ENDING RURAL HUNGER

The case of Senegal

October 2017

www.endingruralhunger.org

Africa Growth Initiative at BROOKINGS

Ibrahima Hathie, Boubacar Seydi, Lamine Samaké, and Suwadu Sakho-Jimbira

Dr. Ibrahima Hathie is the research director at the Initiative Prospective Agricole et Rurale (IPAR) in Senegal.

Boubacar Seydi is a statistician at IPAR.

Lamine Samaké is a research assistant at IPAR.

Dr. Suwadu Sakho-Jimbira is a senior researcher at IPAR.

Author's note and acknowledgements

This report was prepared by Dr. Ibrahima Hathie, Boubacar Seydi, Lamine Samaké, and Dr. Suwadu Sakho-Jimbira of the Initiative Prospective Agricole et Rurale as part of the Ending Rural Hunger project led by Homi Kharas. The team at the Africa Growth Initiative within the Global Economy and Development program of the Brookings Institution, led by Eyerusalem Siba and comprising Amy Copley, Christina Golubski, Mariama Sow, and Amadou Sy, oversaw the production of the report. Christina Golubski provided design and editorial assistance. John McArthur provided invaluable feedback on the report. Data support was provided by Lorenz Noe, Krista Rasmussen, and Sinead Mowlds.

The authors wish to thank Mariama Kesso Sow, Isseu Dieye, Yacor Ndione, Ahmadou Ly, Ndeye Mbayang Kébé and Mayoro Diop for their support in data collection and in interviews with key stakeholders. We are also grateful to many people (civil servants, donors, technical assistance) who have graciously accepted to share their views. This study was supported by a grant from Brookings. This paper reflects the views of the author only and not those of the Africa Growth Initiative.

The Brookings Institution is a nonprofit organization devoted to independent research and policy solutions. Its mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations for policymakers and the public. The conclusions and recommendations of any Brookings publication are solely those of its author(s), and do not reflect the views of the Institution, its management, or its other scholars.

Brookings gratefully acknowledges the Bill & Melinda Gates Foundation's support of the Ending Rural Hunger project.

Brookings recognizes that the value it provides is in its absolute commitment to quality, independence, and impact. Activities supported by its donors reflect this commitment.

Contents

List of tables and figures

Tables

Figures

Abbreviations and acronyms

AGVSAN	*Analyse Globale de la Vulnérabilité, de la Sécurité alimentaire et de la Nutrition*
CLM	*Cellule de Lutte contre la Malnutrition*
CSA	*Commissariat à la Sécurité Alimentaire*
DHS	Demographic Health Survey
ECOWAS	Economic Community of West African States
EDS	*Enquête Démographique et de Santé*
ENSAN	*Enquête Nationale de Sécurité alimentaire et de Nutrition*
ENSAS	*Enquête nationale de Sécurité alimentaire au Sénégal*
ERASAN	*Enquête Rurale sur l'Agriculture, la Sécurité alimentaire et la Nutrition*
ERH	Ending Rural Hunger
DGPSN	*Direction générale à la protection sociale et à la solidarité nationale*
FAO	*Organisation des Nations Unies pour l'Alimentation et l'agriculture*
FCS	Food consumption score
FSN	Food security and nutrition
FCFA	*Francs Communauté Financière d'Afrique*
GOANA	Great Agricultural Offensive for Food and Abundance
PAM	*Programme Alimentaire Mondial*
PNDN	*Politique Nationale de Développement de la Nutrition*
PRACAS	*Programme d'Accélération de la Cadence de l'Agriculture Sénégalaise*
PRN	*Programme de renforcement de la nutrition*
PSE	*Plan Sénégal Emergent*
SCA	*Score de Consommation Alimentaire*
SE/CNSA	*Secrétariat Exécutif du Conseil National à la Sécurité Alimentaire*
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SNSAR	*Stratégie Nationale de Sécurité Alimentaire et de Résilience*
SSA	Sub-Saharan Africa
WFP	World Food Program
WHO	World Health Organization

Abstract

Senegal is prone to food insecurity based on its low level of access to and quality of food. Using food and nutrition security (FNS) data from the global Ending Rural Hunger (ERH) project and local sources, this paper argues that poor quality of food, low diversification of diet, and consequently high prevalence of child malnutrition are the country's major FNS challenges. Vulnerability to food security is more prevalent in rural areas and in regions with low access to factors of production and markets. Senegalese policymakers should redesign FNS policies with a particular emphasis on: (i) increasing agricultural productivity through reallocation of resources towards more targeted investments in infrastructure, research, and human capital for more sustainable gains and (ii) reducing the high volatility of food production and the country's vulnerability to environmental shocks.

1. Introduction

In June 2014, at the 23rd ordinary session of the African Union Conference in Malabo, heads of states and governments of member countries, including Senegal, pledged to eliminate hunger in Africa by 2025. Efforts to achieve this objective, as set out in the Malabo Declaration, focus on improving nutritional statuses, reducing child malnutrition, and decreasing stunting of under-5 children to 10 percent and the percentage of underweight children to 5 percent by 2025. In September 2015, the international community met in New York to assess the progress of the Millennium Development Goals (MDGs) and define a new agenda for sustainable development. Consequently, the international community designated 17 Sustainable Development Goals (SDGs), among which the SDG2 is dedicated to the elimination of hunger in all its forms by 2030.

Senegal's vision for economic development as expressed in its policy document *Plan Senegal Emergent* (PSE) sets food security as one of its top priorities. Likewise, the fight against food and nutrition insecurity represents one of the main components of the *Programme d'Accélération de la Cadence de l'Agriculture Sénégalaise* (PRACAS), the agricultural component of the PSE. Moreover, within its National Strategy for Food Security and Resilience (*Stratégie Nationale de Sécurité Alimentaire et de Résilience* or SNSAR), Senegal aims to achieve this goal through the following four strategic objectives: (i) sustaining improvement in the availability of diversified, healthy, and nutritious food; (ii) enhancing the accessibility and affordability of diversified, healthy, and nutritious food to vulnerable populations; (iii) reinforcing governance and information systems for food security and resilience; and (iv) strengthening coordination capacity, prevention, and management of food crises.

These objectives relate to the present analysis conducted by using data from the Ending Rural Hunger (ERH) project. Indeed, to support the international community's commitment, the Brookings Institution's Ending Rural Hunger project provides data on the existing needs, policies, and resources of countries as they relate to food security and the realization of SDG2. The objective of this report is to identify the priority needs of Senegal with respect to food and nutrition security, analyze its policies created to fight hunger, examine the resources that support these policies, and finally recommend ways to improve the overall strategy towards hunger eradication in Senegal.

When comparing Senegal to other developing countries based on these data, the results show that the country's food and nutrition insecurity is highly correlated to the *quality* of food

consumption, although accessibility is also an obstacle. The low dietary diversification, and consequently the high prevalence of child malnutrition, remains a major challenge for Senegal. Furthermore, vulnerability to food security in Senegal varies according to sociodemographic and economic characteristics, place of residence (urban vs rural), and geographic region. Indeed, food and nutrition insecurity is more prevalent among rural populations, smaller rural households (fewer than 10 people), agricultural households, and households headed by women or youth under the age of 40. These trends can be explained mainly by their low access to factors of production or markets for selling their products or obtaining food supplies. Another factor of vulnerability is climate shocks.

Finally, food insecurity is more prevalent in the southern and eastern regions, despite their natural resource endowments and economic potential. Among the reasons for food insecurity in these regions is the instability (due to the rebel uprising for independence) that has particularly affected the southern region, leading to restricted access to forest resources and greater constraints to the cultivation of agricultural land for the majority of the population there. Moreover, the lack of roads and the poor quality of transport infrastructure are constraining factors for market access; hence this situation aggravates the lack of access to specific food products, negatively affecting food security.

Significant efforts, including the definition of strategies to combat food insecurity and malnutrition and substantial financing and infrastructure for agricultural policy implementation, have been made by public authorities to address this situation. However, the expected results are limited by the multiplicity of stakeholders involved, coupled with a lack of clear definition of responsibilities and coherent coordination of actions.

The report is divided into six sections. The next section presents the situation of food security and nutrition needs in Senegal, with a comparison to other developing countries based on ERH data and surveys such as the 2014 *Enquête Rurale sur l'Agriculture, la Sécurité alimentaire et la Nutrition* (ERASAN), the 2015 Standardized Monitoring and Assessment of Relief and Transitions (SMART), and the 2015 Demographic Health Survey (DHS). The third section presents the national strategy for the fight against hunger. The fourth section addresses policies implemented by the Senegalese government to achieve its strategic objectives. The fifth section focuses on the analysis of resources devoted towards the achievement of these objectives. The final section concludes and proposes recommendations for policymakers and donors regarding Senegal’s food and nutrition security priorities.

2. State of food security and nutrition needs in Senegal

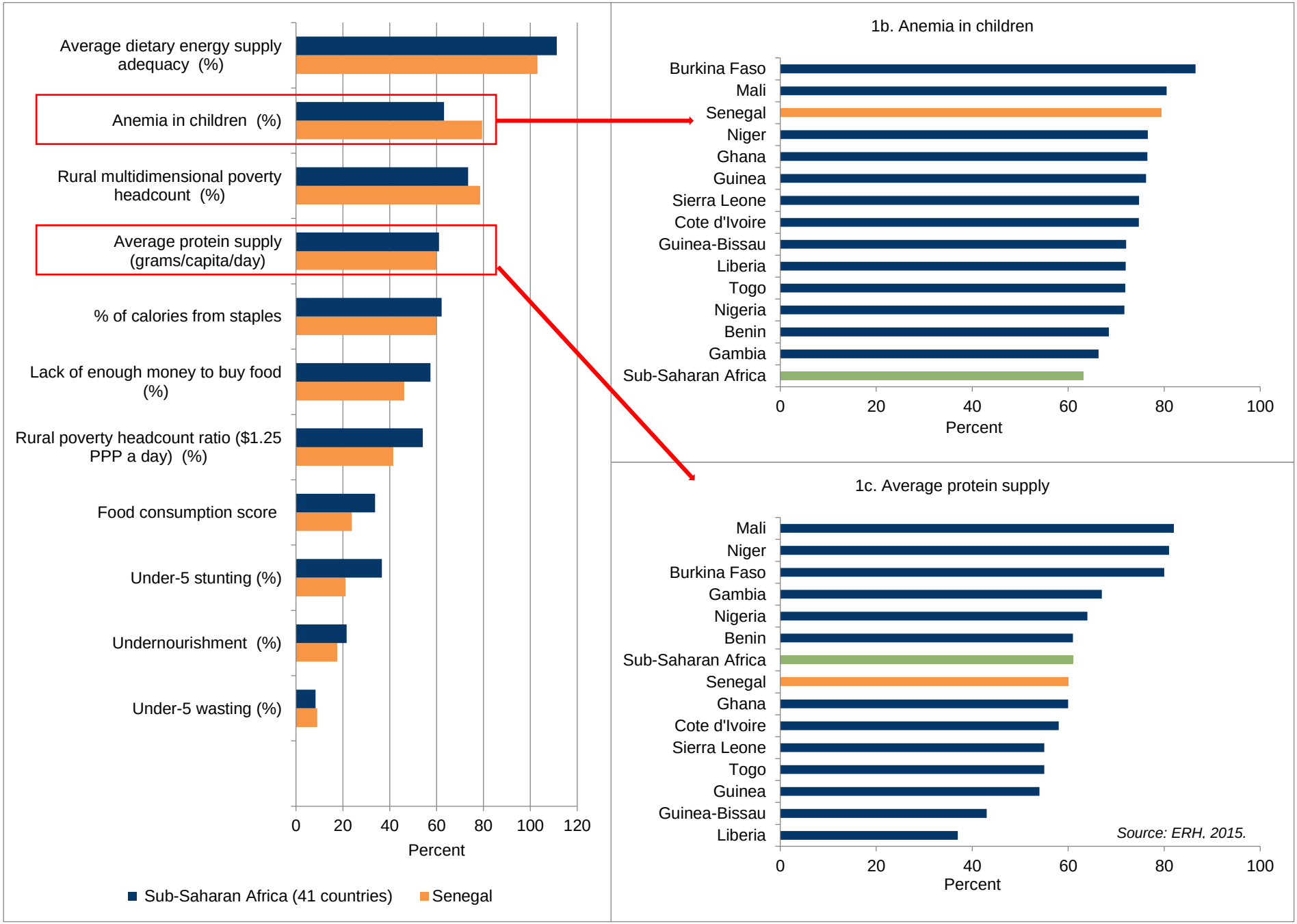
Senegal is prone to food and nutrition insecurity considering its level of access to and quality of food. According to the ERH data, the country displays problems of food access even though the comparison to regional data downplays the severity of this issue in Senegal. Two indicators of access show how Senegal underperforms compared to its counterparts: First, with regard to undernourishment, Senegal has a prevalence of 17.6 percent compared to 15.0 percent for ECOWAS and 15.3 percent for developing countries.[1] Second, when it comes to the rural multidimensional poverty headcount indicator, Senegal registers 78.6 percent while sub-Saharan Africa averages 73.4 percent and the developing country average is well below at 44.1 percent. In contrast, considering the proportion of households that lack enough money to buy food, Senegal has an edge (46.2 percent) with respect to sub-Saharan Africa (57.4 percent) (Figure 1). However, the low level of food consumption diversification and consequently high malnutrition rates among children are worrisome.

Compared to other countries in sub-Saharan Africa, diet quality seems to be a large contributor to Senegal's food insecurity. For instance, the average protein supply in Senegal is slightly less than the sub-Saharan African average. These results are corroborated by other findings for which the national supply of fish and other animal products are insufficient to meet demand. For example, the annual meat availability per person is only 12.9 kg, which is far from adequate.[2] In addition, milk production only covers up to 14 percent of protein needs (Ndione, 2010).

