy

Senegal is in West Africa, covers an area of 196,712 km^2, and has a population of 13,508,715 (RGPHAE, 2013). Considered a least developed country, Senegal is ranked 170 out of 188 countries according to the Human Development Index of the United Nations Development Programme (UNDP, 2015). The country belongs to the Sahel zone and as such is prone to recurrent climatic challenges, structural deficits in food production, and price volatility. The agricultural sector employs nearly 60% of the active population but contributed only 11.2% to GDP in 2013, a sign of the sector's low productivity (ANSD, 2016).[1]

To cope with these constraints, the *Plan Senegal Emergent (PSE)* has set a vision of "an emerging Senegal in 2035 with an inclusive society and the rule of law". This national strategy for economic and social development, initiated in 2014, focuses on wealth and job creation, governance strengthening, and the development of key strategic sectors that have significant impacts on improving the well-being, particularly through the protection of vulnerable groups and ensuring access to essential services.

The Programme of Accelerated Cadence of Senegalese Agriculture (PRACAS), the agricultural component of *Plan Senegal Emergent* (PSE) aims to build competitive, diversified and sustainable agriculture. This vision focuses on the emergence of an agriculture capable of: (i) feeding people sustainably on an endogenous basis; (ii) taking advantage of the benefits of international trade; (iii) securing and increasing rural incomes; (iv) providing agricultural and non-farm employment; (v) managing natural resources sustainably; and (vi) improving the nutritional status of the population. PRACAS aims, in a very short time, to achieve food and nutrition security and develop agricultural exports, while building a competitive, diversified and sustainable agricultural sector. Specifically, it seeks self-sufficiency in rice and onion, optimisation of groundnut sector performance, and development of the off-season fruit and vegetable sectors.

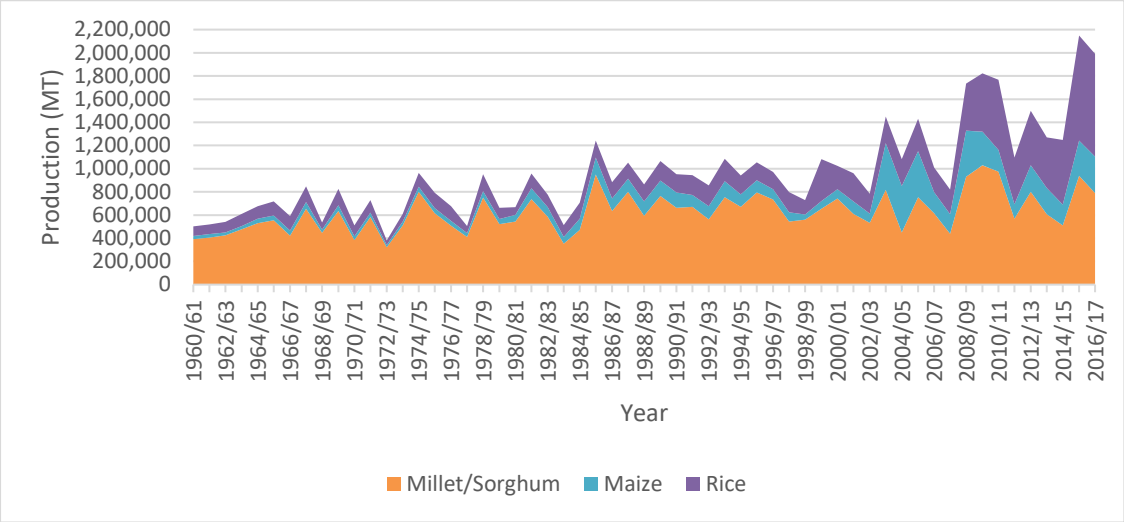
2.1 Food supply and demand

Cereal production and imports

Grain production follows an irregular path with a tendency to rise (Figure 1). The main crops (millet/sorghum, maize and rice) constitute the bulk of cereal production in Senegal. From 1960 to 2016, cereal production averaged 954,622 metric tonnes (MT). The share of millet/sorghum amounts to 65% on average over the period, while rice and maize on average represent respectively 22% and 13% of total cereal production.

[1] This includes both the contribution of crops (6.8%) and livestock (4.4%). Overall, in 2013, the primary sector contributed for 15.7% of GDP while the secondary and tertiary recorded respectively 19.0% and 53.3% of GDP (ANSD, 2016).

Figure 1: Evolution of cereal production, 1960-2013



Source: DAPSA, various years

By dividing the period into decades, we see that the contribution of millet/sorghum in total grain production tends to decline in favour of rice mainly, and maize to a lesser extent. Thus, the share of millet/sorghum in cereals produced has evolved from over 70% from 1960 to 1990, to reach a record low of 47% today (Fig.3). This situation reflects the low productivity of millet due to soil quality degradation, recurrent climate shocks, and a lack of genuine support from public policies. For a long time, policies were biased towards cash crops with peanuts benefiting from almost all types of policy support (input provision, credit and marketing). However, the observed change also results from the strategic options for the development of rice production.

Figure 2: Cereal production per decade

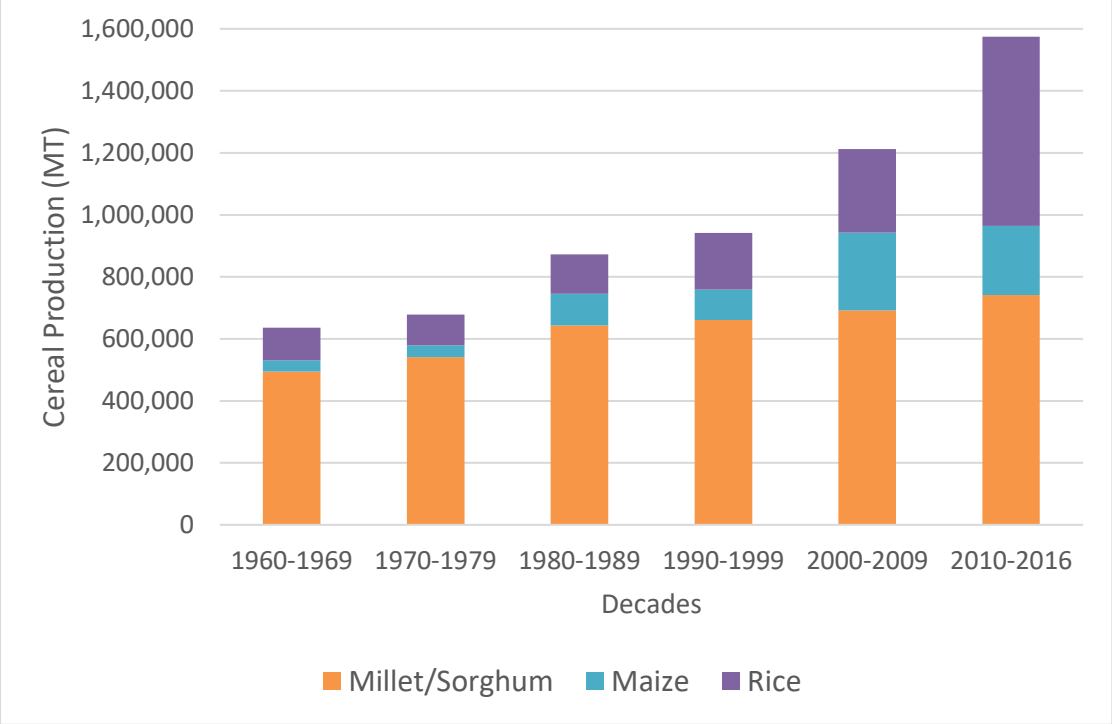
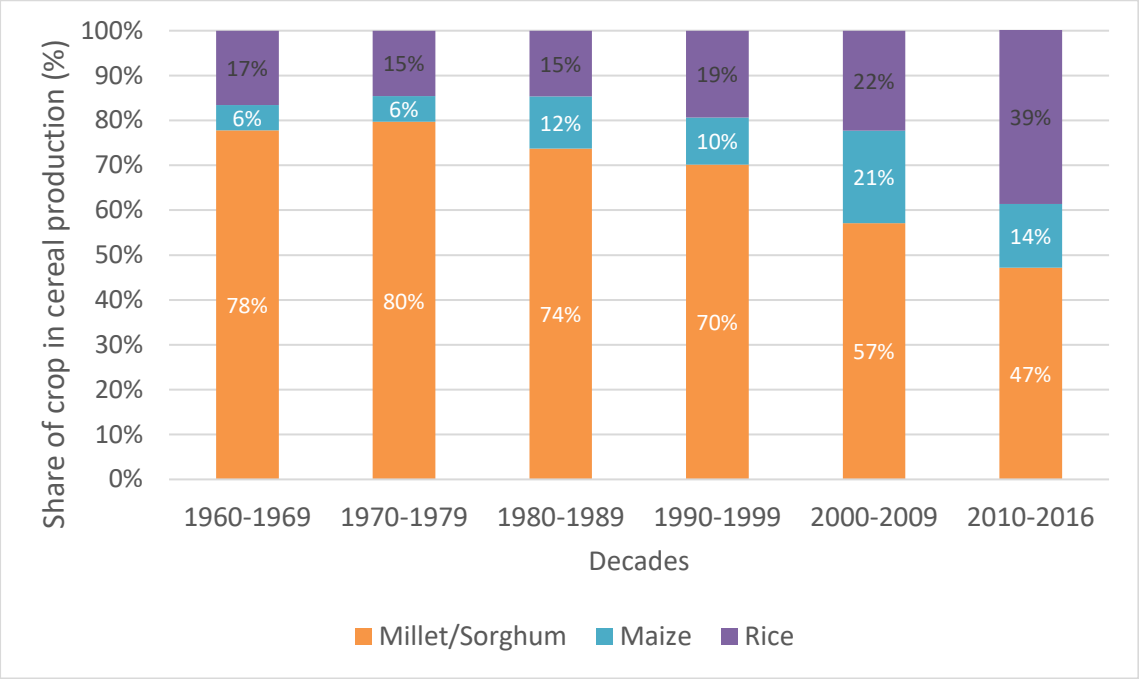


