



Risk Assessment

Senegal

Agricultural Risk Profile



What are the key findings?

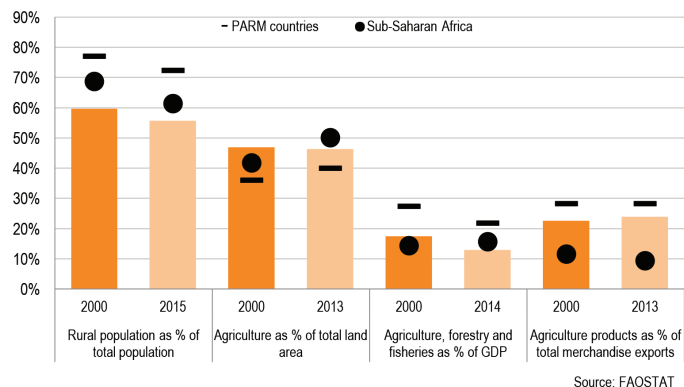
- ▶ The analysis suggests that production risks are greater than output price risks, in terms of both frequency and severity.
- ▶ Increasingly erratic rainfall and livestock diseases are estimated as priority risks. Illicit fisheries are a main concern in that sector.
- ▶ Both temperature and the number of wetter months are rising.
- ▶ Cow peas, tomatoes and groundnuts are the crops most affected by yield losses.
- ▶ Cow peas and maize are most affected by output price risks.
- ▶ Input price risks could be significant.
- ▶ Political stability has improved and become relatively favourable.

What are agricultural risks?

Agricultural risks are uncertain events that cause farmers significant financial loss or other adverse outcomes. They are different from constraints, which are predictable and constant limitations. Risks can negatively affect rural employment and assets, increase food insecurity, and lead to inefficient private and public sector investment. The purpose of the profile is to provide a high-level quantitative analysis of selected risks. It uses a common methodology, drawing on easily available information. As annual national averages are used, local and seasonal variations cannot be observed. This may underestimate production risks as compared to output price risks. The scope of the analysis is also limited by the lack of output data for livestock products. Price data for commodities in Senegal was available only for the period 1991-2011. A detailed country risk assessment requires a much fuller investigation.

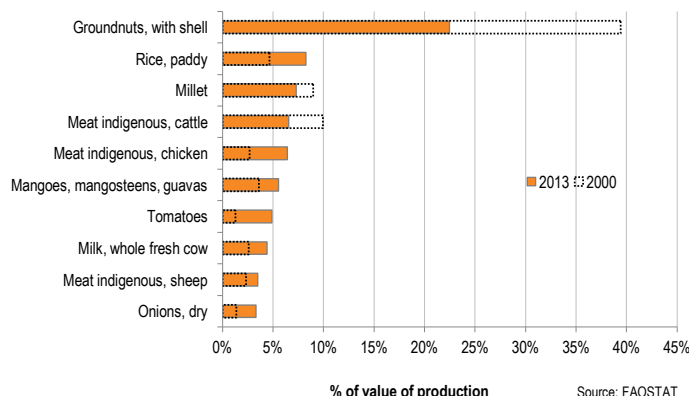
What role does agriculture play?

About 56% of the total population of 15.1 million is rural, less than the Sub-Saharan Africa and PARM countries averages. Agriculture has remained relatively stable in terms of land use and export importance, but fallen in terms of GDP.



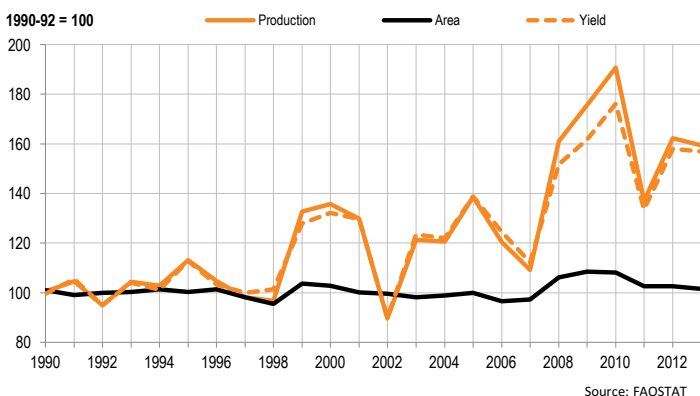
What products are most important?

Groundnuts are by far the most important product, although their relative importance is decreasing. Rice and poultry production show the largest increases. The top ten products represent 73% of production in 2013, with all crops accounting for 71%.