One of the consequences resulting from poor food diversity is the high prevalence of malnutrition. First, we note the relatively high level of anemia in children, 79 percent, which indicates that Senegal is among the top-10 developing countries with the highest prevalence of anemia in children. Second, the prevalence of under-5 wasting in Senegal is 9.1 percent while the regional average is 8.3 percent. These statistics from the ERH database confirm the findings of the Demographic Health Survey (DHS) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART) survey in 2015.

[1] Sub-Saharan Africa's higher rate of undernourishment (21.6 percent) tends to overshadow Senegal's poor performance, compared to the ECOWAS region and developing country averages.
[2] According to the FAO, per capita meat consumption below 10 kg per year is considered insufficient and could lead to malnutrition and undernourishment. Per capita meat consumption in developed countries is nearly 80 kg per year, and in developing countries it is approximately 34 kg per year.

Figure 1. Access to food and malnutrition



In fact, according to the DHS and SMART surveys, the nutrition situation in Senegal is generally precarious and rates of chronic malnutrition, acute malnutrition, and underweight children under five are high (see Table 1).

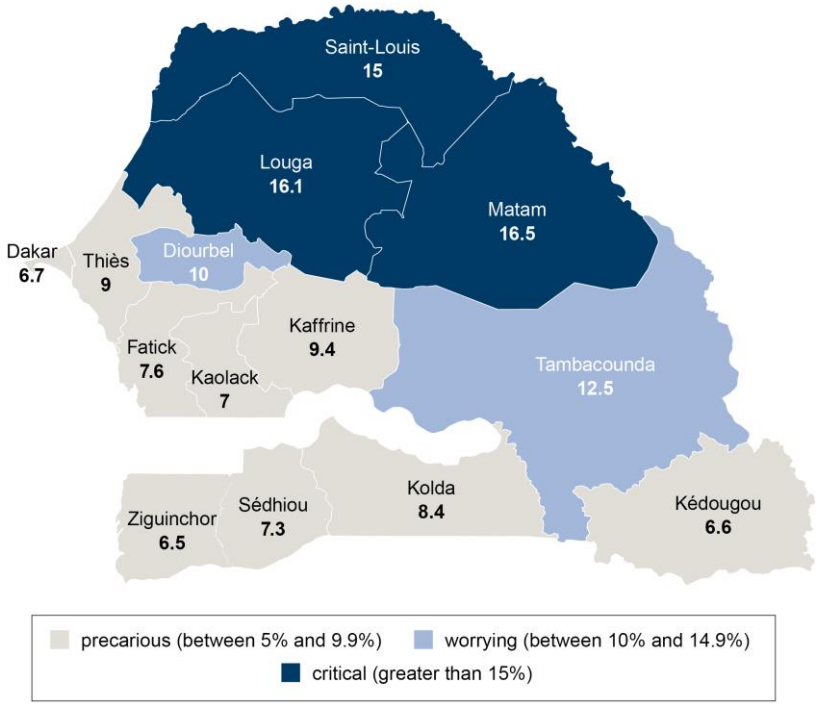
Table 1: Prevalence of malnutrition of children under 5 years

Indicators	DHS continued 2015	SMART 2015 (27 Sept. - 02 Dec.)
Chronic malnutrition among children under 5 years	21%	17%
Acute malnutrition among children under 5 years	8%	9%
Underweight children under 5 years	16%	13%

Source: MAER, RCSA, 2016.

Senegal is in a precarious situation of acute malnutrition, with 9 percent of children affected according to the results of the SMART 2015 survey.[3] The prevalence of acute malnutrition has stayed fairly consistent over time, according to the results of the DHS 2015 (Figure 2). Regional disparities in FNS status also persist. For instance, acute malnutrition exceeds the threshold defined by the WHO in northern Senegal while stunting remains higher in the south.

Figure 2. Prevalence of acute malnutrition in Senegal



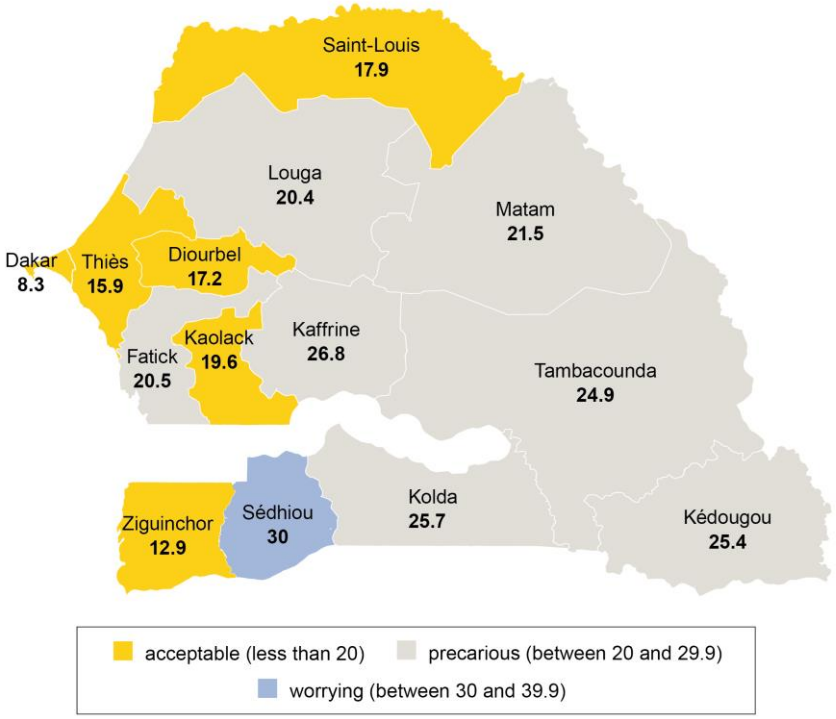
Source: SMART, 2015.

[3] According to the SMART 2015 survey, acute malnutrition is considered "acceptable" if the rate is less than 5 percent, "precarious" if the rate is comprised between 5 percent and 9.99 percent, "worrying" if the rate is between 10 percent and 14.99 percent, and "critical" if the rate is greater than 15 percent.

Despite some progress in the reduction of chronic malnutrition over the period 2011-2014, its prevalence rate remains high at 21 percent in 2015, with Sédhiou facing the most critical situation (see Figure 3).[4]

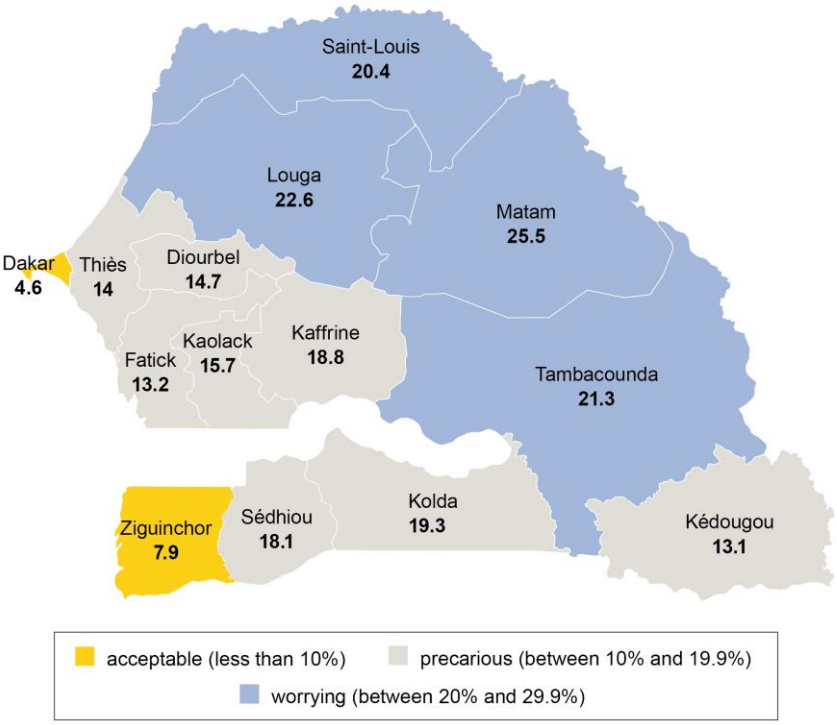
Overall, Senegal is in a precarious state in terms of the prevalence of underweight children, with a national prevalence rate estimated at 13.9 percent according to the SMART 2015 survey. According to the DHS 2015 results, 18 percent of children living in rural areas are underweight, against 10 percent in urban areas. There are regional disparities in terms of where the prevalence of underweight children is the highest (Figure 4), but also disparities in terms of poverty status and gender. Children in poor households are also more likely to be underweight (21 percent of children in the poorest quintile compared to 18 percent of children of the wealthiest quintile), and there is a higher share of underweight boys (17 percent) than girls (14 percent).

Figure 3: Prevalence of chronic malnutrition in Senegal



Source: SMART, 2015.

Figure 4. Prevalence of underweight children in Senegal



Source: SMART, 2015.

[4] According to the SMART 2015 survey, chronic malnutrition is considered "acceptable" if the rate is less than 19 percent, "precarious" if the rate is between 20 percent and 29 percent, "worrying" if the rate is between 30 percent and 39 percent, and "critical" if the rate is greater than 40 percent.

2.1. Factors explaining FNS in Senegal

2.1.1 Lack of access to food

The high level of food insecurity in Senegal can be attributed to a number of factors, including low levels of economic and physical access to food. Looking at the financial capacity to buy food, we note that almost half of survey respondents from a Gallup World Poll in Senegal lacked enough money to buy food at least once during the 12 months preceding the survey—although the rate is still higher for Africa generally (ERH database, 2015). In the context of absolute poverty, more than 2 households out of 5 are poor in Senegal (Table A1 in the Annex). With regard to multidimensional poverty, which takes into account access to health services and education, we note that nearly 4 out of 5 households are poor.

Food is an important expenditure item in the household budget in Senegal. However, due to low purchasing power and high poverty, the food and nutritional needs of the population are not completely satisfied. In addition, people can be subject to food price shocks, especially for grain, which is an obstacle to adequate access to food. In 2014, for example, prices increased by 25 percent, 19 percent, and 28 percent respectively for the cereals millet, sorghum, and maize, compared to their average 2010-2014 levels (SNSAR, 2015).

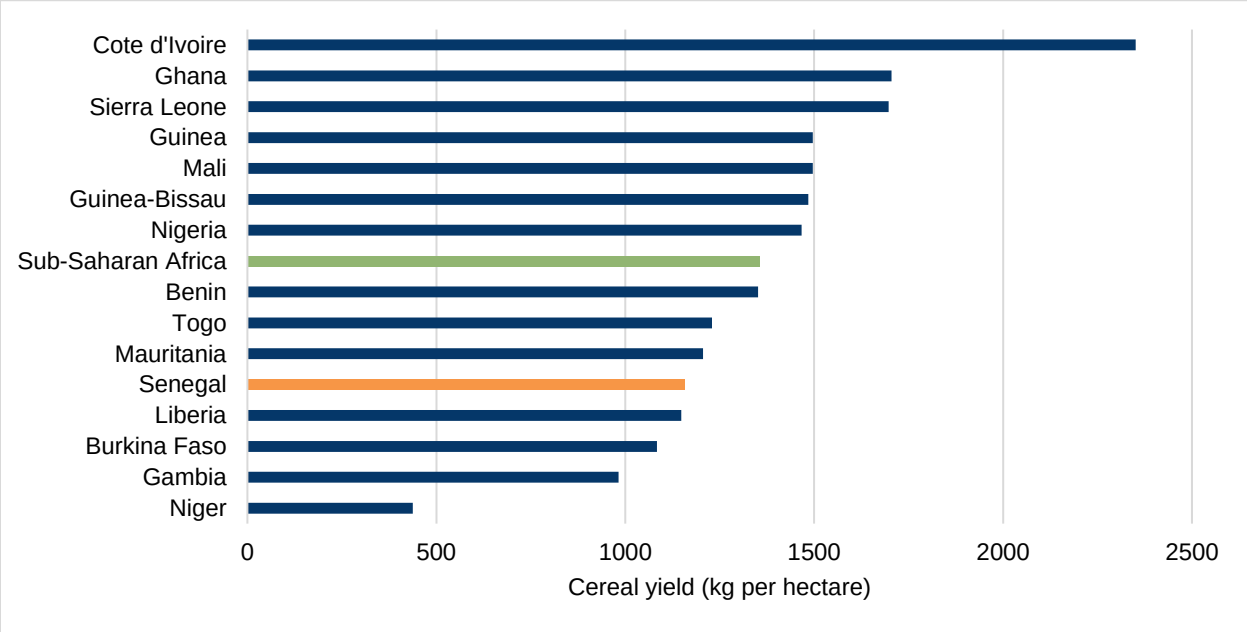
FNS in Senegal is also limited by physical accessibility due to the isolation of some production areas such as the Southern and Eastern regions. According to the ERH data, road density is very low for Senegal—ranked 11th and 23rd in ECOWAS and sub-Saharan Africa, respectively—which limits opportunities to connect farmers with markets and consumers. Poor quality road networks are also constraints for food supply particularly during the rainy season. In addition, inadequate storage and processing facilities disrupt regular access to food throughout the year.

2.1.2 Agriculture productivity gap

The existence of substantial, healthy, and adequate food production is one of the conditions for having adequate food accessibility and thus robust food and nutrition security. Regarding agricultural productivity, Senegal is far below the sub-Saharan African average for both cereal yields and agricultural value added per worker according to the ERH data (see Figures 5 and 6). The average cereal yield in developing countries is double that of Senegal's yield, that is 2432.4 kg/ha against 1157.3 kg/ha (Table A2 in the Annex). Similarly, in terms of agricultural value added per worker (Figure 6), Senegal is in 10th place within the group of Economic Community of West African States (ECOWAS) countries and 22nd in sub-Saharan Africa. Cereal production, the level

of availability corresponding to 1,251,248 tons in 2014/2015 shows a decrease of 241,372 tons (16 percent), compared to the average of the last five years (estimated at 1,492,620 tons over 2010-2014) (SNSAR, 2015). Horticultural production, including the production of vegetables, has increased over time due to improved yields and an increase in areas under production. To supplement the inadequate domestic production, particularly for cereals and animal products, significant amounts of food are imported to cover the country's production deficit. Over the period 2009-2011, the dependency ratio on cereal imports was 46.9 percent, indicating that almost half of the cereal requirement is imported.