Figure 3: Share of crops per decade over time



Source: DAPSA, various years

Senegal, like most other countries of the Sahel, faces a relatively difficult food situation. Weak domestic cereal production is offset by grain imports. The gap between domestic production and the growing needs of the population has been widening over the years. Table 1 below shows the importance of grain imports. Between 2010 and 2012 for instance, cereal imports averaged 1,366,956 MT per year against average annual production of 1,454,082 MT that barely covers 52% of the country's needs.

Table 1: Cereal imports, 2010-2014

	2010	**2011**	**2012**	**2013**	**2014**
Tons	1,196,322	1,323,980	1,580,565	1,552,564	1,706,680
millions FCFA	207,022	270,491	327,037	302,484	290,737

Source: ANSD, NACE, 2014

Characteristics of demand and consumption patterns

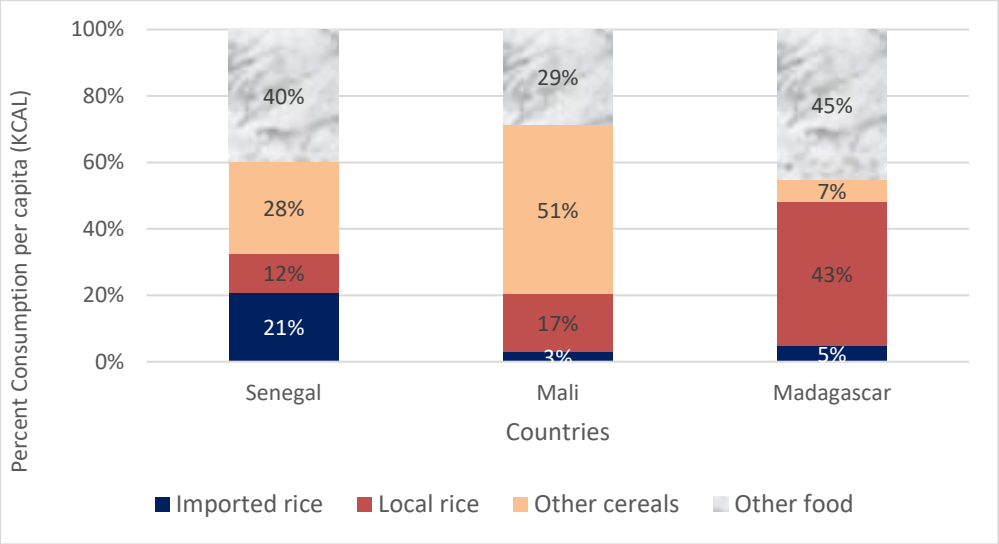
Senegal has food traditions, both urban and rural, based on consumption of cereals (rice, millet, maize, and sorghum) as staple foods, constituting 40% of the household food budget, along with other products in variable proportions depending on the available crops, area (urban or rural), and social status (rich or poor) of families or individuals.

Senegal's food situation has deteriorated steadily since the 1970s, and this phenomenon is accelerating due to urbanisation and high population growth, which increases cereal consumption, in a context where cereal production has increased only slightly. As a result, cereal imports are increasing, reaching 1,706,680 MT in 2014 (Table 1). The result is serious food dependence, permanent food insecurity, and frequent food crises for the most vulnerable groups.

There is increasing rice and millet substitution in the Senegalese diet as urban consumers prefer rice. Consumption of wheat flour has also increased. Unfortunately, over 70% of the consumed rice and 100% of the wheat are imported. In contrast, millet, sorghum and maize are mostly produced within the country. This preference for rice and wheat is related to urbanisation that leads to changes in eating habits. The share of these two imported products has increased in household consumption, making food imports per capita go up steadily.

As stated above, rice, millet/sorghum, wheat, and maize are the foundations of the Senegalese diet. Senegalese derive 60% of their calories from grain consumption. Today, rice occupies the first place, meeting a third of the population's calorie needs. A comparison with Mali and Madagascar (two large rice consumers) shows the special situation of Senegal (Figure 4). Rice provides 48% of calories to Malagasy, and it is mainly produced locally (43%). As for Mali, not only other cereals (millet / sorghum, maize) occupy more space, domestic rice provides an important contribution, relegating the caloric intake of rice imports to only 3%.

Figure 4: Percent consumption of food per capita (kcal) in selected countries



Source: David-Benz and Lançon, 2013.

2.2 Food and nutrition security in a context of poverty

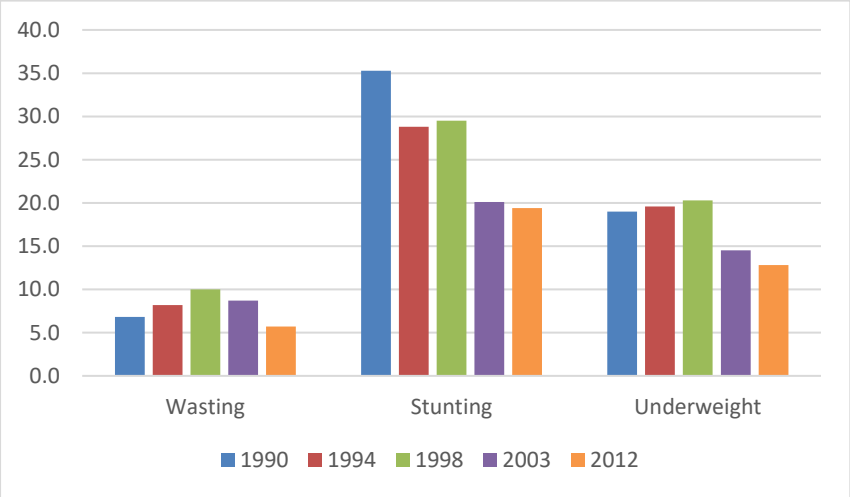
Despite efforts made over years to ensure food self-sufficiency, Senegal is a food-deficit country. Coverage rates of its cereal needs through domestic production has varied between 30% and 65% over the past 10 years. In 2013/14, for example, national cereal availability estimated at 1,079,617 MT covered about 5 months, which represent 45% of needs estimated at 2,381,616 MT. The gap was covered through imports of rice (750,000 MT), wheat (350,000 MT), corn (80,000 MT) and sorghum (25,000 MT). Food aid amounted to 24,703 tons (ANSD, 2016, p.175).

On the nutrition side, Senegal has shown a significant improvement in the nutritional status of its population in recent years. The most striking example is represented by the reduction of stunting among children under 5, which was around 30% in the 1990s and was at 19% in 2012, the second lowest in Sub-Saharan Africa. Figure 5 below shows the proportion of children under the age of five

who suffer from wasting (low weight for their height) or stunting (low height for their age), and those who are underweight. Figure 6 below shows a decline in the prevalence of undernourishment and food inadequacy. All these figures display slight improvements over time, although an in-depth look will contrast these observations.