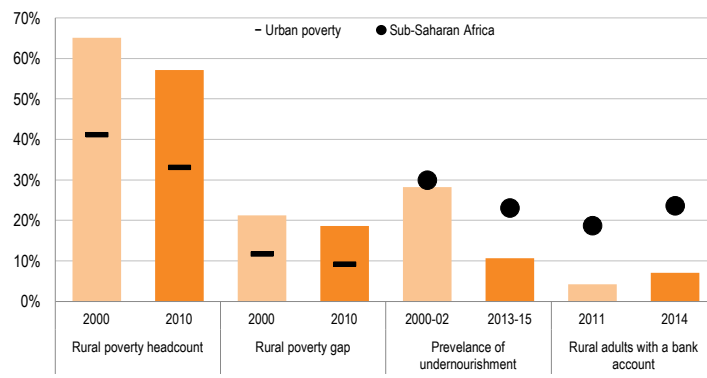
How has the sector grown?

Between 1990 and 2013, agricultural output increased by 60%. This is primarily due to rising yields, with the total land area used for agriculture rising just 2% since 1990. There is considerable yearly variation in average yields. Crop output has risen twice as fast as livestock.



How vulnerable are people to risks?

There has been a slight fall in both the rural poverty headcount and gap since 2001, mirroring a similar improvement in urban poverty. The prevalence of undernourishment has fallen dramatically, but the portion with bank accounts remains relatively low.



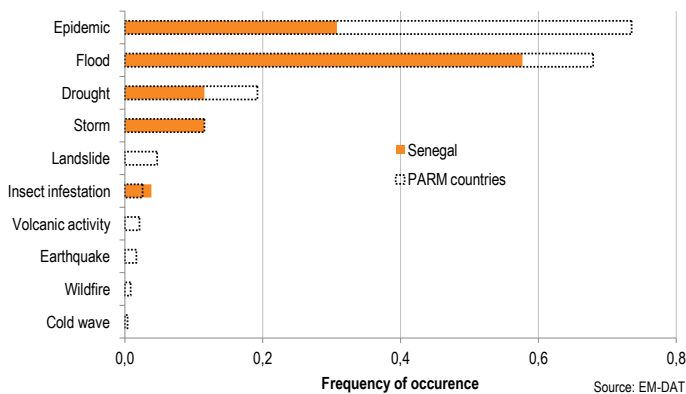
Production risks

What are production risks?

A large number of risks affect agricultural production. These include climate related events (such as droughts, floods and cyclones), outbreaks of pests and diseases, and damage caused by animals, windstorms or fire. The geographic and temporal spread of these impacts can vary significantly. Production risks are mostly associated with yield reductions but can also affect product quality.

How often do major disasters occur?

In the period 1990-2015, floods were the most frequent disaster to affect Senegal, occurring once every two years. Major droughts and storm events occur about once a decade. One insect infestation disaster was recorded.

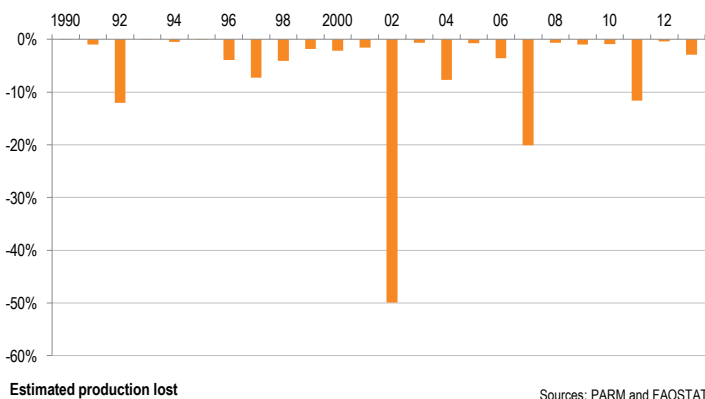


What is the likely impact of future climate change?

The IPCC 5th assessment report concludes that land temperatures over Africa are likely to rise faster than the global land average, particularly in the more arid regions. Tropical West Africa, including Senegal, is also identified as a hotspot, with possible temperature rises of between 3-6°C above the late 20th century baseline. Projected rainfall change over most of sub-Saharan Africa, including West Africa, is uncertain due to complex topography. Further research is required. Increasing temperatures and changes in precipitation are very likely to reduce cereal crop productivity, and could also adversely affect high-value perennial crops. Pest, weed, and disease pressure on crops and livestock is expected to increase.