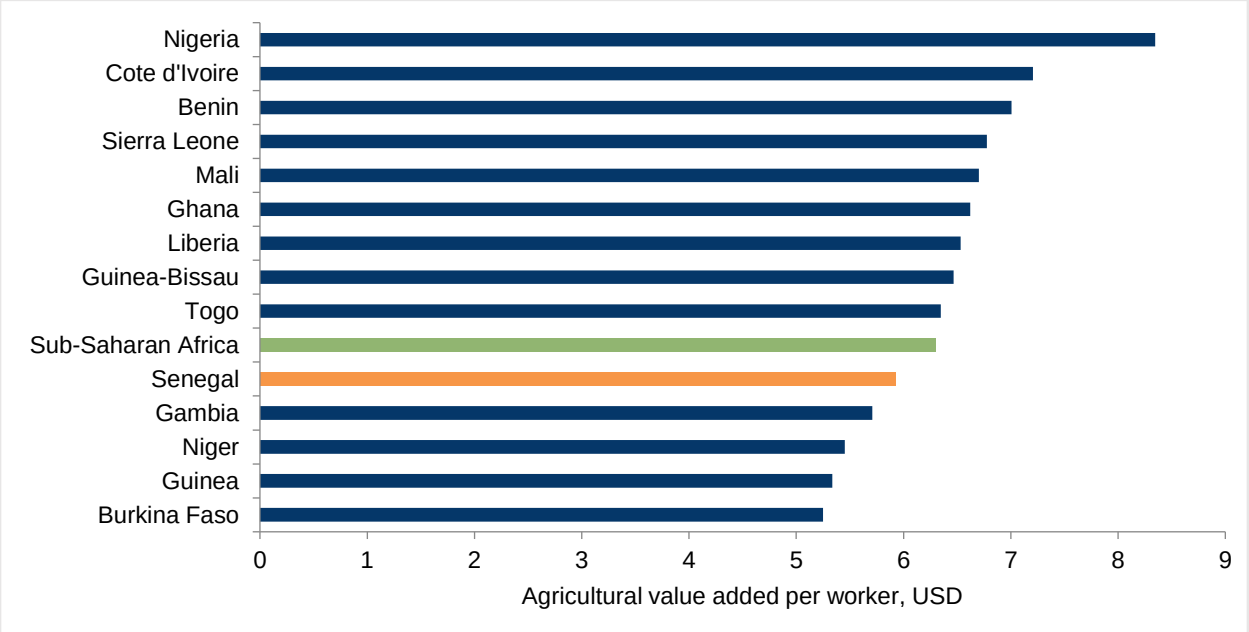
Figure 5. Cereal yield, ECOWAS



Source: ERH, 2015.

Overall, the gap in agricultural productivity can be explained in large part by the low level of access to factors of production (e.g., inputs, infrastructure, and technology). Indeed, the comparison of indicators across countries shows that those who have better access to inputs (fertilizers, finance, infrastructure, irrigation systems, etc.) have higher agricultural productivity. Senegal is below regional averages when it comes to several of these production factors, including arable land equipped for irrigation, road density, and account at a formal financial institution (see Table A2 in the Annex). Still, it performs better than the sub-Saharan African average on other indicators, such as the percent of area devoted to modern varieties, access to agricultural input markets, distance to fertilizer index, and access to financing for farmers.

Figure 6. Agricultural value added per worker, ECOWAS



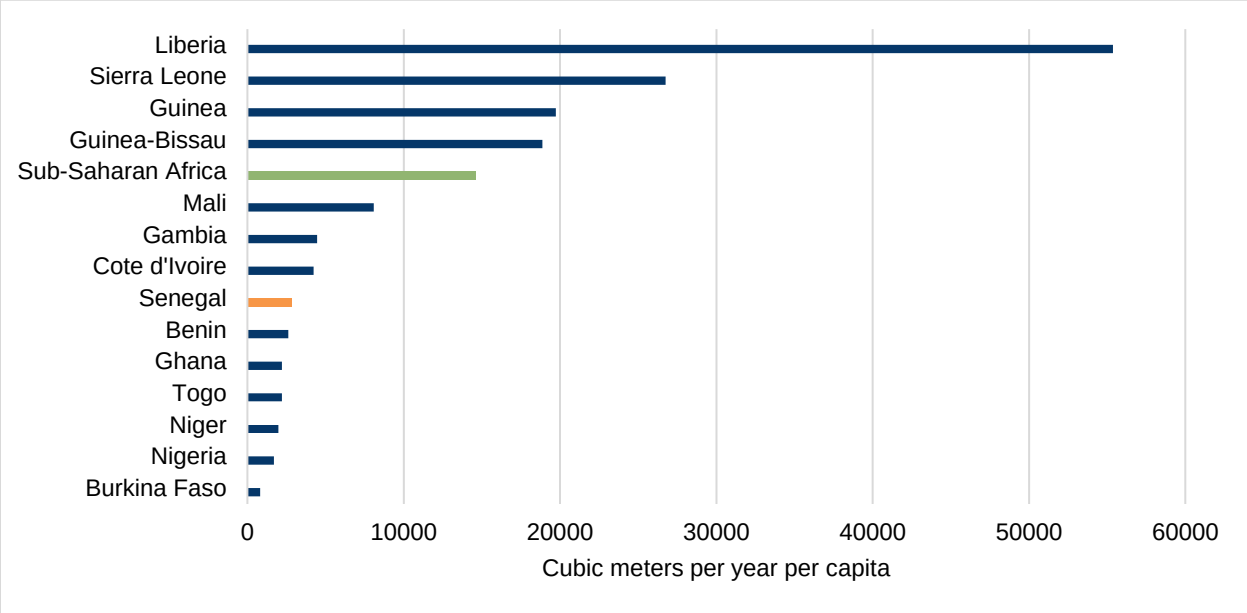
Source: ERH, 2015.

2.1.3 Poverty and vulnerability to shocks

While the rural poverty rate remains high in Senegal at 41.5 percent, it remains below the regional average of 51.4 percent. The multidimensional poverty rate is also very high for Senegal (78.6 percent), surpassing the regional average (73.4 percent). Moreover, Senegal stands out in terms of the high volatility of food production (in USD/person) with a coefficient of variation of 0.08, the highest level in sub-Saharan Africa, which increases the country's FNS vulnerability. The lack of storage infrastructure and transport problems also constitute constraints for the stability of food supply. Given that rural households typically spend more than half of their budget on food, they are particularly vulnerable to food production shocks and resulting price shocks.

Furthermore, the ERH database's analysis of environmental shocks shows a projected decline in crop yields of 31 percent due to climate change. Twenty-two percent of land in Senegal has low soil organic content and high soil erosion, making it susceptible to land degradation (Table A3 in the Annex). Production and food supply are erratic in Senegal due to dependency on rain-fed agriculture, and thus climatic conditions and water availability. When considering renewable water resources (in cubic meters per year per capita), the value observed in rural Senegal (2839) is lower than one-fifth of the sub-Saharan African average (14,593.9) (Figure 7). Increasing the availability of water is thus an important move in improving productivity especially for crops like millet and maize as well as in irrigated products like rice.

Figure 7. Renewable water resources, ECOWAS

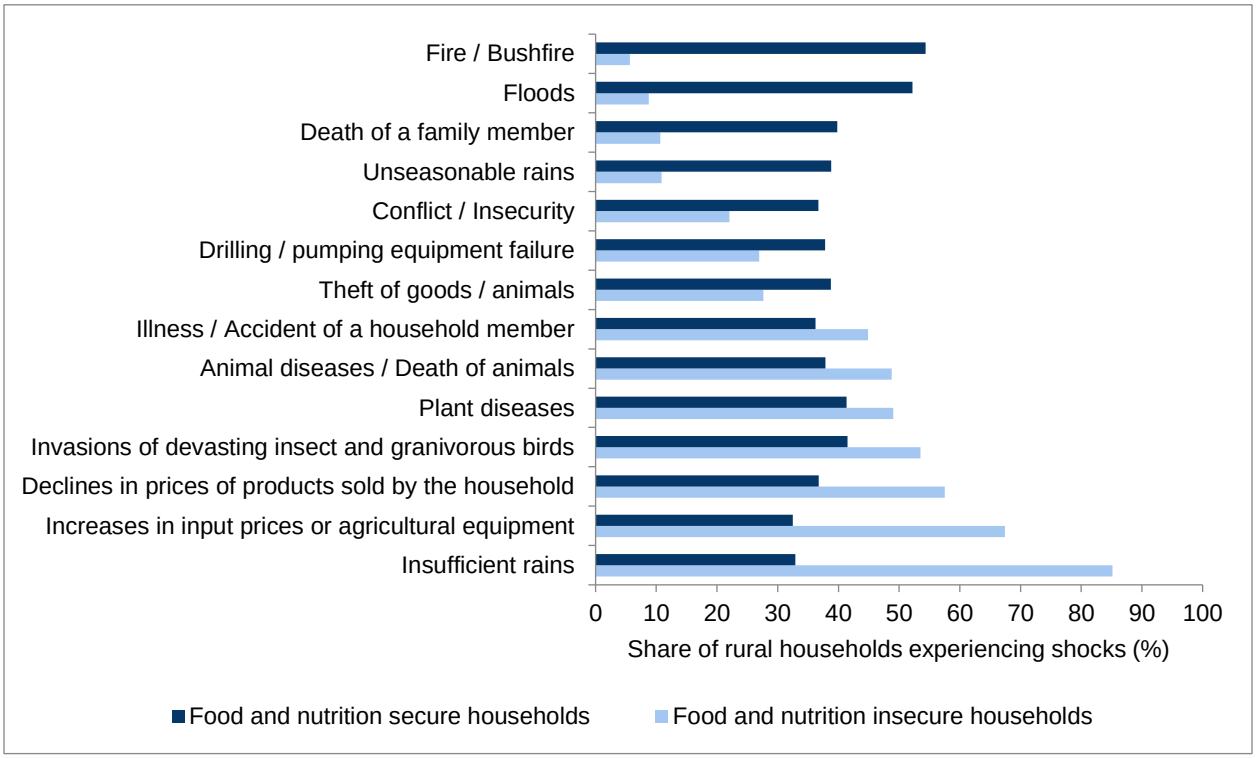


Source: ERH, 2015.

According to the ERASAN survey (2014), the lack of rain, rising food and input prices (including that of farm equipment), and lower prices of products sold by households are the most frequent shocks and prove to be the most devastating for food-insecure populations, leading them to adopt a reduction in food consumption as a coping strategy (see Figure 8). In contrast, fires, floods, death of a family member, and unseasonal rains are the rarest types of registered shocks, but when they do occur, they also adversely affect households' food security.

The analysis of the state of food and nutrition security in Senegal, in addition to the importance and specificity of the identified gaps compared to other countries, particularly in sub-Saharan Africa, shows the need to focus on improving food quality as one of the top priority areas for Senegal. Strengthening the quality of food must go with dietary diversification and an increased consumption of foods high in calories and protein. Senegal also needs to address the low level of agricultural productivity through improved access to factors of production (inputs, infrastructure, and technology). Addressing vulnerability to climactic and economic shocks is also needed to ensure stable food production, supply, and access. Scaling up the best practices of agricultural insurance such as the weather index insurance in the predominantly rain-fed regions could be a viable option in this respect. In addition, interventions could also focus on promoting village- and district-level cereal stocks (cereal banks) that could provide communities with food during the lean season and when environmental shocks hit.

Figure 8. Shocks leading households to reduce food consumption by household food security status



Source: ERASAN, 2014.

2.2 Spatial and socioeconomic analysis of FNS in Senegal

In this subsection, we analyze the situation of FNS in Senegal by assessing household food consumption through the food consumption score (FCS) (see methodology in Box 1 in Annex 4).[5] This score is an indicator of food access and the quality of food consumption in households calculated from: (i) dietary diversity (the number of food groups consumed by a household during the seven days preceding the survey); (ii) consumption frequency (number of days in which a food group has been consumed during the seven days preceding the survey); and (iii) nutritional importance of the different food groups. Three synthetic scores are used: (i) “acceptable” (42.5-112); (ii) “limited” (24.5-42); and (iii) “poor” (0-24). Our analysis is based on the results of the 2014 ERASAN survey with a particular emphasis on social, economic, and spatial dimensions.

Figure 10 and Table 2 give an overview of the food insecurity at the department[6] level. Table 2 shows the proportion of households with poor, limited, and acceptable FCS by department.

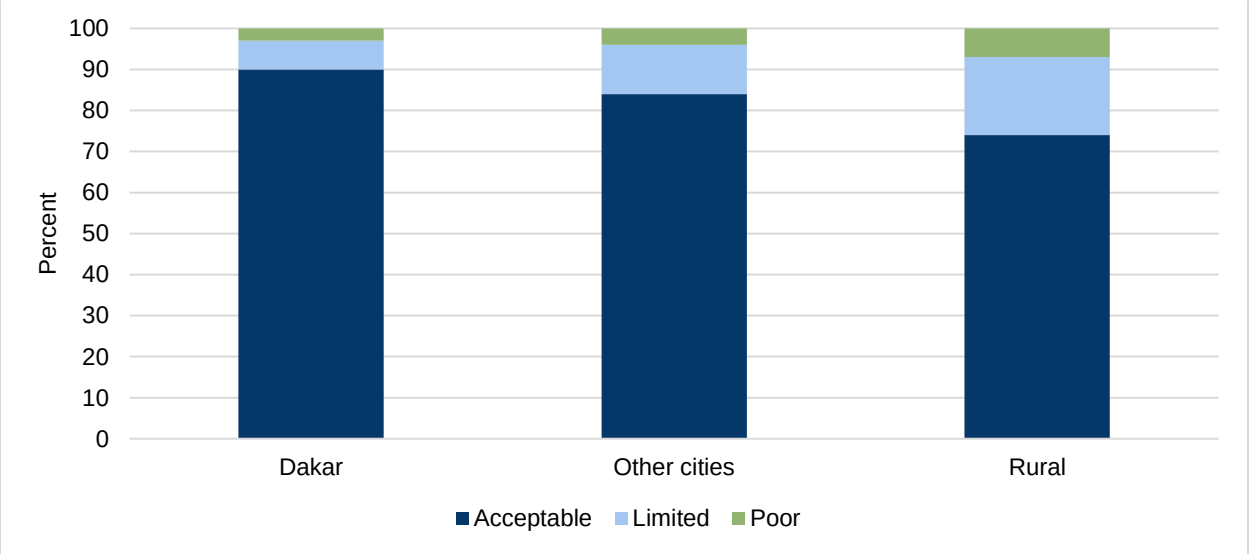
[5] Please note that the methodology for calculating the FCS used in the 2014 ERASAN survey differs from the methodology used to calculate the ERH FCS value. For more information on the ERH FCS methodology, see: https://endingruralhunger.org/methodology/.
[6] A department is an administrative subdivision of a region. There are 14 regions in Senegal and 45 departments. Each region is comprised of 3-4 departments.