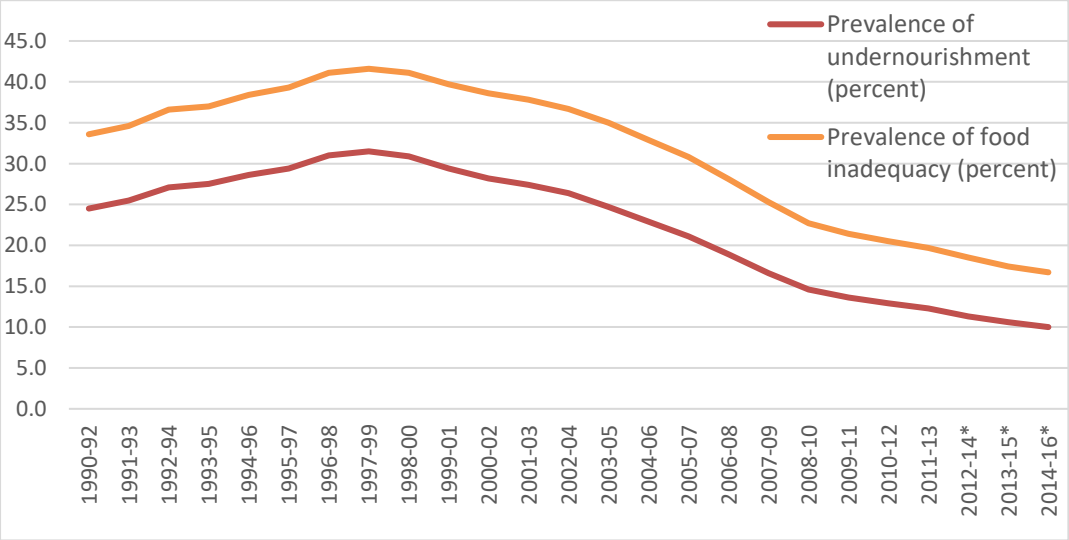
Acute malnutrition has stagnated, with regular and seasonal peaks in certain areas of the country, especially during the lean period, while chronic malnutrition is declining. Senegal still has an acute malnutrition rate much lower than other countries thanks to its intervention framework driven by the Cellule de Lutte contre la Malnutrition (CLM) programme, and based on critical alliances at different levels (local elected officials, Civil Society Organisations, and local communities). Micronutrient deficiencies are still a public health concern.

Figure 5: Percentage of children under 5 affected by wasting, are stunted and/or are underweight



Source: FAO, Food security indicators, 2016

Figure 6: Prevalence of undernourishment and food inadequacy



Source: FAO, Food security indicators, 2016

The following subsections will respectively address the incidence of poverty, chronic food insecurity, and the situation of malnutrition.

The incidence of poverty

As shown in the table below, 46.7% of the population is poor. The southern, eastern and central regions record the highest poverty rates of over 60% (Table 2). These poorest regions correspond to areas where households face more food shortages. The other main feature of Senegal is the very high rate of poverty in rural areas, where it amounts to 69% and mainly affects women.

Table 2: Poverty level by region

Regions	Number of poor	Total population	Poverty
Dakar	857 086	3 337 499	25.7%
Ziguinchor	535 510	801 818	66.8%
Diourbel	809 489	1 681 112	48.2%
Saint-Louis	376 069	953 410	39.4%
Tambacounda	358 129	591 619	60.5%
Kaolack	557 909	905 499	61.6%
Thiès	714 645	1 760 244	40.6%
Louga	210 311	793 534	26.5%
Fatick	491 750	728 912	67.5%
Kolda	536 731	697 699	76.9%
Matam	249 200	547 836	45.5%
Kaffrine	334 559	528 811	63.3%
Kédougou	100 583	140 537	71.6%
Sédhiou	318 502	475 472	67.0%
Total	**6 450 473**	**13 944 002**	**46.7%**

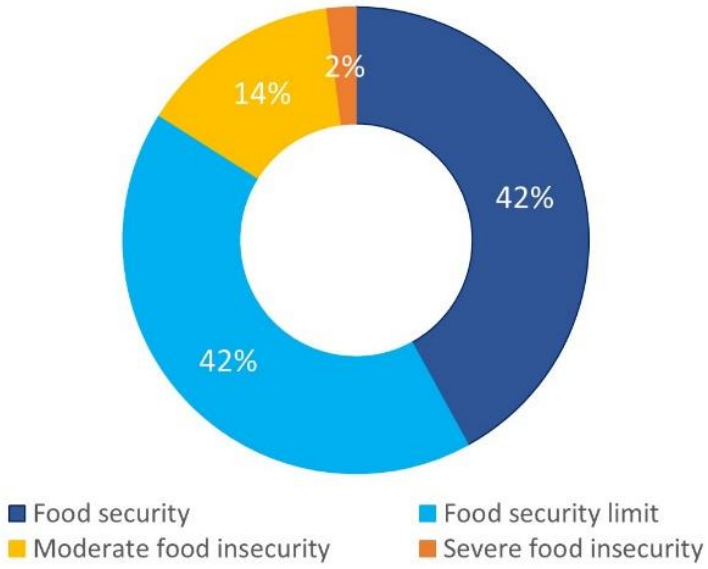
Source: Diop, 2015

Chronic food insecurity

As stated above, domestic production only covers half the demand for grain. Senegal relies heavily on cereal imports, which increases its vulnerability to price spikes. The country is also prone to recurrent droughts and floods. In some areas, farming is also affected by land degradation. As a result, food insecurity becomes a structural problem.

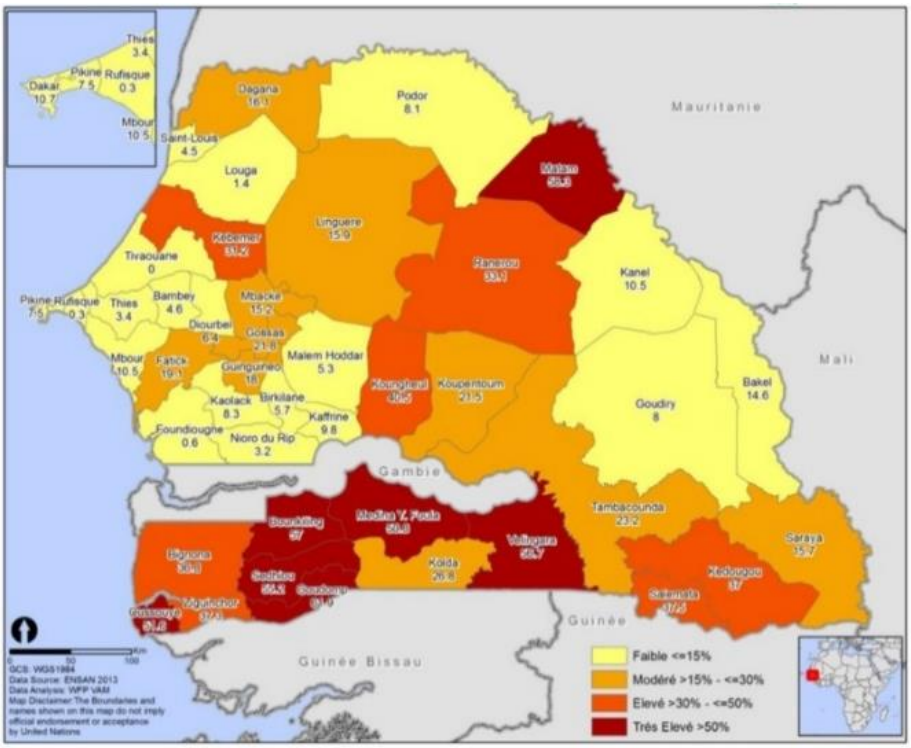
In Senegal, 16% of households are food insecure, including 2% in severe condition and 14% in moderate condition. These households display deficient food consumption patterns and cannot meet their minimum food needs without recourse to irreversible coping strategies: selling productive assets, reduction of essential non-food expenditures, withdrawal of children from school, etc. About 42% of households are on the edge of food security. These households have barely adequate food consumption without the use of irreversible coping strategies, but cannot afford some essential non-food spending (PAM, 2015). Food insecurity affects more rural households. Indeed, 21% of them are food insecure while about 9% of households in urban areas are in this precarious position.

Figure 7: Level of food security



The north-eastern, eastern and southern regions show a high prevalence of food insecurity, as illustrated by the following figures: Sédhiou (58%), Kolda (42%), Ziguinchor (39%), Matam (38%), Kédougou (33%), and Tambacounda (22%). Within these regions, some districts record even higher food insecurity measures as more than half of the households surveyed are affected. These include the districts of Goudomp (62%), Matam (58%), Bounkiling (57%), Sédhiou (55%), Oussouye (52%), and Medina Yoro Foulah (51%).