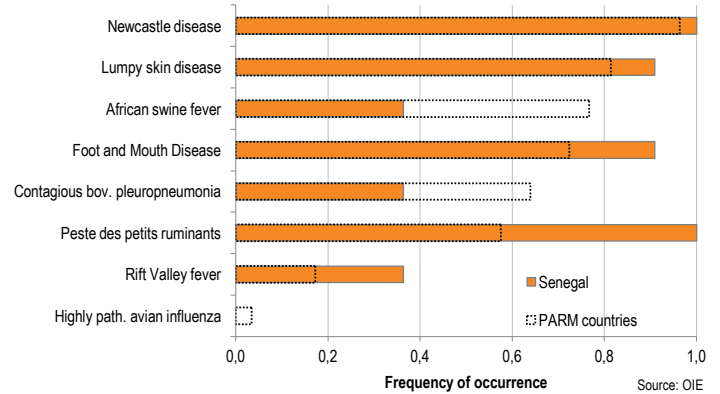
Has the risk varied over time?

Totalling the annual value of production losses for the 12 crops provides an indicative production risk profile for the period. Production losses averaged 8%, ranging from 0-50%. The largest loss occurred in 2002 associated with severe drought conditions.



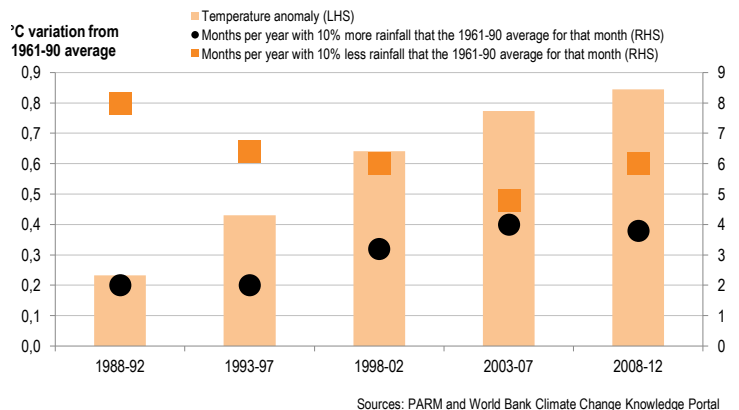
What animal diseases are present?

Of the eight animal diseases analysed over the period 2005-2015, two could be considered endemic. Two others (Lumpy skin and FMD) have been recorded as present in all but one year. Only Highly pathogenic avian influenza has never been reported.



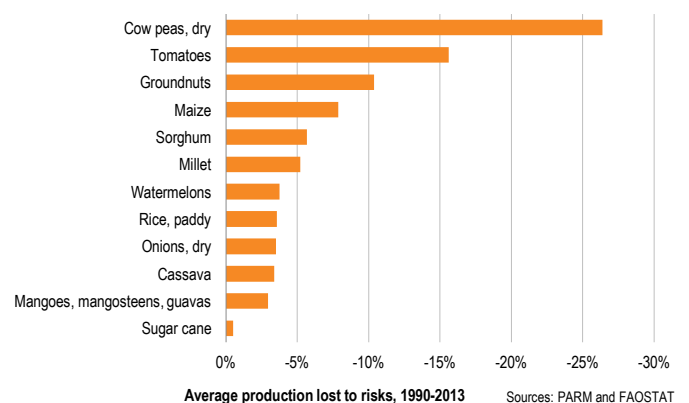
Are weather anomalies increasing?

Temperature levels are rising, with the 2008-12 average 0.9°C warmer than the 1961-1990 average. There is no clear change in rainfall patterns, although the number of wetter than average months has risen and the number of drier months has fallen.



Which crops appear most at risk?

Cow peas, tomatoes and groundnuts are the crops most affected by yield losses as estimated by the impact on production. Annual yield losses averaged over 10% production levels for these crops (average losses of 36-90% once every three years).





Market risks

What are market risks?

Market risks are issues that affect the price and availability of outputs and inputs. Commodity markets can have a high degree of volatility caused by changing local and global supply and demand. Producers are concerned about low prices (reducing their income); consumers are worried by high prices (raising their expenditure). Other market risks include exchange rate volatility, which can affect the price of outputs and inputs.

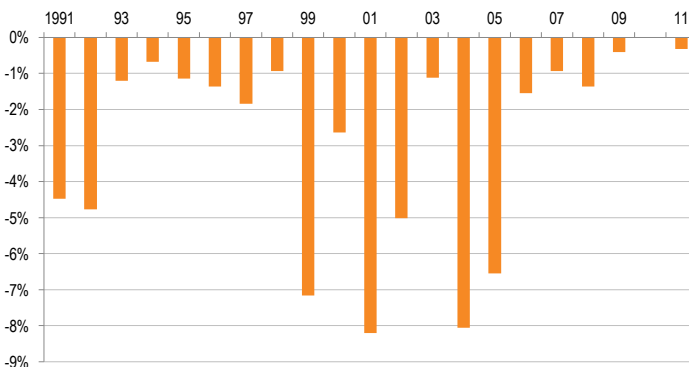
Which products appear most at risk?