According to Figure 10, the highest prevalence of food and nutrition insecurity are located in the southern regions, followed by the eastern and central-western regions.

2.2.1 Spatial dimension

Rural areas in general and in the south and east regions in particular are disadvantaged in terms of food security. While 74 percent of households in rural areas have an acceptable FCS, cities fare much better: About 90 percent in Dakar and 84 percent in other cities have an acceptable FCS (see Figure 9). The higher FCS in cities could be explained by greater dietary diversification with regular intake of animal protein and dairy products, in contrast to rural households. The level of income, availability of agricultural products, and food habits are also important factors of differentiation.

Figure 9. Breakdown of households by level of food security and area of residency

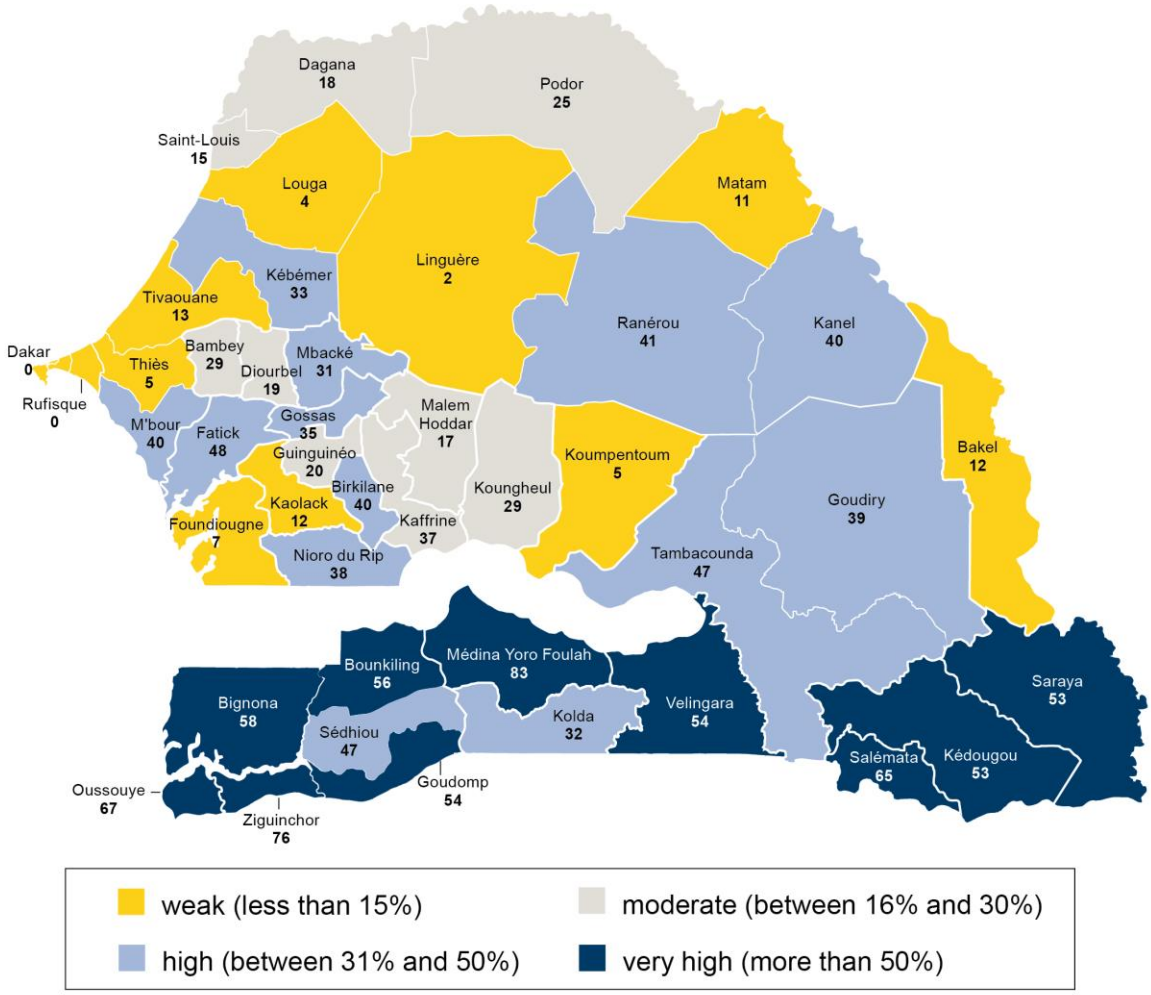


Source: ENSAN, 2013.

The analysis of food consumption scores (Figure 10) by region shows that the southern and eastern regions of Ziguinchor (67.0 percent), Kédougou (56.9 percent), and Kolda (56.3 percent) and Sédhiou (52.3) have relatively high proportions of households whose food consumption is considered poor and limited, compared to the regions of Dakar (0 percent), Louga (17.4 percent), and Tambacounda (18.9 percent), which have the lowest percentages of their populations in the poor and limited FCS categories.[7]

[7] Ziguinchor and Kolda have conducive climates to produce food. Insecurity, however, has been a major impediment to agricultural production in Ziguinchor. For Kolda, lack of infrastructure has been a significant barrier. The situation of Kédougou could be explained by its geographical isolation with regard to urban centers and markets, as well as the lack of reliable transport infrastructure, which would otherwise facilitate better access to markets.

Figure 10. Prevalence of food insecurity in Senegal



Source: ERASAN, 2014.
Note: The level of food and nutrition insecurity is determined by the percentage of the population falling under the poor or limited FCS categorizations. Departments with "weak" food and nutrition insecurity are those where fewer than 15 percent of the population falls into the poor or limited FCS categories; "moderate" food and nutrition insecurity exists where 16-30 percent of the population falls into the poor or limited FCS categories; "high" food and nutrition insecurity occurs where 30-50 percent of the population falls into the poor or limited FCS categories; and "very high" food and nutrition insecurity takes place where over half of the population falls into the poor or limited FCS categories.

Table 2: Food security by department

Department	FCS			Department	FCS			Department	FCS		
% row	Poor	Limited	Acceptable	% row	Poor	Limited	Acceptable	% row	Poor	Limited	Acceptable
Dakar	**0.0**	**0.0**	**100.0**	**Kédougou**	**22.9**	**34**	**43.1**	**Sédhiou**	**16.8**	**35.5**	**47.6**
Rufisque	0.0	0.0	100.0	Kédougou	33.9	18.6	47.5	Bounkiling	23.6	31.9	44.4
Diourbel	**10.9**	**15.6**	**73.5**	Salémata	25.6	39.5	34.9	Goudomp	12.3	42.0	45.7
Bambey	12.9	16.4	70.7	Saraya	9.1	43.9	47.0	Sédhiou	14.5	32.7	52.7
Diourbel	2.7	16.4	80.8	**Kolda**	**30.5**	**25.8**	**43.7**	**Tambacounda**	**7.6**	**11.3**	**81.0**
Mbacke	17.0	14.0	69.0	Kolda	6.8	25.0	68.2	Bakel	3.9	8.5	87.6
Fatick	**14.1**	**16.1**	**69.8**	Médina Yoro Foulah	67.5	15.6	16.9	Goudiry	19.0	20.2	60.7
Fatick	24.8	23.4	51.7	Velingara	17.2	36.8	46.0	Koumpentoum	0.0	5.2	94.8
Foundiougne	2.2	5.1	92.7	**Louga**	**2.9**	**14.4**	**82.6**	Tambacounda	26.8	20.1	53.0
Gossas	15.3	19.8	64.9	Kébémer	5.8	26.7	67.5	**Thiès**	**5.1**	**17.5**	**77.4**
Kaffrine	**12.05**	**18.7**	**69.3**	Linguère	0.0	2.2	97.8	M'bour	9.9	29.8	60.3
Birkilane	17.3	22.3	60.4	Louga	1.9	2.5	95.6	Thiès	0.3	5.1	94.6
Kaffrine	17.2	19.7	63.1	**Matam**	**14.4**	**16.3**	**69.4**	Tivaouane	6.5	6.5	87.0
Kounghuel	11.6	17.4	71.1	Matam	0.0	11.1	88.9	**Ziguinchor**	**32. 7**	**34.3**	**33**
Malem Hoddar	2.1	15.3	82.6	Kanel	21.1	19.1	59.9	Bignona	17.5	40.9	41.5
Kaolack	**10.7**	**12.5**	**76.8**	Ranérou	22.0	18.7	59.3	Oussouye	26.0	41.1	32.9
Guinguinéo	6.2	13.7	80.1	**Saint Louis**	**6.5**	**12.7**	**80.7**	Ziguinchor	54.5	21.0	24.6
Kaolack	3.0	8.5	88.5	Dagana	8.3	9.5	82.1				
Nioro du Rip	22.9	15.3	61.8	Podor	8.6	16.2	75.2				
				Saint Louis	2.7	12.5	84.8				

Source: ERASAN, 2014.

However, there are also intra-regional differences masked by the regional data. Matam is an illustrative case. Indeed, the Matam region has a high rate of food insecurity (poor and limited) at 33 percent, due to the high rate of food insecurity of the Ranérou department (40.65 percent, the 14th highest rate nationally out of 42 departments); while the Matam *department*, which is in the same region, is characterized by a lower rate of food insecurity (seventh nationally with a rate of 11.11 percent). The same holds for the regions of Kolda, Ziguinchor, and Kaolack, as some departments within the region have much higher rates of food insecurity than the regional average.

Moreover, the 10 departments most exposed to food insecurity in Senegal are all located in the southern part of Senegal, despite the area's significant natural resource endowments. As stated earlier, this situation is due to years of instability generated by recurrent clashes between military forces and rebel groups fighting for independence. Booby traps and land mines spread throughout the forest prevent the rural population from exploiting the forest resources and cultivating land.

Table 3: Number of food groups consumed by the household during the 7 days prior to the interviewer coming the house, percent of respondents

Region	Less than 4	Between 5 and 6	More than 6
Dakar	0	40.6	59.4
Diourbel	27.4	48.6	24.1
Fatick	22.4	50.4	27.2
Kaffrine	40	48.8	11.2
Kaolack	16.5	54.5	29
Kédougou	53	39.3	7.7
Kolda	44.2	33.2	22.6
Louga	6.3	31.2	62.5
Matam	43.6	36.4	20
Saint Louis	12	52.5	35.5
Sedhiou	42.8	44.3	12.9
Tambacounda	29.4	44	26.6
Thiés	7.4	39	53.6
Ziguinchor	43.8	44.3	11.9
Total	**27.1**	**44**	**28.9**

Source: ERASAN, 2014.

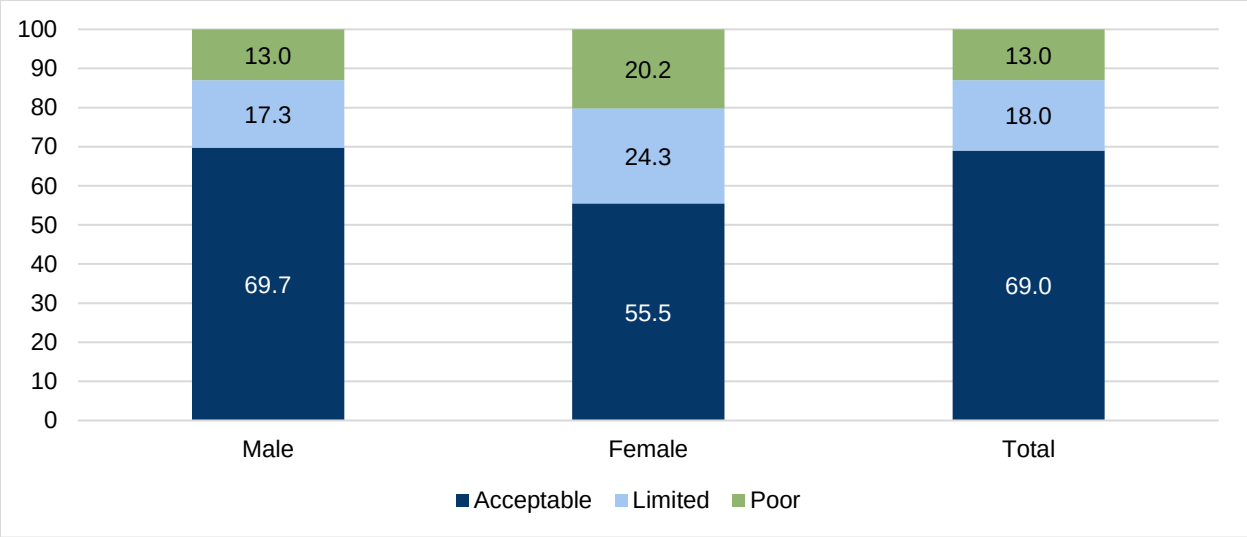
In terms of food diversification, as seen in Table 3, the Louga region stands out positively with 62.5 percent of households consuming more than six food groups, followed by the regions of Dakar (59.4 percent), and Thies (53.6 percent). On the other hand, diversification is lower in the

regions of Kédougou, Kolda, Ziguinchor, Matam, and Sédhiou where the proportion of households consuming less than four food groups is higher.