Figure 8: Prevalence of food insecurity by district



Source: WFP, 2014

Food insecurity results from several factors:

1. Low agricultural productivity resulting from low water control, degradation of productive resources, and under-equipment.
2. Strong dependence on markets: 89% of households primarily source their food from purchase, and about 80% of the food they eat is purchased.
3. Pervasive household poverty – according to the Enquête de Suivi de la Pauvreté au Sénégal (ESPS) survey (2011), almost half of the population (46.7%) lived below the poverty line. Poverty rates above 60% were recorded in the Eastern, Southern and central regions: Kolda (76.6%), Kédougou (71.3%), Sédhiou (68 3%), Ziguinchor (66.8%), Fatick (67%), Kaffrine (63.8%), Tambacounda (62.5%) and Kaolack (61.7%).
4. High food prices contributing to increased food insecurity and vulnerability. In 2013, except for the price of imported ordinary rice that was regulated through price control, grain prices were higher than the average of the past five years.
5. Finally, Senegal is exposed repeatedly to climatic shocks (droughts, floods) which increase the vulnerability of households.

Box 1. Senegal and its food security challenges

Senegal continues to cope with a food and nutrition crisis that particularly affects the North and East regions. More than 2.4 million people are food insecure (17% of the population), of which over 220,000 will be in crisis during the lean season 2016. It is expected that more than 407,500 children under 5 years will suffer from acute malnutrition in 2016, including 86,026 from severe acute malnutrition. Climate shocks such as drought and delayed onset of the rainy season have worsened the situation especially in the north, while in other areas floods have affected more than 60 000 people.

Indeed, it is estimated that more than 407,500 children under 5 years are at risk of acute malnutrition among which more than 86 000 cases suffering from the severe form; 31% (28,645) of these severe cases of acute malnutrition are found in the priority areas (regions of Tambacounda and Matam and Podor). In addition, almost 74,000 pregnant and lactating women will be at risk of acute malnutrition.

Source: Extract 2016 Response Plan

At the national level, food spending accounts for 46% of the household budget. This figure is higher among rural households. Indeed, in rural areas, 51% of household expenditures go to food while in urban areas, households spend about 41% of their budget on food. As expected, the share of expenditure on food is higher among households located in the eastern and southern part of the country: Tambacounda (64%), Kédougou (60%), Kolda (59%), Sédhiou (55%), Matam and Ziguinchor

(52%), Kaolack (51%) and Fatick (50%). In Tambacounda, Kolda, and Kédougou, 23 to 27% of households spend more than 75% of their budget on food.

Persistently high malnutrition levels

Malnutrition levels are high among children under five, and are a testimony of the precarious nutritional situation of this age category. The global acute malnutrition rate is 9.1%, very close to the WHO alert threshold of 10%. This rate is highest in the Matam region (18.8%), which contains three districts exceeding the critical threshold of 15%. Acute malnutrition has risen in the last five years. In contrast, chronic malnutrition has been following a downward trend, although it is still pervasive with 16.5% of children under 5 affected at the national level. Chronic malnutrition rates are higher in the south and south east of the country, with high prevalence in the departments of Kolda (31%), Medina Yoro Foula (30%), Saraya (29%) in the regions of Kolda and Kédougou (PAM, 2014).

Malnutrition is partly due to poor dietary habits including inappropriate feeding practices, especially in the early months of life. Only one third of children under six months are exclusively breastfed and 21% of children receive a diversified diet. The nutritional situation in Senegal is also characterised by micronutrient deficiencies. Of serious concern is the high prevalence of iron deficiency among women and children under five. Access to iodised salt, especially for rural households, is also a serious issue (Genequand et al., 2016).

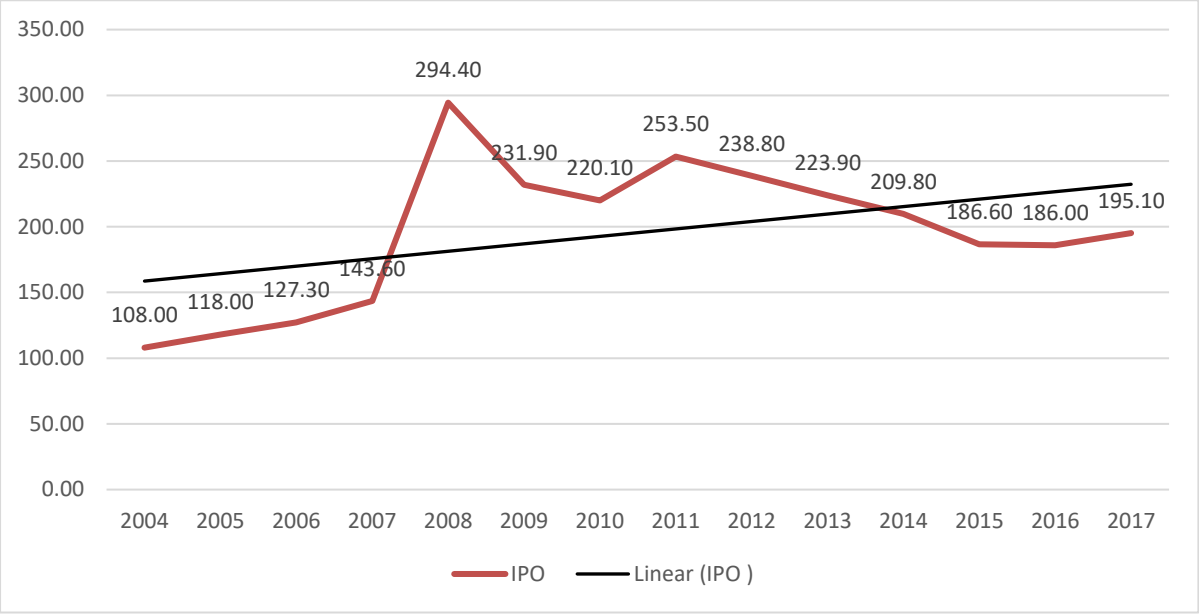
3. Government intervention for food security

3.1 Interventions for price stabilisation

The global food price shock of 2007/2008 is a good example of government intervention for price stabilisation. This section first presents the evolution of prices during the target period and explains how price transmissions operate. It then describes the main steps in government intervention.

International rice prices experienced an upward trend in which the 2008 crisis is the highest point (OSIRIZ index, Figure 9). The strong price hike of 2007-2008 was followed by a significant decline in prices in 2009 and 2010. Prices increased again in 2011, followed by a clear downward trend in 2012-2017. Despite this downward trend, prices were still at relatively high levels in 2017, above the 2007 prices.

Figure 9: Yearly Evolution of World Rice Prices - OSIRIZ (2004-2015)



Source: Mendez del Villar P. (2004-2015)

Seasonal fluctuations of the millet price, the main local grain, are known and can be explained mainly by the availability of the product over time and space. But it is especially the stabilisation of the price of imported rice that has always concerned the authorities due to the sensitivity of this product, especially in urban areas. The global food price crisis of 2007/2008 highlighted Senegal's vulnerability to the volatility of the international price of rice. In Senegal, global rice prices determined the retail price of imported rice, as well as the price of rice produced locally, over a long period. However, the impact of international prices is recorded with a delay of two to three months in Dakar and four months in the countryside. This price transmission was mainly due to the fact that rice is a staple food and imports account for most of its supply. The price of millet is not affected by fluctuations in the price of imported rice (Diarra, 2008).

By September 2007, facing soaring prices including energy,[2] the government decided to suspend customs duties of 10% applied to rice. Rice imports have been exempt from VAT for several years. The suspension of duties boosted imports which reached exceptional levels in 2007, well above the national needs without the desired (expected) effect on lower consumer prices.

From April 2008, confronted by the severity of the problem, the government took several measures:

1. Limiting margins of the various market intermediaries. This was to curb speculation by predetermining margins. Thus, the following margins were permitted: importer (2000 FCFA / ton); semi-Wholesale (5000 FCFA / ton including transportation), retail (750 FCFA / bag and 15 FCFA / kg).

[2] The price of energy has multiple effects on the price of other goods and on transport cost, thus worsening the case for food prices.

2. Supporting the purchasing power of end consumers through a grant of 5.1 billion FCFA between May and July 2008. This measure was very expensive, and its implementation led to supply rationing.
3. Distributing food and animal feed. The state also specifically aided the strongly-affected rural sector strongly affected through the purchase of 25,000 MT of rice and cattle feed.
4. Establishing reference stores: in June 2008, to improve access to basic products at moderate prices, the state allied with few private operators to establish reference stores.
5. Finally, the government decided in May 2008 to boost local production through the Great Agricultural Offensive for Food and Abundance (GOANA) programme, with its rice self-sufficiency programme component.

From July 2008, coping with the budgetary difficulties and the limited impact of the measures taken so far, the Government stopped subsidies and took drastic control measures, including establishing::

1. A toll-free number by the Internal Trade Department, prompting consumers to report traders who participate in the rationing of supply and upward price speculations.
2. An operational security plan of the territory against illegal trade practices (re-exports, arbitrations through outgoing products to neighbouring countries).
3. A control committee against food retention with a focus on a control of distribution channels by state services.
4. Support for a few importers to conduct special operations to supply the local market in rice.