Over the period 1991-2011, cow peas and maize appear to be the commodities most affected by output price risks. These products have an average annual price loss of greater than 4% (an average loss of 11-12% occurring every three years).



Has price risk changed over time?

Totalling the estimated revenue lost due to output price risks for the individual commodities provides an indicative market risk profile. The average annual revenue loss is 3%, with a maximum loss of 8%. Output price risks have been low for the last six years.

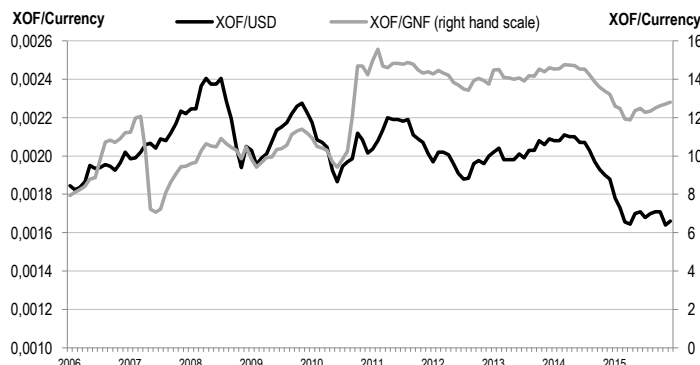


Estimated revenue lost

Source: PARM and FAOSTAT

Is there an exchange rate risk?

Senegal's currency, the West African Franc (XOF), is pegged at a fix rate to the Euro. Most trade is with Europe and other XOF members, removing most of the risk. The XOF has appreciated against the Guinean franc, the currency of an important African market.



Source: OANDA

How are the product and temporal risks estimated in this profile?

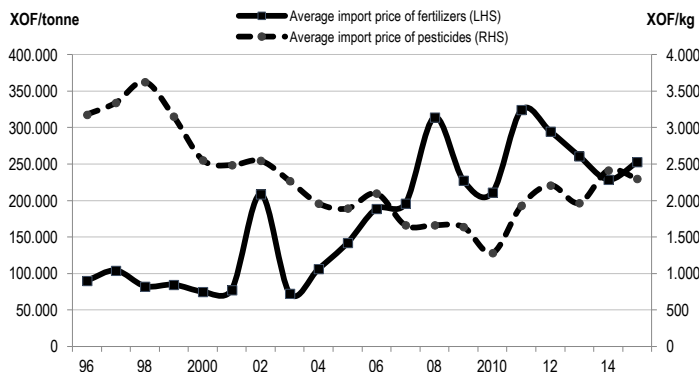
Indicative estimates of production and output price risks are calculated in a similar way. A loss threshold of 0.33 times the standard deviation below the trend value in either yield or prices is calculated to set a benchmark for identifying the losses resulting from production and market risks respectively.

To calculate product specific risk values, the average yield or price loss below the threshold level and the frequency of these occurrences are multiplied to obtain average production and price loss ratios. This is done for the 12 most important crop and livestock commodities for which data was available.

To calculate the risk profile over time, the individual loss for each respective year is added together across the crop commodities only.

How variable are input prices?

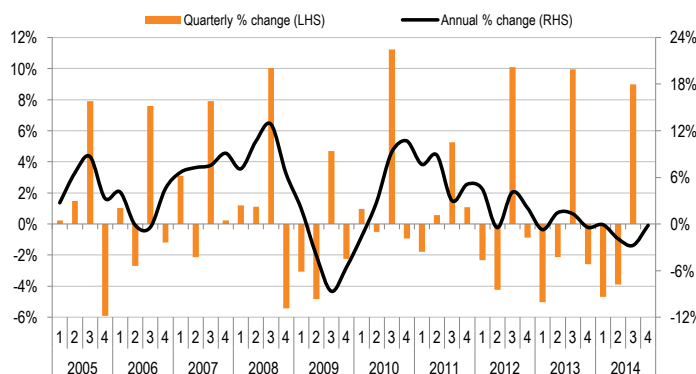
Variations in annual average import prices suggest farmers face some input price risks. The import price of fertiliser increased by 300% between 2003 and 2008. In contrast the average pesticide price halved between 1999 and 2010.



Sources: PARM, UN Comtrade and World Bank

Do food prices vary for consumers?

Over 2005-14, the food component of the consumer price index recorded an average annual increase of 3%. The highest annual rate of 13% was recorded in September 2008. Prices have risen more slowly since 2010 but fluctuate to the same extent.