2.2.2 Social dimension

Households headed by men display higher levels of food security. According to the 2014 ERASAN survey, in rural areas 70 percent of male-headed households have an acceptable food consumption score, compared to 55.5 percent of female-headed households (Figure 11). This trend is explained in part by the higher levels of poverty and vulnerability of female-headed households because of their limited access to production factors (e.g., inputs, land, and credit) and the social impediments against women in rural settings (IPAR, 2015a).

Figure 11. Distribution of food security by gender



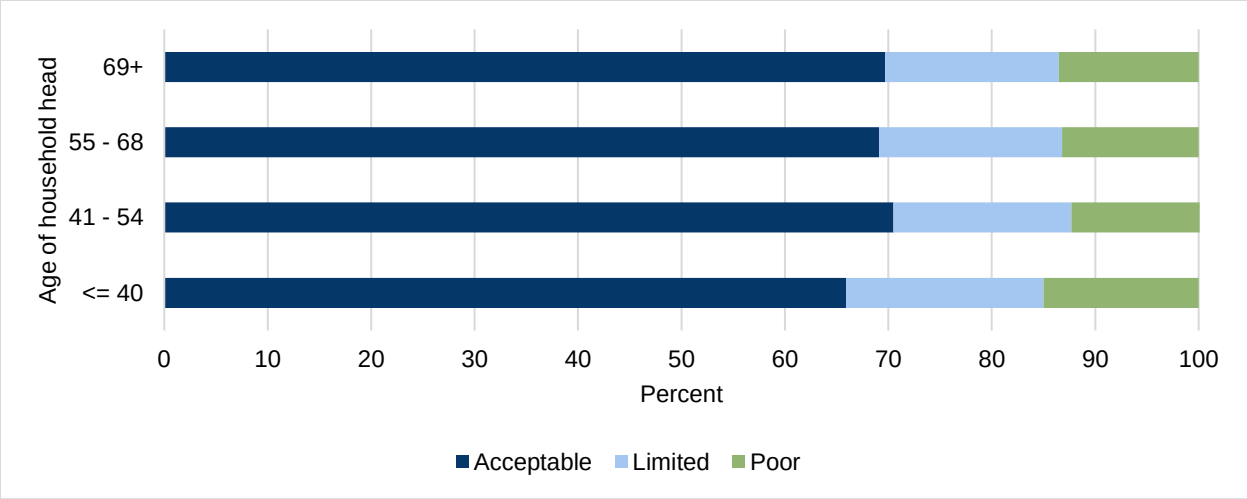
Source: ERASAN, 2014.

Furthermore, households headed by young people are slightly more likely to be food insecure (Figure 12). According to ERASAN (2014), when the age of the household head is below 40 years, the share of households with an acceptable level of food consumption is marginally lower, while those with poor and limited food consumption is higher.

Large households display more satisfactory levels of food security. According to the 2013 census on Population, Settlement, Agriculture and Livestock (*Recensement Général de la Population, de l'Habitat, de l'Agriculture et de l'Elevage* or RGPHAE), the average household size in Senegal is eight persons. However, there are differences between rural and urban areas. The average size in urban areas is seven persons, while it is 10 in rural areas. The analysis of food consumption by area of residence displays different consumption levels according to the household size.

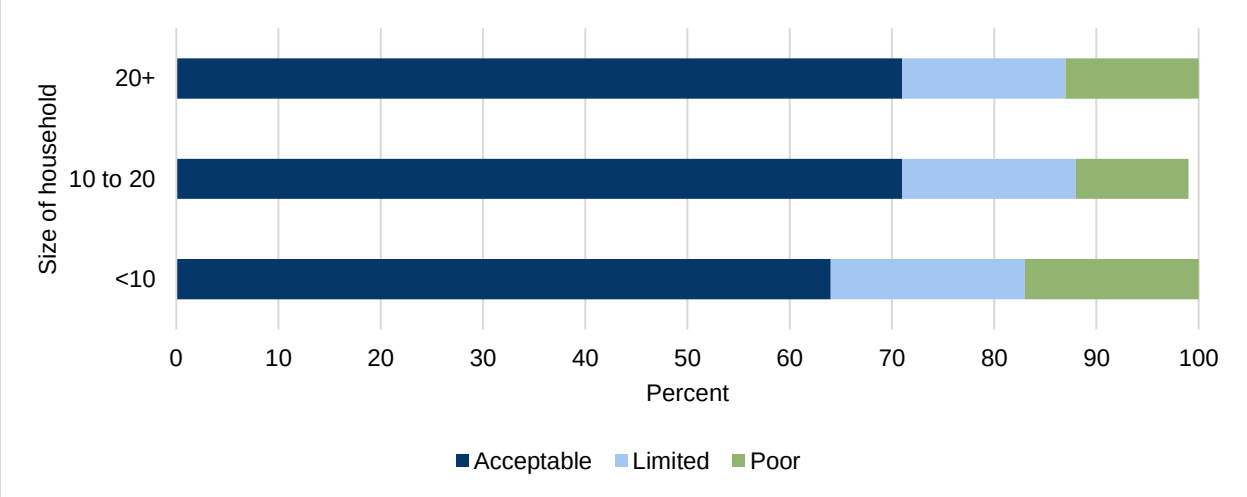
Indeed, in rural areas, 71 percent of households with 10 or more people have an acceptable level of food consumption (Figure 13). This figure is 64 percent for households with fewer than 10 members. In rural areas, where agriculture is the main economic activity, the level of household wealth is mostly proxied by land endowments, livestock, and household size. The latter is also highly correlated to the agricultural labor force of the household. The low skilled labor force and the traditional character of agriculture in rural areas explain why labor availability is a crucial determinant of the level of household production. Thus, all things being equal, households with more individuals tend to have more labor available for agricultural production and therefore have better food security.

Figure 12. Distribution of food security by age of household head



Source: ERASAN, 2014.

Figure 13. Distribution food security in rural Senegal by size of household



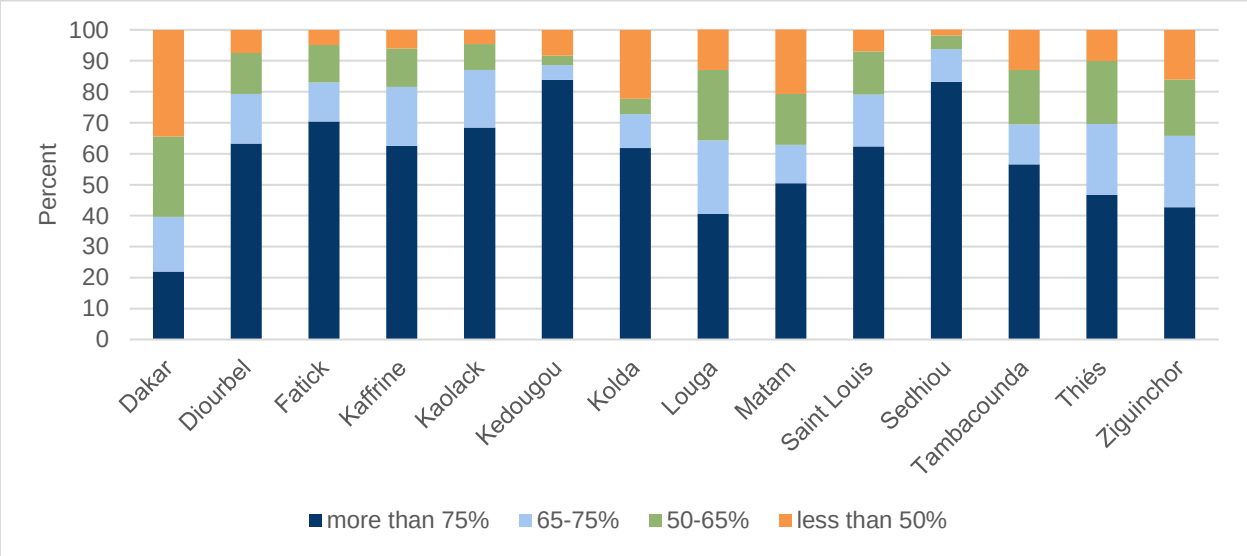
Source: ERASAN, 2014.

2.2.3 Economic dimension

Rural households generate the majority of their income from agriculture. In the ERASAN survey, 71 percent of the households list agriculture as their main activity. At the national level, food is a major expenditure item in household budgets, with 58.2 percent of households spending more than 75 percent of their expenditures on food and only 12 percent of households spending less than 50 percent of their expenses on food. In eight regions (Diourbel, Fatick, Kaffrine, Kaolack, Kédougou, Kolda, Saint Louis, and Sédhiou), over 60 percent of households spend more than 75 percent of their expenditures on food.

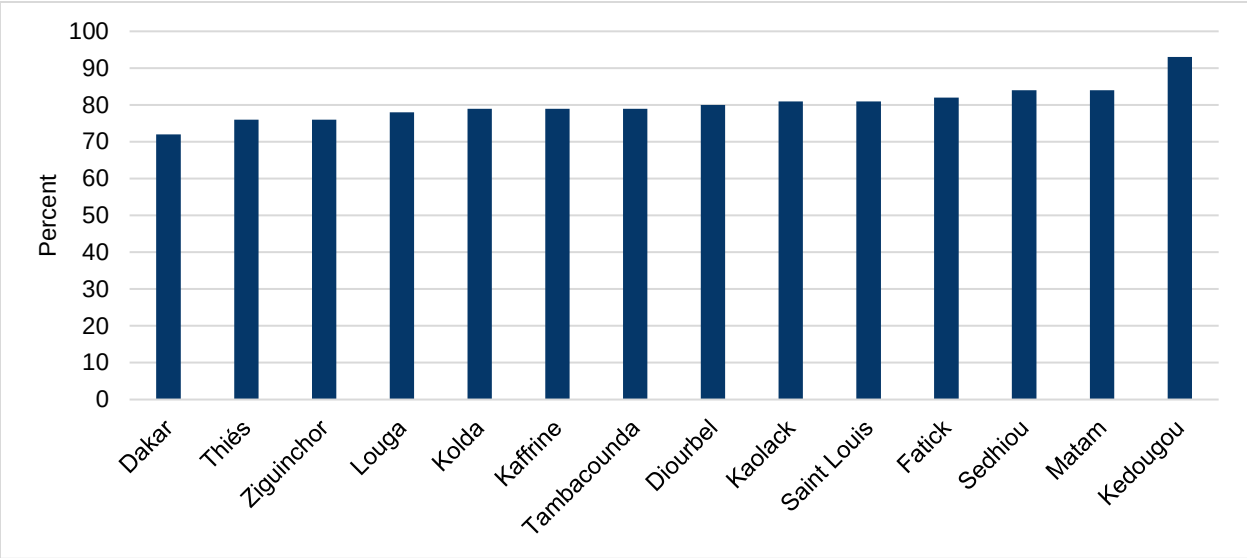
However, it is noteworthy that even among regions with an acceptable FCS, 69.5 percent of households spend more than 75 percent of their budget on food, suggesting a pronounced vulnerability of households to shocks, including changes in prices and production. High shares of household expenditures on food could be attributed to the rapid depletion of stocks resulting from longer lean periods for net sellers of food. The level of poverty is also a contributing factor. Households are thus obliged to meet their food needs through greater allocation of their income to food expenditure.

Figure 14. Distribution of food expenditure by region



Source: ERASAN, 2014.

Figure 15. Share of spending on food per household by region



Source: ERASAN, 2014.

We have seen in this section, specifically around the food consumption score that Senegal suffers from a lack of dietary diversification. Malnutrition is a serious issue, and anemia is both a concern and a challenge, as efforts made over time seem to generate very few effects. The low quality of food characterized by low dietary diversification could partly be the cause of the high levels of malnutrition recorded in Senegal, resulting in high rates of children with anemia or who are underweight. Regarding agricultural productivity, Senegal is below the regional average on both cereal yields and agricultural value added per worker. Overall, the highest food insecurity rates are in the southern and the eastern regions. Rural populations, particularly agricultural households, households with fewer than 10 members, and households headed by women or persons under 40 are the most affected by food insecurity. High levels of absolute and multidimensional poverty, instability in the southern regions, geographic isolation from markets and reliable transport networks, pronounced vulnerability to household production and food price shocks, and gender biases in access to productive resources are also contributing factors to food insecurity.

3. Country strategy to achieve SDG2

Since 2012 and the advent of the second political regime change (*2e alternance*), Senegal has adopted the *Plan Senegal Emergent* (PSE) with a 2035 horizon. The first pillar of the PSE is "structural transformation of the economy," which considers agriculture a major driver. Food and nutrition security is a priority objective of the PSE and occupies a prominent place in the "Program for the Acceleration of the Pace of the Senegalese Agriculture" or PRACAS, the agricultural component of the PSE. This plan aims to reach food and nutrition security by prioritizing the development of crops with greater value added such as horticultural crops. In terms of nutrition, crops such as cowpea and sweet potato are especially encouraged.

In 2015, Senegal developed and validated two important documents for food and nutrition security: the National Strategy for Food Security and Resilience (SNSAR), 2015-2025 and the National Policy for the Development of Nutrition (PNDN), 2015-2025. The objective of the SNSAR is to ensure that the Senegalese people enjoy sustainable food security and better resilience to shocks by 2035. The strategy is based on four key areas: (i) sustaining improvement in the availability of diversified, healthy, and nutritious food; (ii) enhancing the accessibility and affordability of diversified, healthy, and nutritious food to vulnerable populations; (iii) reinforcing governance and information systems for food security and resilience; and (iv) strengthening coordination capacity, prevention, and management of food crises. It aims to create an adequate framework for the harmonization of various interventions regarding food security and resilience, provide strategic guidance and priorities in food security and resilience, and take into account the protection of rural populations' livelihoods through a strengthening of their productive capacities and resilience to shocks.