Beyond unilateral administrative measures, the government negotiated with importers who accepted to incur part of the price increase from the international market, with a limited transmission to domestic prices. Authorities promised to pay the shortfall once the situation stabilised and the fiscal situation was less tense. This agreement lasted only a few months due to the persistence of the crisis and the heavy financial burden for importers. The breakdown of the deal resulted in a greater transmission of the international price changes to the domestic market prices.

Table 3: Changes in regulations on imported rice

Tools	Action/ Price regime	Rice category
Decree 95-77 of 20 June 1995	Authoritarian pricing	Rice
Decree 2006-1246 of 14 November 2006	Rice removed from the authoritarian fixing scheme	
Inter-ministerial Order No. 3419 dated 16 April 2008	Pricing of certain varieties of imported broken rice	Fragrant broken rice; ordinary broken rice
Ministerial order of 4 February 2011	Price freeze of certain essential commodities	Non-fragrant broken rice; fragrant broken rice
Decree n° 2013-692 of 17 May 2013	Authoritarian pricing	Ordinary broken rice
Ministerial Order No. 07111 dated May 22, 2013	Prices of oil, sugar and non-fragrant broken rice are administered	Non-fragrant broken rice

Source: compilation of texts by author

3.2 Senegalese rice self-sufficiency policy

Senegal aimed to achieve rice self-sufficiency by 2017 with production targets of 1.6 million MT of paddy. These results would be achieved through 331,308 ha of planting, of which 55% will come from rainfed areas (Table 4). Although progress has been made, the goal of self-sufficiency was not achieved.

Table 4: Forecasted Acreage and Rice Production by 2017

Zones / Items	Senegal River Valley (SRV)	Anambe	Rainfed	Total
Area (ha)	140,308 42.4%	8,000 2.4%	183,000 55.2%	331,308 100%
Production (MT)	**912,002** 57%	**48,000** 3%	**640,500** 40%	**1,600,502** 100%

Source: Ministry of Agriculture and Rural Equipment (MARE), 2014, p.27

The overall cost of the rice self-sufficiency programme is estimated at 424.7 billion CFA francs. Seeds and fertilisers account for 55% of that amount, while irrigation schemes and equipment take up 33% and 8.98% respectively.

Rice production increased suddenly in 2008 under the combined effect of more irrigated land and higher yields. These results stem from the innovations carried out as part of the Great Agricultural Offensive for Food and Abundance (GOANA) and favourable prices for producers in the context of the crisis in food prices. Yields also improved significantly from 2008. If the Senegal River Valley has seen steady progress and displays average yields of 5 to 6 MT/ha per year, with peaks of 8 MT/ha, the introduction of the "Nerica" varieties in rainfed production has greatly improved the yields of upland rice and subsequently positively impacted average rice yields across the country.

Figure 10: Area planted and rice yields in Senegal (2004/05 – 2015/16)

Source: DAPSA, 2014

Rice production reached an exceptional level of 906,348 MT of paddy in 2015, against an average annual production of 555,399 MT from 2010-2014. In terms of white rice equivalent, it is estimated that domestic production amounted to 308,565 MT on average over the past 10 years, representing approximately 28% of the country's needs. Table 5 below shows that the coverage of the country's rice needs through domestic production has improved over the last 5 years, ranging between 24 and 47%, covering an average a little less than a third of demand (30%). Despite steady progress over these years, these rates show the enormous challenge to achieve rice self-sufficiency goals.

Table 5: Domestic production of rice and demand coverage (2004-2015)

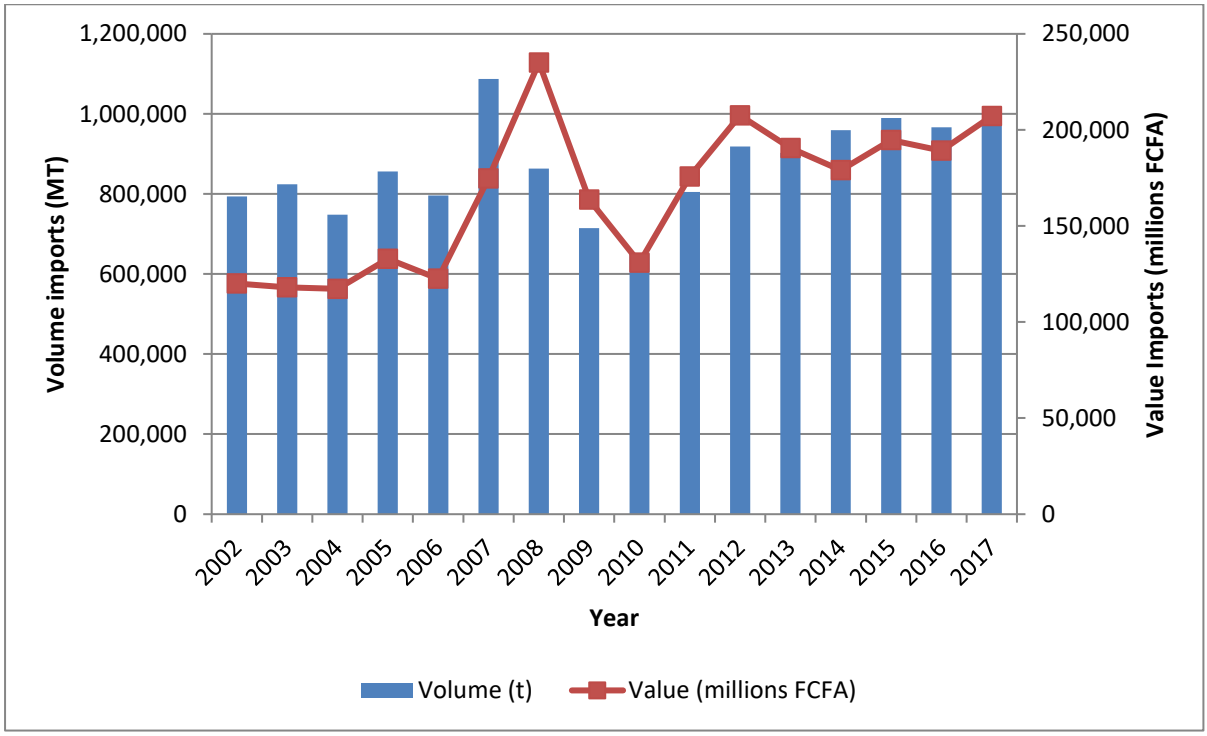
Year	Acreage (ha)	Yield (kg/ha)	Paddy Production (MT)	White rice Equivalent (MT)	Demand (MT)	Coverage ratio
2004/05	81,486	2,476	201,744	133,151	782,219	17%
2005/06	97,779	2,854	279,080	184,193	832,974	22%
2006/07	85,037	2,240	190,493	125,725	896,123	14%
2007/08	80,312	2,408	193,379	127,630	921,538	14%
2008/09	125,329	3,257	408,219	269,425	970,972	28%
2009/10	139,388	3,602	502,104	331,389	1,010,215	33%
2010/11	147,208	4,103	604,043	398,668	1,063,302	37%
2011/12	109,177	3,717	405,824	267,844	1,105,543	24%
2012/13	117,729	3,989	469,649	309,968	1,161,839	27%
2013/14	108,547	4,018	436,153	287,861	1,215,784	24%
2014/15	134,973	4,142	559,021	368,954	1,248,611	30%
2015/16	237,300	3,819	906,348	598,190	1,282,323	47%

Source: DAPSA 2016 and calculations of the author

Trends in Senegalese rice imports

Senegalese rice imports remained high during this decade, despite efforts in recent years by the government to develop local production. Average imports (2005-2017) are at 866,091 MT per year, with a peak in 2007 of 1,087,522 MT in anticipation of rising world prices. The next three years, rice imports experienced a downtrend to reach a minimum of 650,789 MT in 2010. Since then, they have remained above 800,000 MT per year (Figure 11). In value terms, rice imports amounted, on average, to 187 billion CFA franc per year from 2008-2017. The weight of these imports on the trade balance is undeniable: they account for 7% of total imports and 33% of imports of foodstuffs (ANSD, NACE, 2006-2014).