Source: ILO

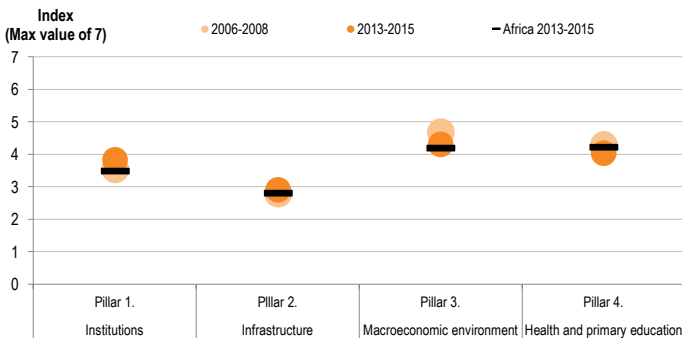
Macro level risks

What are macro level risks?

Macro level risks cover unexpected changes in the broader economic environment in which agriculture occurs. It can include changes in government or business regulations, fiscal and monetary policy settings, external trade restrictions, political instability, corruption, regional conflict and domestic unrest.

Are basic requirements in place?

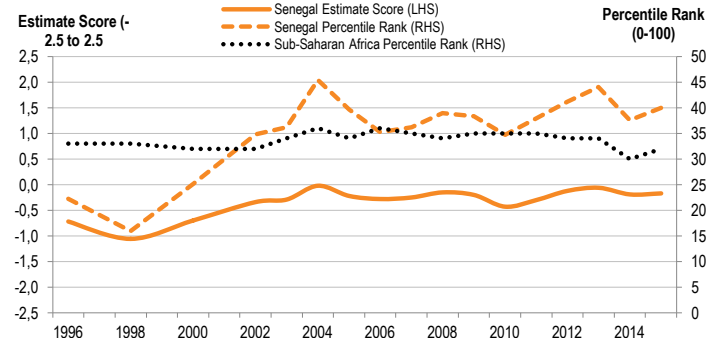
Index scores for the basic requirement pillars place Senegal very close to the African average across all four pillars. Index scores have lifted for two but have fallen for two. In particular health and primary education has fallen below the African average.



Source: World Economic Forum, Global Competitiveness Index

Is the political environment stable?

Senegal generally scores above the Sub-Saharan Africa average in the political stability and absence of violence index. Its percentile ranking has varied within the 35-45 range for the last decade suggesting a degree of stability.



Source: Worldwide Governance Indicators

Overall risk assessment

The PARM process

A detailed risk assessment was carried out as part of the PARM process, in partnership with NEPAD and the relevant African government. It is a rigorous consultation process during which the main agricultural risks of Senegal were identified and prioritised. The PARM studies focused on livestock and fisheries, complementing a 2015 World Bank study that was more focussed on crops.

The results of these studies indicate that increasingly erratic rainfall, particularly in northern Senegal pose the most significant production risks. Pests and diseases are the second most important risk. A key risk within the livestock sector is uncertainty over land tenure and access. Price volatility of imported feeds is a major source of risk within the poultry sector. Illicit fisheries are a major risk for the sustainability of that sector.

What are the main agricultural risks?

The analysis suggests that overall production risks are greater than output price risks. The frequency of yield losses associated with production risks and their severity (both on average and in the worst-case scenario) are greater than for output price risks.

RISK	VARIABLE	AVERAGE FREQUENCY	AVERAGE SEVERITY	WORST-CASE SCENARIO
PRODUCTION	RAW SCORE	0.32	-27%	-86%
	RISK LEVEL	● HIGH	● MEDIUM	● VERY HIGH
OUTPUT PRICE	RAW SCORE	0.30	-10	-18%
	RISK LEVEL	● HIGH	● LOW	● MEDIUM

What are the linkages between risks?

Managing risks in agriculture is particularly challenging, as many risks are highly correlated, resulting in whole communities being affected at the same time. Impacts on yield that are widespread and have a significant impact on total market supply can have profound effects on market prices. In Senegal drought is a clear example of one risk that can trigger others, aggravating some pests and diseases (additional production risks), leading to spikes in food prices but also plummeting prices as pastoralists are forced to sell (market risks).

What is PARM? The Platform for Agricultural Risk Management (PARM), an outcome of the G8 and G20 discussions on food security and agricultural growth, is a four-year multi-donor partnership between developing nations and development partners to make risk management an integral part of policy planning and implementation in the agricultural sector. PARM operates a process to achieve this through risk assessment, policy dialogue, tools assessment and capacity development.

PARM Secretariat International Fund for Agricultural Development (IFAD)

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