The PNDN strives to optimize nutrition for all Senegalese. After the approval of the document by the ministerial council, efforts were focused in the development of a Multi-sectoral Strategic Plan of Nutrition (PSMN) in 2016. The PSMN was finalized in 2017. The focus of the strategic plan includes: (i) prevention of malnutrition and noncommunicable diseases related to food; (ii) combating micronutrient deficiencies; (iii) enhancing the availability and accessibility of foods that are diverse, healthy, and of high nutritional value; (iv) training, research, and innovation; and (v) nutrition governance. For the implementation of the PSMN, 12 sector plans of actions were developed. The targeted sectors are agriculture, trade, decentralization and local governance, education, livestock, higher education and research, environment, family and social protection, water and sanitation, industry, fisheries, and health.

The governance of food security and nutrition falls under three different institutions. The National Commission of Food Security (CNSA) with its Executive Secretariat plays a steering role while the *Commissariat à la Sécurité Alimentaire* (CSA) is in charge of food security operations. On the nutrition side, the *Cellule de Lutte contre la Malnutrition* (CLM) or the Malnutrition Control Unit, is the body leading the fight against malnutrition.

Following the 2012 presidential transition, social protection became a government priority. As a result, the General Delegation for Social Protection and National Solidarity (DGPSN) was created under the supervision of the presidency. Following this institutional change, the *Commissariat à la Sécurité Alimentaire* (CSA) was no longer autonomous but reported to DGPSN, thus losing its right to have an independent bank account. The CSA's loss of autonomy led to delays in operations even in periods of urgency, given the longer chain of command. Overall, the governance of food security have suffered from these changes due to the anchoring (lack of autonomy) of public institutions in charge of food security: DGPSN and CSA depend on the presidency while the Secretariat of the CNSA and the CLM are housed under the prime minister.

A study[8] on Senegal's food- and nutrition-related public spending commissioned by the European Union Delegation in 2015 indicated that the institutional framework of FNS in Senegal is inconsistent and inefficient. Indeed, institutional bodies responsible for conceiving and implementing the FNS policy are under different authorities (the presidency, prime minister's office, and sector ministries). This fragmentation of public entities involved in FNS does not facilitate the implementation of a coherent strategy for food and nutrition security, particularly with regard to the programming and budgeting of the relevant activities. In key decision-making bodies, there is no clear distinction among the roles of design, coordination, and supervision of FNS policy and implementation in the field. According to the study, "the multiplicity of actors creates a dispersion of actions, causes duplication of programs and poses problems of inconsistency in the approach" (DAI Europe, 2015).

Although some institutional flaws exist within the government's approach to FNS programming, significant progress has been made in coordinating FNS activities between government institutions and their development partners. Government and international stakeholders involved in food security issues have established channels of collaboration that facilitate interventions.

[8] DAI Europe "Prévisibilité des dépenses publiques liées à la sécurité alimentaire et nutritionnelle au Sénégal", Advisory Service in Social Transfers (ASiST III), Décembre 2015.

Each year, a response plan is designed on the basis of well-crafted analyses by the World Food Program (WFP) and the Executive Secretariat of the CNSA. Operationally, significant progress has been made in targeting beneficiaries (the most vulnerable populations) of food security interventions, based on a participatory process.

4. Policies and on-the-ground program interventions to address FNS needs

The rather low performance in food and nutrition security in Senegal is in contrast with much of its performance in agricultural policies and political prioritization of FNS. For instance, according to the ERH database, for indicators such as the "investment climate for rural businesses" and the "policy framework for rural organizations," Senegal is among the top-five countries in sub-Saharan Africa (Table 4). When it comes to agricultural pricing and trade distortions indicators such as "logistics performance index," and the "access to agricultural extension services" (also from the ERH database), Senegal also ranks among the top 10 in sub-Saharan Africa. It ranks first in the region for "time to export," (Table 4). Regarding political prioritization, Senegal ranks second in "agricultural spending intensity" in sub-Saharan Africa, as seen in Table A6.

Table 4: Summary of select ERH policy variables

Indicators	Senegal	Sub-Saharan Africa (41 countries)	Unit of measurement/score definition	Senegal's score among SSA countries
Investment climate for rural businesses	4.7	3.6	A score (from 1-6, 6 being best). 5 = Government has made major efforts to encourage private traders to open a business.	Top 10
Policy framework for rural organizations	4.9	4.1	A score (from 1-6, 6 being best). 5 = Government is pro-active in its political and legal support for the establishment of conditions conducive to the development of organizations of the rural poor.	Top 10
Accountability in rural areas	3.5	3.4	A score (from 1-6, 6 being best). 4 = Government has done much to decentralize administrative and fiscal authority to the local level	
Access to land	3.6	3.5	A score (1-6, 6 being best). 4 = A majority of rural poor households, including women, indigenous populations and other vulnerable groups, have access to land.	
Access to water for agriculture	4.0	3.6	A score (1-6, 6 being best). 4 = Government has a water resources management strategy that provides an integrated framework for equitable water resources allocation.	

Enabling conditions for rural financial services	4.3	3.6	A score ranging 1-6, 6 being best). 4 = Development plans recognize the important role of financial services in the rural development process.	Bottom 10
Dialogue with rural organizations	4.4	3.8	A score (1-6, 6 being best). 4 = There is a process for rural organizations to enter into dialogue with or lobby government.	Bottom 10
Corruption	-0.5	-0.7	An index that captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests	
Political stability	-0.2	-0.7	An index that captures perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism.	
Rule of law	-0.4	-0.8	An index that captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular, the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.	Top 10
Doing Business Index	43.0	47.3	An index that ranks countries based on their ease of doing business with higher rankings indicating better, usually simpler, regulations for businesses and stronger protections of property rights.	
Time to export	12.0	32.9	The length of time in days needed to export a given good.	
Logistics performance index. Transport	2.5	2.2	An index that captures logistics professionals’ perceptions of a country’s quality of trade and transport related infrastructure (e.g. ports, railroads, roads, information technology). Scores are averaged across all respondents.	
Agricultural R&D as percent of agricultural GDP	0.8	0.7	Public (government, higher education and non-profit) spending on agricultural research and development as a share of agricultural GDP.	
Access to agricultural	4.2	3.8	A score (1-6, 6 being best).	Top 10

extension services			4 = Public agricultural research and extension have made major efforts to improve the participation of poor farmers in setting priorities.	
Share of researchers with PhD	9.4E-5	8.3E-6	The number per rural capita of PhD-qualified agricultural researchers.	
Share of female researchers	2.1E-5	8.7E-6	The number per rural capita of female agricultural researchers.	

Source: ERH, 2015.

Why is it that these substantial efforts made in the design and implementation of agricultural policies do not translate into better performance in terms of food and nutrition security outcomes? There are several reasons for this seeming contradiction: (i) the dependence of agriculture on rainfall and the subsequent vulnerabilities linked to increased climate variability in the region; (ii) the small ratio of arable land (as Senegal ranks at the bottom of ECOWAS countries in terms of "access to land and to water for agriculture," as seen in Table A4, and below the regional and developing country averages in term of "arable land equipped for irrigation," as seen in Table A2); and (iii) dilution of institutional responsibilities in matters of food and nutrition security and poor coordination.

However, there have been some noteworthy performances recently in food and nutrition security programming. In this regard, several ongoing and recently established initiatives are worth highlighting, including interventions related to rice self-sufficiency, child malnutrition, and conditional cash transfers and emergency contingency planning.

Rice self-sufficiency. Senegal aims to achieve rice self-sufficiency with production targets of 1.6 million metric tons (MT) of paddy, given that rice is one of the country's main staples.[9] In 2008, Senegal experienced sudden increases in rice production under the combined effect of more irrigated land and higher yields. In fact, the interventions carried out as part of the Great Agricultural Offensive for Food and Abundance (GOANA) and favorable prices for producers in the context of the 2008 food price crisis boosted rice output. Since then, 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 rain-fed production has also greatly improved

[9] While initially the government aimed to achieve this goal by 2017, the latest data suggests that the country has made some progress but is still far from reaching the target, registering just 900,000 MT of paddy in 2016.

the yields of upland rice and subsequently positively affected average rice yields across the country.

As a result, domestic production of white rice amounted to 308,565 MT on average over the past 10 years. The coverage of the country's rice needs through domestic production has improved over the last five years, meeting an average of 30 percent of demand. Despite this steady progress over the years, achieving the rice self-sufficiency goal will remain a great challenge for the country. For instance, developing the rice industry in Senegal will require striking the right balance of investment in local rice production while also subsidizing imported rice to satisfy national consumer demand. Moreover, in order to sustainably expand the amount of land under irrigation for rice cultivation, strategies must be developed at all levels of government for managing renewable water resources and protecting soil fertility (Hathie, 2016b).

Child malnutrition. Reducing child malnutrition through community intervention programs has been one of Senegal's key strategies since 2002 under the Nutrition Enhancement Program (PRN). This program is built around three pillars: (i) a traditional nutrition supplementation approach combining growth promotion and integrated disease control; (ii) multi-sectoral interventions with several ministries involved in program implementation; and (iii) institutional capacity building of the relevant agencies for future sustainability of the program. The program has been credited with reducing the prevalence of severely underweight children under 5 years by more than half, nearly doubling the proportion of children exclusively breastfed until 6 months, and providing regular growth monitoring and counseling of caretakers for 200,000 children under three in intervention areas (Independent Evaluation Group, 2016). The program's relative success in the area of nutrition illustrates an effective approach to a multi-sectoral and multiplayer strategy of intervention. The CLM itself is multi-sectoral in nature as it gathers, among others, all ministries concerned with nutrition. Its implementation scheme of interventions guarantees stakeholder involvement at the community level, thus allowing establishment of a role for each actor. Consequently, the CLM, ministries, locally elected officials, civil society organizations, and village level communities work hand in hand under the leadership of the decentralized authorities (Hathie, 2016a).

Conditional cash transfers and emergency contingency planning. The *Programme national des bourses de sécurité familiale* (PNBSF) implemented by DGPSN is a conditional cash transfer program with three main requirements: (i) school registration and attendance of household children; (ii) vaccination records of children 0-5 years; and (iii) civil registration. Introduced in

2013, the main objective of the integrated social protection scheme is to contribute to the fight against vulnerability and social exclusion of families and strengthen their productive and educational capabilities. The PNBSF is part of the overall national social safety net system, which relies on a National Unique Registry to identify the poorest households through a community-driven process involving geographical targeting and proxy-means testing. In early 2016, the registry included over 280,000 households, 180,000 of which were benefiting from the national conditional cash transfer program. Since then, a new mobile payment mechanism was introduced to increase the accessibility and security of payments, enabling 30,000 households to receive payments via their mobile phones. Currently, Senegal is building an emergency contingency plan that connects early warning systems for both food production shocks and famine to the social safety net program. It is expected that the warning systems will trigger a pre-defined set of temporary interventions, including cash transfers, to respond to specific shocks or crises.[10]

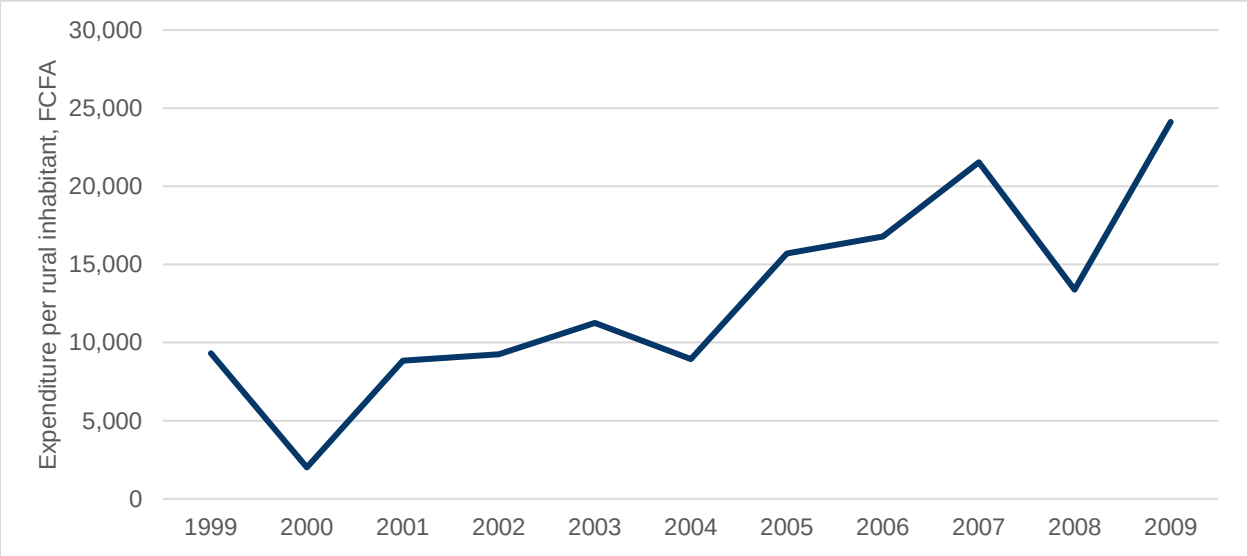
[10] See "In Senegal, A Safety Net System Designed to Break the Cycle of Poverty," World Bank Feature Story, June 20, 2016, available at: http://www.worldbank.org/en/news/feature/2016/06/20/in-senegal-a-safety-net-system-designed-to-break-the-cycle-of-poverty.

5. Food and nutrition security resources

Over the last few years, Senegal has made commendable efforts in terms of investments in the agricultural sector along with notable improvements in policy design and implementation. In the early 2000s, agriculture again became a priority sector with an increase in budgetary allocations to it (Figures 16 and 17). This trend was reinforced after the food price crisis of 2008, with a special emphasis on rice self-sufficiency.