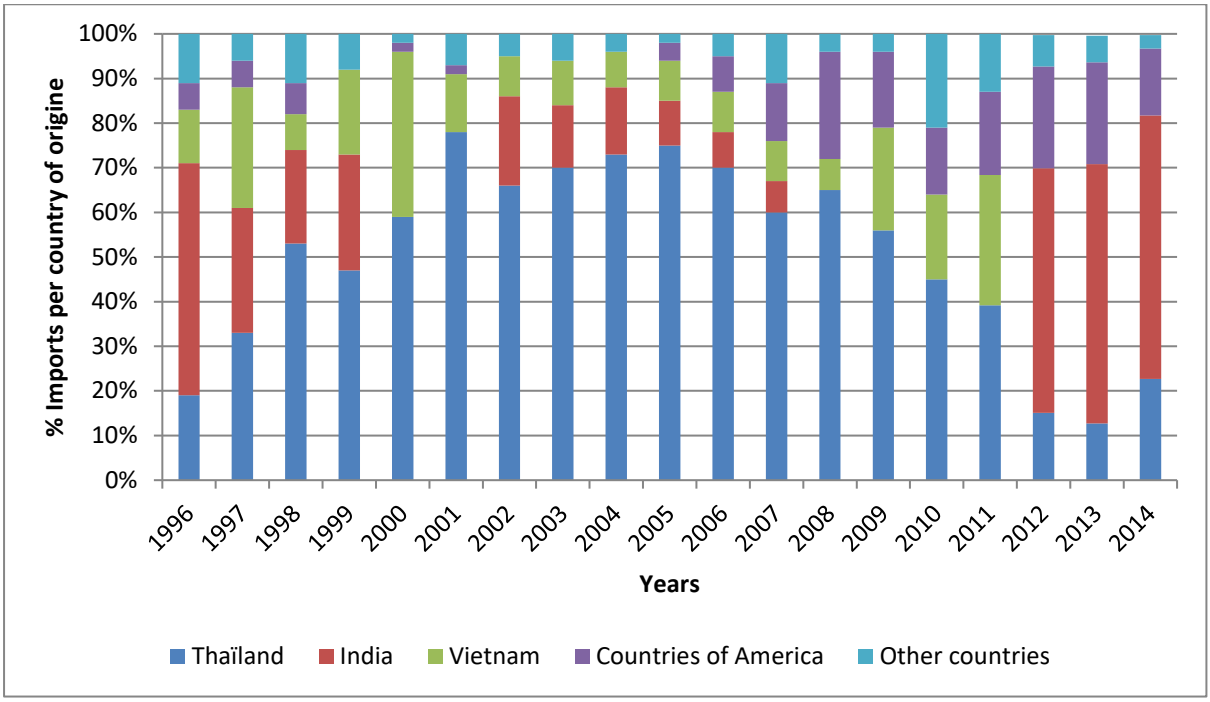
Figure 11: Rice imports in volume and value terms (2002-2017)



Source: ANSD/NACE (2006-2017)

Rice imports are mainly from Thailand, India, Vietnam, and Latin America (Brazil, Argentina). For many years, Thailand was the main origin of Senegal's rice imports, providing more than half of the volume from 1998 to 2009. The last three years, India has overtaken Thailand and is the first rice provider for Senegal (Figure 3). To cope with the price increases, Senegalese consumers have changed their purchasing patterns, buying more from India, which proposed cheaper but lower quality products. This led to a shift from high quality fragrant broken rice (Thailand) to unscented broken rice (India). Between 2004 and 2008, imports of fragrant rice varied between 50% and 64% of total rice imports. By 2013, they dropped to a low 15%.

Figure 12: Proportion of imports by origin (1996-2014)



Source: Customs, Handling services, Consignees, Directorate of Plant Protection, National Statistical Agency

3.3 Food reserve and government intervention

From the 1970s, a history of government intervention

Due to a persistent cereal deficit, the constitution of food stocks has always been translated through various policies initiated by the Senegalese authorities, albeit with different goals and means. In the 1970s and 1980s, the government managed the process through public and parastatal bodies. However, the liberalisation era that followed influenced implementation.

Centrality of ONCAD in the 1970s

In Senegal, the food business is characterised by strong dependence on the outside world, accentuated by changing consumer preferences which favour rice and wheat consumption. Already in the mid-1970s, the persistent cereal deficit (between 220,000 and 500,000 MT per year) led the authorities to develop a food investment plan (1977-1985). The plan called for strong measures to prevent a likely deterioration of nutrition during the 1980s, and a heavy trade deficit due to increasingly high grain imports.

Following the first droughts of the 1970s, the National Cooperation and Development Assistance Office (ONCAD) was assigned the supply of urban and rural deficit areas, the creation of a food reserve and the fight against speculation at all levels. Thus, in terms of food supply and food security, ONCAD had a monopoly on rice imports, storage, and distribution to licensed traders (quota holders). Other cereals (except wheat) were also under its responsibility. Finally, starting in 1975, ONCAD had a monopoly on primary collection of traditional cereals (millet, sorghum, maize). Controlling both commercial cereal imports and domestic marketing, ONCAD was therefore a key component of the Senegalese grain policy. But food aid, which became important following the 1973 drought, was under the direct responsibility of the "*Commissariat à l'aide alimentaire*" (the Commission for Food Aid).

ONCAD's intervention was restricted to being a service provider (unloading, handling, transportation) (Hirsch, 1979).

Period prior to liberalisation (1979-1988)

The marketing of local cereals (millet/sorghum, maize, paddy rice) followed strong state regulations. It involved public and parastatal organisations such as the *Caisse de péréquation et de stabilisation des prix* or CPSP (the price stabilisation agency), the *Commissariat à la Sécurité Alimentaire* (CSA) (the Commission for Food Security) and the Regional Rural Development Service (SRDR), and private sector actors (accredited traders).

The CPSP oversaw the distribution of imported rice (75% of the local rice supply at the time) and locally produced rice. It received local rice from the regional public bodies (SRDR) that oversaw the primary collection and hulling of rice. The CPSP distributed rice inside the country through SONADIS, (a parastatal specialised in distribution) and private traders who were quota holders. In general, they had to market their quota within three months, with monthly instalments. *The CPSP needed to be prepared to dispose at any time of a rice buffer stock which amounts to at least two months of national consumption*.

Beside rice, other cereals (millet/sorghum, maize) were managed by the *Commissariat à la sécurité alimentaire* (CSA). From the dissolution of ONCAD in 1980, CSA was responsible for public marketing of local cereals such as millet, sorghum, and maize. The transfer of grains to deficit areas, *the distribution of free food to the poor,* and the supply of millet and maize to processing plants were all under the responsibilities of CSA at this time (Sow and Newman, 1988).

Price stabilisation policy of grain products: the role of the CSA (1979-1988)

In Senegal, cereal production fluctuates considerably and causes significant fluctuations in grain prices. In the early 1980s, Sow and Newman (1988) noted that millet prices were a barometer of these fluctuations. Indeed, these prices displayed a pattern of four stages during the year:

1. At harvest (October-December), millet prices are low – below the price floor set by the government.
2. During peanut marketing, between January and March, millet supply is reduced, resulting in a price increase.
3. In April-June, preparations for the rainy season encourage producers to sell millet in order to buy peanut seeds and fertiliser – as the result, there is a slight price drop.
4. Finally, during the lean season (July-September), prices are highest.

To stabilise prices of cereal products, the government put forward the CSA. From the inception of the New Agricultural Policy (up to 1988), the CSA was responsible for stabilising the market during harvest, paying millet producers the minimum price set by the government. Despite these CSA interventions, market prices during harvest were on average lower than the price floor. The limited impact of the CSA interventions was primarily due to:

1. Inadequate financial resources that prevent the CSA from buying any quantity that producers are willing to sell;
2. The administrative policy that does not allow the CSA to buy small quantities; and

3. The CSA's dispersion of its interventions, as it made a costly decision to spread its activities to a wide range of markets rather than focusing on targeted ones, to contain costs.

CSA programmes aimed at stabilising prices and ensuring producer access to markets have not been very effective. Reducing price variability in the local cereal subsector has been an elusive catch. This is probably why the government decided to end the experiment in 1988 and to refrain from millet and maize price stabilisation policies (Ndoye et al., 1991). The context of structural adjustment and liberalisation policies has also certainly played a role.

Food security stocks and price stabilisation

Since the 1970s, food reserves have been included as a strategy in the fight against food insecurity. ONCAD was mandated to set up reserves. At its dissolution in 1980, the CPSP (price stabilisation agency) was responsible for ensuring the presence of a stock that can cover national cereal needs for at least two months. In addition, the *Commissariat à l'aide alimentaire* (Commission for Food Aid) was created after the great drought of 1973 to specifically manage the food aid component. This organisation was replaced a few years later by the CSA, mandated to ensure the free distribution of food to vulnerable people. The above policies had often been designed with the inclusion of price stabilisation objectives. That was one of the essences of the CPSP, which managed its funds to smooth out prices and revenues in the agricultural sector, keeping in mind the interests of both producers and consumers in a context of urban dwellers' larger political clout.

During this period, the government took care to maintain a stock of 2,000 to 3,000 MT of rice renewed periodically. But the high costs of managing this food security system and the policy environment of structural adjustment of the 1980s and 1990s encouraged the authorities to end the use of food reserves despite food insecurity and recurrent shocks.

Significant changes occured in the late 1990s following the commitments made at the World Food Summit. As a result, the National Food Security Council (CNSA) was created in 1998.[3] A year later, a food security strategy was developed. This marked a turning point because the strategy indicates clearly that the maintenance of food security stocks is not necessary insofar as Senegal is a coastal country and can stock up in a relatively short time. In this context, maintaining a safety stock at national level by the CSA is not required.

The government must limit its actions to provide support to stakeholders who wish to create lines of defence for their community, of the departmental safety stock type or other communal grain banks. Government assistance can concentrate on providing guidance in areas including the management and maintenance of inventories and seasonal credit.

The process of liberalisation of the rice sector, which began in 1995, culminated with a devolution of the monopoly on imports and distribution of broken rice to the private sector. To support the process, a rice market management and monitoring unit (*Cellule de gestion et de surveillance des marchés du riz*) was created along with a market regulatory agency (*Agence de regulation des marchés - ARM*). Furthermore, by Ministerial order, a market information system for rice was established. This

[3] Decree 98-554 of 25 June 1998.

institutional environment has contributed to preventing the establishment and maintenance of a food reserve, considered too expensive by the government of Senegal (PAM, 2008).

Reconstitution of the food security stock

With the change of political regime in 2000, policymakers decided to replenish food security stocks for use in case of food crises (during the lean season) and/or unexpected shocks. In reality there is no stock on site, but a budgetary provision called "replenishment of food security stock" (a budget line).

Table 6: Level of funding allocated for the food security stock

Year	2011	2012	2013	2014	2015
Amount allocated (millions FCFA)	2176	4900	1 500	3 160	1 200

Source: Diop, 2015

In principle, the CSA uses the funds provided following specific procedures. Procurements are made by tender procedure following which two suppliers are retained for two years. Goods are bought, and direct redistribution is made, immediately and with fast rotation. Therefore, there is no palpable physical stock. Although CSA has 71 stores spread all over the country with a total capacity of 87,340 tons (Table 7), these are not used for long to medium term storage. When needed, CSA had the capacity and the knowledge to handle the necessary volumes. The distribution is made to people who cannot make ends meet during the lean season and to religious leaders who organise religious ceremonies. The funds allocated to this budget line are generally limited (Table 6).

Table 7: CSA's storage capacities in Senegal

Regions	Volume (MT)	Regions	Volume (MT)
Thies	19000	Kaolack	10000
Louga	10000	Kaffrine	4000
Saint Louis	7500	Tambacounda	6000
Matam	3000	Kédougou	1000
Diourbel	14000	Kolda	3000
Fatick	9000	Ziguinchor	840

Source: Audit CSA, 2015

The distribution rules of the available goods are unclear and political interference is significant. A recent audit noted the lack of a manual of procedures. Religious ceremonies use most of the provisions (there are about 735 religious events annually during which the CSA is requested to provide rice support).

Supply is made with rice. The government encourages the use of locally produced rice, but suppliers usually complain about logistical constraints due to dispersed production and high costs for its aggregation. According to the CSA, suppliers tried to stock up at the Senegal River valley (the main rice basket) in 2015 but they encountered several difficulties: rice availability, i.e. problems gathering large volumes in a short time span, quality from small-scale processors; and high prices offered by modern processing plants than cannot match the prices offered by suppliers in their responses to the tender (based on import prices). Due to the procurement procedures, a restricted tender cannot be made on local rice only.

When a shock occurs, the food security stock is not mobilised, and cannot be, for two reasons: (1) the CSA stock is limited and used mostly for religious events; and (2) there is a budget line to cope with these shocks but the allocated funds are insufficient. According to a high level official, food crisis is not budgeted.

In general, when these shocks happen, government officials tend to take two complementary actions: (i) they resort to development partners; and (ii) they print guaranteed letters that allow suppliers to commit and get resources from a bank. In 2013, for instance, the government emitted a special guarantee of 5 billion FCFA of which 2.6 billion were spent. In 2015, the government was able to fund its intervention through the African Risk Capacity (ARC) funds. ARC funding covered much of the operations, with 5.6 billion for food security and 3.2 billion for safeguarding livestock (cattle feed).

3.4 Food reserve and government intervention

Social Cash transfer programmes

Experience of Senegal's national conditional cash transfer programme (*Programme national des bourses de sécurité familiale - PNBSF*)

The main objective of the programme is to contribute to the fight against vulnerability and social exclusion of families through an integrated social protection scheme to strengthen their productive and educational capabilities. Specifically, the programme aims to:

1. Allocate 25,000 FCFA per quarter to 300,000 households by 2017.
2. Promote school enrolment and retention of children.
3. Ensure beneficiary households have registered their children for a birth certificate.
4. Encourage beneficiary households to regularly update of vaccination records of children aged 0-5 years.

The first and second phases (2013-2014) each covered 50,000 households. In 2015, 100,000 new beneficiaries were enrolled, bringing the number to 200,000; the goal was reached in 2016 with 300,000 households integrated. Each selected household benefits from the programme for five years; equivalent to 20 quarterly cash transfers.

Table 8: Number of National Cash transfer programme beneficiaries

Year	Number of beneficiaries	Number of Cash transfer paid
2013	50,046	90,121
2014	99,980	379,560
2015	197,751	554,927

Source: DGPSN, 2016

The PNBSF is a conditional programme with three main requirements:

1. Registration and maintenance of household children at school
2. Maintain vaccination records of children 0-5 years
3. Civil Registration

The programme seeks to gradually target all urban and rural households listed in the National Unique Registry and in extreme poverty, based on geographic, community and categorical targeting. In addition to the chronically poor, the main target of the cash conditional transfer programme, the National Unique Registry includes households who are *potentially* vulnerable so that they are easily identified during crises.

Senegal is also currently building an emergency contingency plan that includes an early warning system. It is expected that the early warning system will trigger a pre-defined set of temporary interventions and a financing strategy to respond to specific shocks or crises.[4]

Specific interventions in nutrition

Reducing child malnutrition through community intervention programmes has been one of Senegal's key strategies since 2002 under the *Programme de Renforcement de la Nutrition* – Nutrition Enhancement Programme. This programme is built around three pillars:

1. A traditional nutrition supplementation approach combining growth promotion and integrated disease control.
2. Multi-sectoral interventions with several ministries involved in programme implementation.
3. Institutional capacity building of the relevant agencies for future sustainability of the programme.

Senegal's relative success in nutrition is linked to its multi-sectoral and multiplayer intervention strategy. CLM itself is multi-sectoral in nature as it gathers, among others, all ministries concerned with nutrition. This is strengthened by an implementation scheme that guarantees stakeholder involvement at community level, thus providing a role for each actor. Consequently CLM, ministries, local elected officials, civil society organisations, and village level communities work hand in hand under the leadership of the decentralised authorities who play the key role of 'contracting authorities' for the interventions.

World Food Programme's (WFP) experiences

WFP's intervention has included several interesting experiments: (i) the distribution of food; (ii) the distribution of food stamps; and (iii) the use of village stocks. Cash transfer was also implemented, but abandoned due to high institutional costs.

What lessons from WFP's experiences? The 2012 intervention

Joint missions (government / development partners) conducted in November 2011 and February 2012 revealed that 739,000 people in rural areas were food insecure because of the scale of the agricultural production deficit. There was also an urban targeting project. In addition to geographic targeting, WFP partnered with 25 institutions/NGOs to perform the individual targeting and distribution of food assistance.

Overall, from 28 April to 31 October 2012, WFP assisted 1,080,902 food insecure people with 23,704 MT of food and 1,785,382,506 FCFA in food vouchers in 116 localities. A total of 167 village cereal

[4] World Bank: http://www.worldbank.org/en/news/feature/2016/06/20/in-senegal-a-safety-net-system-designed-to-break-the-cycle-of-poverty

banks (VCB) were supplied with 3,800 MT of cereals that benefited more than 116,019 beneficiaries. Food stamps (cash vouchers) were distributed in seven urban areas and 11 rural areas to 142,628 beneficiaries in the amount of 1,785,382,506 FCFA.

After these various interventions, WFP was able to distribute food at least twice in different target areas. In areas where food insecurity was found to be high, three to four distributions were made to the same recipients. The "food voucher" modality seems the most efficient because in the majority of targeted areas, 4-5 distributions were realised. The restocking of VCB has also been very successful.