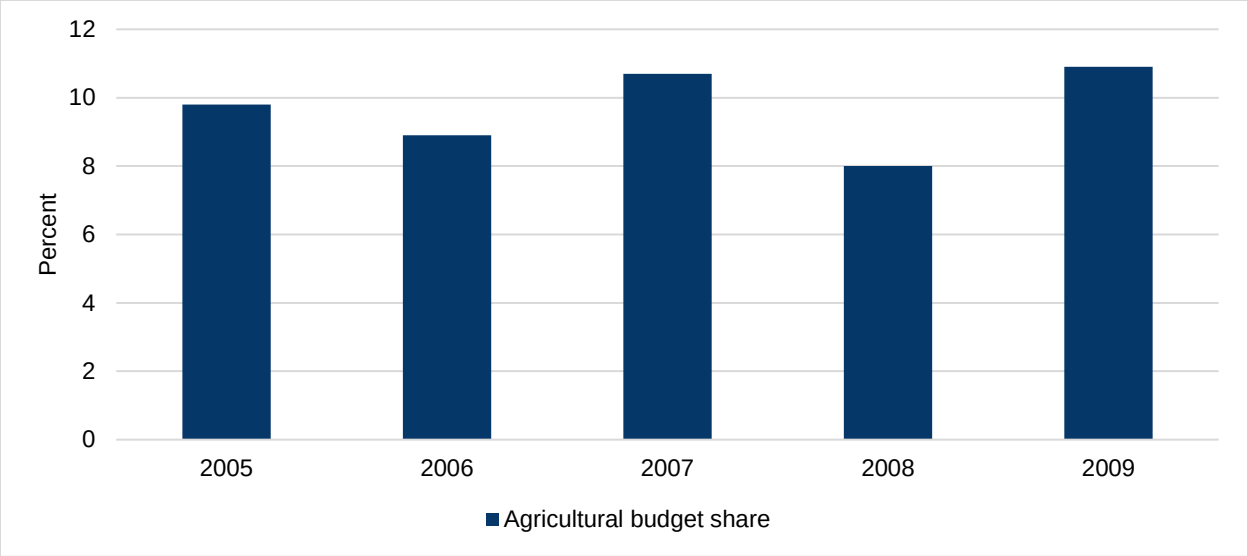
Senegal's commitment to agricultural spending is reflected in the ERH database, which reveals that Senegal is first in government expenditures per capita for the agricultural sector in the ECOWAS zone, spending $60.60 per capita, far above the ECOWAS average of $10.90, and fourth in sub-Saharan Africa, which has an average of $22.90 (Table 5). These high expenditures, combined with food insecurity, suggest inefficiencies and weak control of agricultural expenditures in Senegal.

Figure 16. Public agricultural expenditure per rural inhabitant, in FCFA, 1994-2009



Source: ANSD.
Note: $1 is approximately 500 FCFA. FCFA is pegged to the euro. 1 euro is 655.957 FCFA.

Figure 17. Agricultural spending as a share of total public expenditure



Source: MEF, Budget Directorate / Directorate General of Public Accounts and Treasury, ANSD.

Table 5: Domestic public investment and official development assistance

	Government spending on agriculture	ODA to FNS	Official flows to FNS-Brazil	Other official flows (DAC)
Senegal	60.6	18.9	0.4	2.7
ECOWAS average (14 countries)	10.9	14.6	0.1	4.5
ECOWAS ranking (14 countries)	1	6	2	8
SSA average (41 countries)	22.9	10.5	0.1	7.1
SSA ranking (41 countries)	4	8	2	20
Developing countries average (116 countries)	72.3	9.4	0.2	5.7
Developing countries ranking (116 countries)	33	17	6	50
Top/bottom 10 in sub-Saharan Africa	Top 10	Top 10	Top 10	

Source: ERH, 2015.

Some studies highlight the significant level of agricultural subsidies, which are not sustainable compared to the budget, in addition to the fact that a considerable proportion of them does not reach the targeted beneficiaries (IPAR, 2015b; Seck, 2016). A recent study also suggested that,

although Senegal spent 9.7 percent of its budget on agriculture in 2005-2009, about 63 percent of the capital expenditures are not in infrastructure, research, or human capital but rather in "input supply services" (Cabral, unpublished manuscript). These interventions can have short-term effects on production but not on long-term growth in the sector.

In recent years, the advent of the *Plan Senegal Emergent* (PSE) and new directions favorable to the development of agriculture, have strongly affected the expenditure structure of food and nutrition security. Thus, the value of agricultural projects increased by 137 percent between 2010 and 2014, from 48 billion FCFA ($96 million) in 2010 to 115 billion FCFA ($230 million) in 2014 (DAI Europe, 2015). These projects include agricultural public goods (such as irrigation schemes and rural roads) as well as projects on the production of private goods and services. As shown in Table 6, agricultural sector spending increased from 146.335 billion FCFA ($293 million) in 2011 to 225.617 billion FCFA ($451 million) in 2015.

Table 6: Evolution of agricultural sector spending in millions FCFA

Agricultural sector	2011	2012	2013	2014	2015
Operating expenditures	20,031	19,015	22,640	21,479	37,786
Investments	126,304	184,301	154,379	175,021	187,831
Total budget on agriculture	146,335	203,316	177,019	196,500	225,617
Internal resources	81,785	132,820	103,496	114,032	112,665
% external resources	45%	35%	42%	42%	52%
Family grants (social protection)				11,800	21,200

Source: MAER, RCSA, 2015.

Similarly, social transfers tend to emerge an important instruments for fighting poverty. The introduction in 2013 of "family grants" (PNBSF) has become an important part of social safety net spending associated with FNS. The budgeted amount in 2015 reached 21.2 billion FCFA ($42 million) against 11.8 billion FCFA ($24 million) in 2014, in line with the increase in coverage of beneficiaries, up to 200,000 families (DAI Europe, 2015).

Other important changes are in the financing of the FNS agenda. From 2013, price subsidies were replaced with guarantee funds.[11] These funds rose from 700 million FCFA in 2010 to 5 billion FCFA in 2014. Subsidies for agricultural inputs have declined in recent years, after reaching a

[11] Price subsidies focused mostly on the peanut sector and were unpopular with donors. To replace these subsidies, the government created a farmer support fund (or guarantee fund) which covered the differential between the guaranteed minimum producer price and the purchase price by oil millers, based on the balance recorded at the end of the growing season.

maximum in 2012, an election year. This decrease is related to the government's commitment to decrease the share of subsidies to GDP from 0.5 percent to 0.3 percent per year.

A main feature of Senegal's financing for FNS is external dependency. Official development assistance (ODA) for strengthening food security is estimated to be at $18.90 per capita for Senegal, making the country eighth of the most-assisted countries in sub-Saharan Africa according to the ERH database. On average, over the past six years, 74 percent of the investments in the FNS were externally funded. In contrast, transfers to parastatal agencies and transfers to families were mostly financed from internal resources.

FDI is also an important source of external financing. According to a West African Central Bank[12] report (2013), Senegal is one of the most attractive countries to FDI in the West African Economic and Monetary Union (WAEMU), attracting 14.3 percent of net FDI received by WAEMU between 2006-2011. Senegal also experienced an increase of FDI in terms of GDP share from 0.9 percent in 2002 to 2 percent in 2012 (AfDB, 2002; AfDB, 2011). Investments are mostly oriented to telecommunications, mining, and finance, but also agriculture, agribusiness, and the food industry according to APIX data (Sakho-Jimbira et al., 2015).

[12] Known in French as the *Banque Centrale des Etats de l'Afrique de l'Ouest* (BCEAO).

6. Conclusion and recommendations

Senegal is prone to food insecurity considering its low level of access to and quality of food. Given the FNS gaps in Senegal relative to other African and developing countries, as illustrated by the ERH database, addressing the lack of dietary diversification and consequently the high malnutrition rates among children—particularly the prevalence of anemia and underweight children—should be a policy priority. Senegalese policymakers should focus on supporting and financing interventions to improve the quality of food consumption, including higher caloric intake and food diversification. In addition, Senegalese agricultural productivity is below the regional average both in terms of cereal yields and agricultural value added per worker. These figures are worsened by the high volatility of food production, the country's vulnerability to environmental shocks, and limited access to water resources and irrigation equipment. Strengthening access to factors of production and enhancing social safety nets to build resilience among the rural population should also be a policy priority of government authorities in Senegal.

Certain areas and groups of people within Senegal experience greater vulnerability to FNS and consequently require additional responsiveness and targeting in FNS programming. Food and nutrition insecurity is more prevalent among rural populations, smaller rural households (fewer than 10 people), agricultural households, and households headed by women or youth under the age of 40. The southern and eastern regions are host to larger numbers of households suffering from food insecurity, despite their endowments in natural resources. Parts of the southern region are affected by clashes between military forces and secessionist forces, which prevent rural populations from exploiting the forest resources and cultivating land. Limited and poor-quality road networks as well as geographic isolation from markets are also constraints for food supply and access in these regions.

Despite high public spending levels in agriculture, progress made in achieving FNS has been insufficient in Senegal. Productivity gains are real but they fail to match the ambitious targets of the government, in part due to inefficiencies embedded in these agricultural support programs. In addition, agricultural subsidies may not consistently reach their targeted beneficiaries, and the government may overemphasize spending on input supply services, which have short-term effects on production, but not on long-term growth in the sector, according to several studies (IPAR, 2015; Seck, 2016; Cabral, unpublished manuscript). Nevertheless, there have been some noteworthy performances recently in Senegal’s FNS programming. Ongoing and recently established initiatives including interventions related to rice self-sufficiency, child malnutrition

(Nutrition Enhancement Program), and conditional cash transfers and emergency contingency planning (*Programme national des bourses de sécurité familiale*) show promise in addressing the country's priority FNS needs.

The government must redesign its FNS policies and better target its beneficiaries (i.e., the most vulnerable populations) to increase the efficiency of its operations. Two policy areas where the government could focus its attention are: (i) increasing agricultural productivity through reallocation of resources towards more targeted investments in infrastructure, research, and human capital for more sustainable gains and (ii) reducing the high volatility of food production in Senegal and the country's vulnerability to environmental shocks through the expansion of social safety net programming and building resilience of rural populations.

The following key interventions are needed to support these policies:

- Better harmonization of interventions towards achieving food and nutrition security, requiring a rationalization of relevant institutions, leading to better budgeting.

- Targeted programming in the southern regions, which are more affected by food insecurity. Given their natural resource endowments, an integrated research and development program involving research institutes focusing on nutrition, private sector actors engaged in agricultural value chains, and government bodies could be implemented in order to improve FNS in these regions.

- Vulnerable populations, particularly women and youth who lack access to some productive resources, should be targeted while implementing FNS programs aiming to increase access to production factors.

- Donors should encourage the government of Senegal to improve the global coherence in the governance of the FNS from the national to the local level and to have an effective monitoring and evaluation system for FNS policies and actions. Donors should also work towards more sensitive disbursement of budget support that is aligned with the government's FNS priorities.

- Social protection has become prominent in the current government strategy. Instead of a piecemeal approach, donors should coordinate with the government in the design of comprehensive of social protection packages that would strengthen the resilience of the most vulnerable populations.

References

AfDB (African Development Bank) and OECD (Organization for Economic Cooperation and Development). 2006. “Senegal.” In *African Economic Outlook 2006.* Paris, France: OECD Publishing.

AfDB, OECD Development Centre, UNDP (United Nations Development Programme), and UNECA (United Nations Economic Commission for Africa). 2011. “Senegal.” In *African Economic Outlook 2011: Africa and its Emerging Partners*, 188-199. Paris, France: OECD Publishing.

BCEAO (Banque Centrale des Etats de l’Àfrique de l’Ouest). 2013. *Evolution des Investissements Directs Etrangers dans les pays de l’UEMOA au cours de la période 2000-2011.* Rapport de Janvier 2013. Dakar: BCEAO.

Cabral, F. J. “Bias against public capital, Economic Growth and Poverty: the case of agricultural sector in Senegal.” Unpublished manuscript.

DAI Europe. 2015. “Prévisibilité des dépenses publiques liées à la sécurité alimentaire et nutritionnelle au Sénégal.” EU, Advisory Service in Social Transfers (ASiST III), Décembre 2015.

DHS (Demographic Health Survey). 2015. *Enquête Démographique et de Santé Continue (EDS-Continue, 2015)*. Rockville, Maryland, USA: ANSD/Senegal and ICF.

Diop, A. N. 2015. *Revue des dépenses publiques de l’agriculture*. Dakar, Senegal: MEFP & DUE.

FAO (Food and Agriculture Organization). 2014. *Background: Meat Consumption*. Rome, Italy: FAO. http://www.fao.org/ag/againfo/themes/en/meat/background.html.

Genequand, M. M., Pasquet, J., and Seck K. 2016. “Evaluation à mi-parcours du Programme de Pays du PAM (2012-2016).” Rapport d’Evaluation final, Rapport n° OEV/2015/007. Dakar, Senegal: Bureau d’Evaluation du PAM. http://documents.wfp.org/stellent/groups/public/documents/reports/wfp282398.pdf.

Hathie, I. (2016a). “The role of food reserves in enhancing food security: the experience of Senegal.” CIRAD/DAE, EU.

Hathie, I. (2016b). “Politiques d’autosuffisance en riz en Afrique de l’Ouest: Quels acquis, quelles limites et quels débats” Inter-réseaux, Bulletin de synthèse souveraineté alimentaire, N° 23, Décembre. Paris, France: Inter-réseaux. http://www.inter-reseaux.org/IMG/pdf/bds23_riz.pdf.

Independent Evaluation Group (IEG). 2016. *Senegal: A Decade of World Bank Support to Senegal’s Nutrition Program*. Washington, D.C: World Bank Group. http://documents.worldbank.org/curated/en/281111484163839170/Senegal-A-Decade-of-World-Bank-Support-to-Senegal-s-Nutrition-Program.

IPAR (Initiative Prospective Agricole et Rurale). 2015a. Genre et emploi des jeunes ruraux au Sénégal, Dakar. Dakar, Senegal: IPAR. http://www.ipar.sn/IMG/pdf/Genre%20et%20Emploi%20des%20jeunes%20au%20Senegal.pdf.

IPAR, 2015b. "Subventions des intrants agricoles au Sénégal : controverses et réalités." *Rapport sur l'état de l'agriculture et du monde rural au Sénégal*. Dakar, Senegal: IPAR.

https://www.ipar.sn/IMG/pdf/ipar-rapport_agriculture-2015-_p_p_.pdf.