In terms of lessons learned, it was noted that the modality Cash Voucher far outweighs the preference of households as long as the amount transferred can purchase the same amount of commodities in the food basket. Choice of modalities and mechanisms must consider the context and target group acceptability. Cash transfers may not be practical in areas where local markets are non-existent.

Imperfections in the early warning system should be corrected. Likewise, the lack of a contingency plan with an effective mechanism for whistleblowing if necessary, and the lack of adequate resource mobilisation devices, may jeopardise future interventions.

WFP encourages local food procurement. In terms of tools, “cash & voucher modalities are preferred considering the sizeable amount of cash that is injected into the local economy each time a value voucher transfer takes place. With the inclusion of local foods in the food basket, value voucher distributions help to diversify dietary intake, stimulate local agricultural production and offer a market for smallholder farmers and producers.”[5]

[5] WFP Senegal Brief: Reporting period: 01 April – 30 June 2015

Table 9: Summary of food distribution and cash by region (from 28 April to 31 October 2012)

REGION	Food & Cash	Beneficiaries	Food (MT)	CASH (FCFA)	PARTNERS
DIOURBEL	Food	53 958	1 762.43	-	SDDR, CARITAS THIES
Fatick	Food	2 232	87.01	-	CARITAS KAOLACK
Kaffrine	Food	41 107	1 052.48	-	SDDR, WORLD VISION
Kaolack	Food	20 242	746.83	-	CARITAS KAOLACK
Kaolack	Cash *	18 252	-	130 508 500	CARITAS KAOLACK
Kedougou	Food	87 005	2 332.37	-	SDDR, Croix Rouge Sénégalaise
Kolda	Food	117 768	3 040.02	-	SDDR,CARITAS KOLDA, 7A MAA REWE, World Vision
Kolda	Cash	9 750	-	138 936 000	CARITAS KOLDA,ARD KOLDA
Louga	Food	108 161	3 244.87	-	Croix Rouge Sénégalaise
Matam	Food	55 801	1 211.17	-	Croix Rouge Sénégalaise
Matam	Cash	21 863	-	198 237 000	Croix Rouge Sénégalaise
Saint louis	Food	82 912	1 826.12	-	Croix Rouge Sénégalaise
Sedhiou	Food	79 174	1 603.68		Croix Rouge Sénégalaise
Tambacounda	Food	204 783	4 382.07	-	SDDR, Croix Rouge Sénégalaise & AFRICARE
Tambacounda	Cash	30 195		291 000 506	Croix Rouge Sénégalaise
Ziguinchor	food **	85 131	2 415.00	-	AFRICARE, CICR
Ziguinchor	Cash	62 568	-	1 026 700 500	AFRICARE, CCQ, Université Ziguinchor
TOTAL food		938 274	23 704.05		
TOTAL Cash		142 628		- 1 785 382 506	
Grand Total		1 080 902			

Source: WFP, 2012

** Includes the 2nd distribution of food vouchers distributed in the department of Guinguéneo in early November.*

*** Includes a tonnage of 177 MT distributed in the department of Medina Yoro Foula at the beginning of November due to the inaccessibility of the sites.*

3.5 Governance of the food security system

Institutional changes that inhibit public interventions

In 2012, the new political regime in power made social protection a priority. Therefore, a General Delegation for Social Protection and National Solidarity (DGPSN) was created to take over this issue. DGPSN is under the supervision of the Presidency. Likewise, CSA is no longer autonomous but reports to DGPSN and has thereby lost all autonomy, including the right to have an independent bank account. The governance of food security suffered from these changes due to the anchoring of public institutions in charge of food security: DGPSSN and CSA depend on the Presidency while SE-CNSA and CLM are housed in the Prime Minister's house

Significant progress made in coordinating activities

Government institutions and development partners interested in food security issues have established channels of collaboration that facilitate interventions. Each year, a response plan is designed based on well-crafted analyses. WFP provides leadership in connection with the Executive Secretariat of the National Food Security Commission. Operationally, significant progress has been made on targeting (done in a participatory manner).

4. Conclusions

The rice self-sufficiency programme helped increase grain availability without resolving Senegal's food dependency over imports. Responses to chronic food crises involve a variety of actors who are increasingly well coordinated. The food security strategy of the country recognises the importance of the reconstruction of emergency food stocks even though the modalities for constituting these food reserves are still not clearly specified. The principle of having a mixed strategy involving on the one hand a small food reserve and on the other hand the availability of financial resources that could be mobilised when needed, seems widely shared. However, the practical arrangements are not yet specified. Of prime importance is the need for predictability of financial resources and food to deal with emergencies.

A recent study (ASIST, 2015) advocates alternatives that are worth exploring. They include:

1. The need for priority use of the government's financial reserve.
2. Establishing a financial reserve fund specifically for emergencies.
3. Strengthening the existing physical stock management mechanism.
4. Increasing the scope of the African Risk Capacity (ARC).
5. Use of the ECOWAS regional food security reserve as soon as it is operational.

A cost/benefit analysis of different alternatives could shed light on the pros and cons and provide evidence to policymakers that would guide their decisions.

References

Agence Nationale de la Statistique et de la Démographie, ANSD. (2016, Février). *Situation Economique et Sociale du Sénégal en 2013,* 350p.

Agence Nationale de la Statistique et de la Démographie, ANSD. *Note d'analyse du commerce extérieur, édition 2014,* 350p.

ASiST (2015) " Prévisibilité des dépenses publiques liées à la sécurité alimentaire et nutritionnelle au Sénégal » EU, Advisory Service in Social Transfers (ASiST III), Décembre 2015

David-Benz H. et F. Lançon « Transmission des prix internationaux du riz sur les marchés africains : le long terme, la crise de 2008… et maintenant ? », CIRAD, Powerpoint presentation, 3rd Africa Rice Congress, 21-24 October 2013,Yaounde, Cameroun.

David-Benz H., Diallo A., Lançon F., Meuriot V., Rasolofo P., Temple L., Wane A., 2010. « L'imparfaite transmission des prix mondiaux aux marchés agricoles d'Afrique Subsaharienne », CIRAD / FARM, Février 2010, 97 p.

Diarra M. M. « Mécanisme de transmission de la hausse des Prix des céréales depuis les marchés mondiaux vers les marchés du Mali et du Sénégal » FARM, Rapport de stage de fin de formation de Master 2 Professionnel « Etudes du Développement » (2007 – 2008), Mars-Août 2008.

Diop A. N. (2015). Revue des dépenses publiques de l'agriculture. Rapport MEFP & DUE. 76 pages

Genequand M. M., Pasquet J., Seck K. (2016, Février). « Evaluation à mi-parcours du Programme de Pays du PAM (2012-2016) » Rapport d'Evaluation final, Rapport nº OEV/2015/007. Retrieved June 8, 2016 from http://documents.wfp.org/stellent/groups/public/documents/reports/wfp282398.pdf

Hirsch R.D., (1979). *SENEGAL: la commercialisation du mil par l'ONCAD en 1978/1979*. Etude de cas. Colloque de Nouakchott, 2-7 juillet 1979.

Meuriot V., 2012. « Une analyse comparative de la transmission des prix pour l'orientation des politiques publiques : le cas du riz au Sénégal et au Mali » CIRAD, LAMETA, *Document de recherche* nº2012-04, Janvier 2012, 33 p.

Ndoye O., Boughton D., & Crawford E. (1991). Politique de fixation de prix des céréales au Sénégal : Synthèse d'études réalisées depuis l'installation de la nouvelle politique agricole. *ISRA, Etudes et documents*, Vol. 4, No 17, 28 p.

Programme Alimentaire Mondial, PAM. (2014, Juillet). *Analyse Globale de la Vulnérabilité, de la Sécurité Alimentaire et de la Nutrition (AGVSAN)*. Retrieved April 1, 2016, from https://www.wfp.org/content/senegal-analyse-globale-vulnerabilite-securite-alimentaire-nutrition-juillet-2014

Programme Alimentaire Mondial, PAM. (2011). Analyse Globale de la Vulnérabilité, de la Sécurité Alimentaire et de la Nutrition (AGVSAN). Retrieved April 1, 2016, from

Programme Alimentaire Mondial, PAM. (2008). Rapport d'Analyse de Marché, Senegal Commerce du riz, août 2008.

Sow A. et Newman D.M. (1988) La réglementation et l'organisation des marchés céréaliers au Sénégal: situation des campagnes de commercialisation pour les saisons 1983/84 et 1984/85, 47 p.

United Nations Development Programme, UNDP. (2015), *Human Development Report 2015, Work for human development,* 288 p.

World Food Programme – WFP (2012). Bilan de la réponse du PAM à la crise alimentaire 2011-2012.