Ministère de l'agriculture et de l'equipement rural (MAER) and Direction de l'analyse, de la Prévision et des Statistiques Agricoles (DAPSA). 2016. "Revue conjointe du secteur agricole 2015," Rapport provisoire, Septembre 2016.

Ndione, Y. C. 2010. "Impact des politiques agricoles sur la sécurité alimentaire au Sénégal." Dakar, Senegal: Institut Sénégalais de recherches Agricoles. http://www.bameinfopol.info/IMG/pdf/Memoire_Ya_Cor.pdf.

Programme Alimentaire Mondial (PAM). 2014. *Analyse Globale de la Vulnérabilité, de la Sécurité Alimentaire et de la Nutrition (AGVSAN)*. Rome, Italy: WFP. https://www.wfp.org/content/senegal-analyse-globale-vulnerabilite-securite-alimentaire-nutrition-juillet-2014.

Programme Alimentaire Mondial (PAM). 2010. *Analyse Globale de la Vulnérabilité, de la Sécurité Alimentaire et de la Nutrition (AGVSAN)*. Rome, Italy: WFP. http://documents.wfp.org/stellent/groups/public/documents/ena/wfp244420.pdf.

Programme Alimentaire Mondial (PAM). 2008. *Rapport d'Analyse de Marché, Senegal Commerce du riz*. Rome, Italy: WFP. http://documents.wfp.org/stellent/groups/public/documents/ena/wfp190688.pdf.

Sakho-Jimbira, M.S., Hathie, I., Wade, I., Niang, A., and Niang M. 2015. *Measuring Sustainable Development for Post-2015 in Senegal*. Dakar, Senegal: IPAR.

Seck, A. 2016. "Fertilizer subsidy and agricultural productivity in Senegal." AGRODEP working paper 0024, April. Dakar, Senegal: AGRODEP.

SE/CNSA (Secrétariat Exécutif / Conseil National de Sécurité alimentaire). 2015. "Stratégie nationale de sécurité alimentaire et de résilience," SNSAR, 2015-2035. Novembre 2015.

SE/CNSA. 2013. "Enquête nationale sur la Sécurité alimentaire et la Nutrition (ENSAN, 2013)," Note de synthèse. Dakar, Senegal: SE/CNSA. https://www.humanitarianresponse.info/fr/system/files/documents/files/ENSAN-NOTE%20SYNTHETIQUE%20SECNSA%20version-Final%20-8-10%20-13.pdf.

SE/CNSA, DAPSA, and ANACIM. 2014. "Enquête rurale sur l'Agriculture, la Sécurité alimentaire et la Nutrition 2014 (ERASAN, 2014)," Rapport provisoire de l'enquête ménage. Dakar, Senegal: SE/CNSA.

SMART (Standardized Monitoring and Assessment of Relief and Transition). 2015. Dakar, Senegal: CLM. http://clmsn.org/index.php/14-actualites/122-rapport-de-lenquete-smart.

Annexes

Needs

Table A1: Access to food and malnutrition

Indicators	Senegal	ECOWAS (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Calorie gap								
Lack of enough money to buy food	46.2	60.5	2	57.4	8	41.0	67	Top 10 (best performing)
Undernourishment	17.6	15.0	10	21.6	15	15.3	62	
Average dietary energy supply adequacy	103.0	120.5	14	111.3	25	117.0	90	
Rural poverty								
Rural poverty headcount ratio (at $1.25 PPP a day)	41.5	58.0	1	54.1	9	30.2	50	Top 10 (best performing)
Rural multidimensional poverty headcount	78.6	81.5	6	73.4	23	44.1	70	
Lack of dietary diversity								
Percent of calories from staples	60.0	65.4	1	62.1	15	54.2	70	Top 10 (best performing)
Food consumption score	23.8	32.6	9	33.7	19	33.1	10	
Average protein supply	60.0	61.2	7	61.0	18	71.6	76	
Child malnutrition								
Anemia in children	79.4	74.8	12	63.2	38	44.5	111	Bottom 10 (worst performing)
Under-5 stunting	21.1	33.6	1	36.6	2	26.2	46	Top 10 (best performing)
Under-5 wasting	9.1	9.5	8	8.3	28	6.3	86	

Source: ERH, 2015.

Table A2: Agricultural productivity gap

Indicators	Senegal	ECOWAS (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Output gap								
Cereal yield (kg per hectare)	1157.3	1363.6	10	1355.4	24	2432.4	91	
Agricultural value added per worker	5.9	6.4	10	6.3	22	7.4	91	
Technology gap								
Percent of area devoted to modern varieties	50.2	18.6	1	21.4	4	21.4	4	Top 10 (best performing)
Agricultural TFP growth	0.01	0.009	4	0.01	10	0.02	48	Top 10 (best performing)
Infrastructure gap								
Account at a formal financial institution. Rural	4.2	10.7	9	15.9	29	26.8	92	Bottom 10 (worst performing)
Access to agricultural input markets	4.6	3.9	4	3.6	4	3.9	16	Top 10 (best performing)
Arable land equipped for irrigation	3.4	2.2	3	4.3	11	29.1	81	
Distance to fertilizer index	5669.9	8707.4	3	9972.0	6	6631.3	57	Top 10 (best performing)
Road density	2.0	2.4	11	2.1	23	2.8	89	
Access to financing for farmers	1.0	0.9	3	1.0	9	1.8	51	Top 10 (best performing)

Source: ERH, 2015.

Table A3: Vulnerability

Indicators	Senegal	ECOWAS average (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Environmental shocks								
Total renewable water resources per capita	2839.0	10851.2	8	14593.9	22	13099.2	69	
Projected change in runoff	-44.0	-52.4	6	-49.4	17	-45.6	54	
Projected change in agricultural yield	-31.1	-22.6	12	-2.6	39	37.1	110	Bottom 10 (worst performing)
Land degradation risk	22.1	23.1	9	27.9	19	25.5	59	
Production shocks								
Volatility of agricultural production	0.1	0.1	10	0.1	25	0.1	72	
Volatility of cereal crop yields	0.2	0.2	11	0.2	24	0.2	79	
Volatility of food production	0.08	0.04	14	0.0	37	0.0	108	Bottom 10 (worst performing)
Consumption shocks								
Household exposure to food price shocks	368.6	512.1	5	520.7	11	383.8	43	
Country in receipt of emergency food aid for 8-10 years	1.0	0.9	n/a	0.9	n/a	0.7	n/a	n/a

Source: ERH, 2015.

Policies

Table A4: Agricultural economic policy

Indicators	Senegal	ECOWAS average (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Rural investment climate								
Investment climate for rural businesses	4.7	3.7	1	3.6	2	4.0	17	Top 10 (best performing)
Policy framework for rural organizations	4.9	4.1	2	4.1	3	4.2	10	Top 10 (best performing)
Accountability in rural areas	3.5	3.2	5	3.4	20	3.6	64	
Access to land	3.6	3.2	2	3.5	15	3.8	58	
Access to water for agriculture	4.0	3.4	3	3.6	10	3.7	29	
Enabling conditions for rural financial services	4.3	3.5	4	3.6	8	3.9	29	Top 10 (best performing)
Dialogue with rural organizations	4.4	3.8	4	3.8	6	3.9	19	Top 10 (best performing)
Control of corruption	-0.5	-0.7	3	-0.7	12	-0.6	44	
Political stability	-0.2	-0.6	4	-0.7	14	-0.6	41	
Rule of law	-0.4	-0.8	3	-0.8	9	-0.6	37	Top 10 (best performing)
Doing Business Index	43.0	44.6	8	47.3	26	54.6	93	
Investment climate for rural businesses	4.7	3.7	1	3.6	2	4.0	17	Top 10 (best performing)

Source: ERH, 2015.

Table A5: Agricultural pricing and trade distortions

Indicators	Senegal	ECOWAS average (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Agricultural pricing and trade distortions								
Nominal rate of assistance	0.2	0.1	7	0.1	15	0.1	32	
Relative rate of assistance	0.3	0.2	3	0.2	10	0.2	35	Top 10 (best performing)
Welfare reduction index	16.0	28.6	2	30.4	5	29.4	13	Top 10 (best performing)
Non-tariff barriers. Agriculture (developing country)	1.3E-3	9.9E-4	1	6.2E-3	1	9.9E-3	1	Top 10 (best performing)
Simple average applied MFN tariff. Agriculture (developing country)	14.6	14.8	3	16.5	10	15.0	57	Top 10 (best performing)
Trade bias index	0.4	0.3	5	0.2	13	0.2	34	
Trade reduction index	-0.2	0.1	2	0.1	4	0.1	8	Top 10 (best performing)
Time to export	12.0	27.2	1	32.9	1	26.9	8	Top 10 (best performing)
Logistics performance index. Transport	2.5	2.2	2	2.2	5	2.4	46	Top 10 (best performing)

Consumer tax equivalent of farmer support	0.2	0.1	6	0.1	13	0.1	30	
Share of agricultural peak tariffs in all agricultural tariffs (developing country)	0.6	0.6	6	0.6	14	0.4	64	
Research, skills, and extension								
Agricultural R&D as percent of agricultural GDP	0.8	0.4	1	0.7	11	0.9	16	
Access to agricultural extension services	4.2	3.6	3	3.8	9	3.7	10	Top 10 (best performing)
Share of researchers with PhD	9.4E-5	7.2E-6	3	8.3E-6	12	1.8E-5	22	
Share of female researchers	2.1E-5	4.9E-6	9	8.7E-6	28	1.6E-5	45	Bottom 10 (worst performing)

Source: ERH, 2015.

Table A6: Political prioritization

Indicators	Senegal	ECOWAS average (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Agriculture								
Agricultural spending intensity	21.6	4.2	1	7.2	2	8.6	6	Top 10 (best performing)
Degree to which FNS features in citizen priorities	0.5	0.4	6	0.4	15	0.4	29	
Allocation and management of resources for rural development	4.0	3.5	3	3.6	11	3.9	44	
Nutrition								
National dietary guidelines	0.0	0.3	5	0.3	13	0.6	54	
Time-bound nutrition targets	0.0	0.5	8	0.3	14	0.4	23	
Governments promote complementary feeding	0.0	0.8	11	0.8	27	0.8	40	
Food safety score	40.0	55.1	8	47.0	20	66.5	80	
Rural social assistance								
Food safety net programs	0.0	0.5	7	0.8	20	1.8	68	
Social safety net benefit incidence	20.0	18.7	3	22.8	18	24.2	67	
Social safety net adequacy	9.3	31.5	3	36.9	11	25.0	45	
Social safety net coverage	6.8	18.9	4	24.3	16	45.3	66	
Women's enabling environment								
Secure access to land (women)	0.5	0.6	4	0.6	6	0.4	7	Top 10 (best performing)
Access to financial services (women)	0.0	0.4	12	0.4	30	0.3	63	

Source: ERH, 2015.

Table A7: Public investment and private external investment

Indicators	Senegal	ECOWAS average (14 countries)	ECOWAS ranking (14 countries)	Sub-Saharan African average (41 countries)	Sub-Saharan African ranking (41 countries)	Developing countries average (116 countries)	Developing countries ranking (116 countries)	African top /bottom 10
Domestic public investment & official development assistance								
Government spending on agriculture	60.6	10.9	1	22.9	4	72.3	33	Top 10 (best performing)
ODA to FNS	18.9	14.6	6	10.5	8	9.4	17	Top 10 (best performing)
Official flows to FNS-Brazil	0.4	0.1	2	0.1	2	0.2	6	Top 10 (best performing)
Other official flows (DAC)	2.7	4.5	8	7.1	20	5.7	50	
Foreign direct investment & U.S. NGOs and philanthropy								
Philanthropy	0.0	0.2	10	0.6	31	0.3	66	Bottom 10 (worst performing)
NGO	1.7	1.8	4	1.1	5	0.8	7	Top 10 (best performing)

Source: ERH, 2015.

Box 1. Food Consumption Score

The Food Consumption Score (FCS) is developed by VAM (Vulnerability Analysis and Mapping) of the World Food Program (WFP) as a composite score for measuring dietary diversity and food frequency of households over a reference time period of 7 days.

A food group is defined as a grouping of food items that have similar caloric and nutrient content. The following table presents the food groups considered, their weights in the score calculation, and an example of calculation.

			Example	
Food items (examples)	**Food groups (definitive)**	**Weight (definitive) (A)**	**Number of consumption days in the 7 last days (B)**	**Note A x B**
Maize, maize porridge, rice, sorghum, millet pasta, bread, and other cereals				
Cassava, potatoes and sweet potatoes, other tubers, plantains				
Beans. peas, groundnuts, and cashew nuts	Legumes	3	1	3
Vegetables, leaves	Vegetables	1	2	2
Fruits	Fruit	1	0	0
Beef, goat, poultry, pork, eggs, and fish	Meat and fish	4	0	0
Milk yogurt and another diary	Milk	4	1	4
Sugar and sugar products, honey	Sugar	0,5	4	2
Oils, fats, and butter	Oil	0,5	2	1
Composite food consumption score				26

The FCS is equal to the weighted mean of consumption frequencies of different food groups. It changes between 0 and 112 points. Usually, the score is categorized into three consumption groups: “poor,” “borderline” and “acceptable,” which correspond respectively to scores 0-24, 24.5-42 and 42.5-112 points (ERASAN, 2014).

The group of households with poor food consumption scores are those households with less diversified diets and whom consume more cereals and occasionally vegetables, sugar, and oil. There are no animal proteins, nor legumes and milk products in their diet. Households with limited food consumption scores are those who eat mainly cereals and more frequently vegetables, fruits, sugar, and oil compared to households with poor food consumption. These households rarely consume animal proteins and legumes and almost never dairy products. Households with an acceptable food consumption score are consuming daily staple foods with legumes and fruits. The regular consumption of animal proteins and milk products is only experienced by this group. When a household’s food consumption score is poor or limited, it means that it is food insecure.