



Risk Assessment

Zambia

Agricultural Risk Profile



What are the key findings?

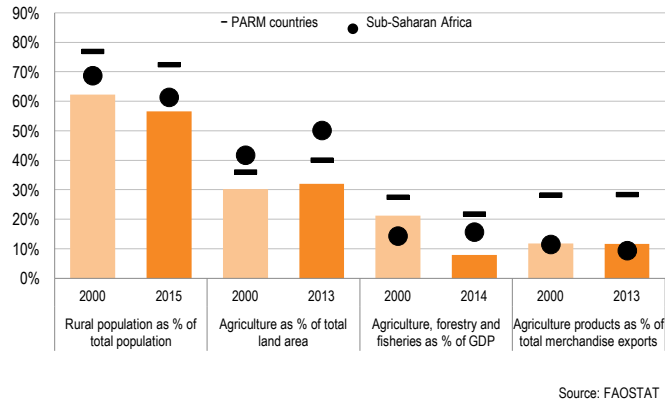
- ▶ The analysis suggests that production risks are greater than output price risks.
- ▶ A flood disaster occurs every two years, with a drought every decade.
- ▶ Sunflower seeds, sweet potatoes, soybeans, cotton and tobacco are the crops most affected by yield losses.
- ▶ Apart from 1992, yield losses have been relatively low across the period.
- ▶ Sorghum is the crop most affected by output price risks.
- ▶ The price of imported inputs appears a risk, along with a depreciating currency.
- ▶ Basic requirements and political stability have improved and are relatively strong.

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 price and output data for livestock products. Local price data for Zambia was available only for 2005-14, and for four commodities. A detailed country risk assessment requires a much fuller investigation.

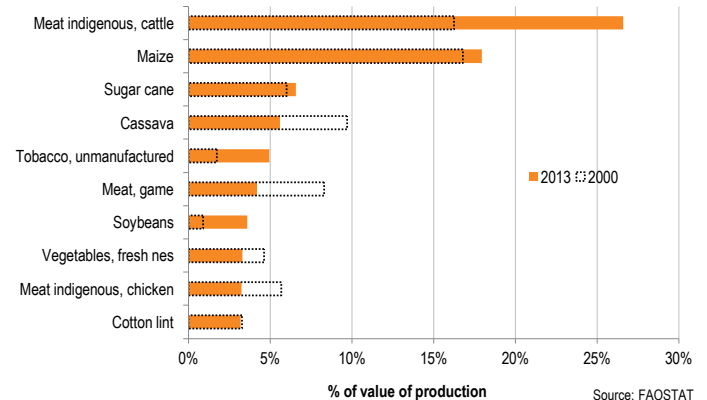
What role does agriculture play?

About 57% of the total population of 16.2 million is rural, similar to the share in 1990. While the area in agriculture has risen, the sector's contribution to GDP has fallen considerably. Its contribution to export earnings remains stable but relatively low.



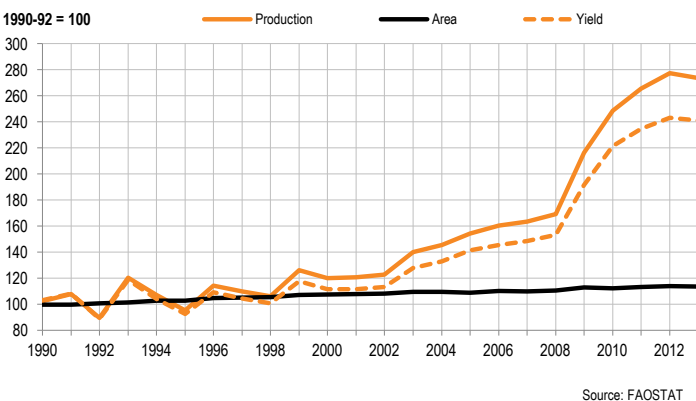
What products are most important?

Cattle meat, maize and sugar cane are the three most important products. The top ten products represent 79% of production in 2013, with all crops accounting for 58%. There has been considerable variation in production trends among the top ten commodities.



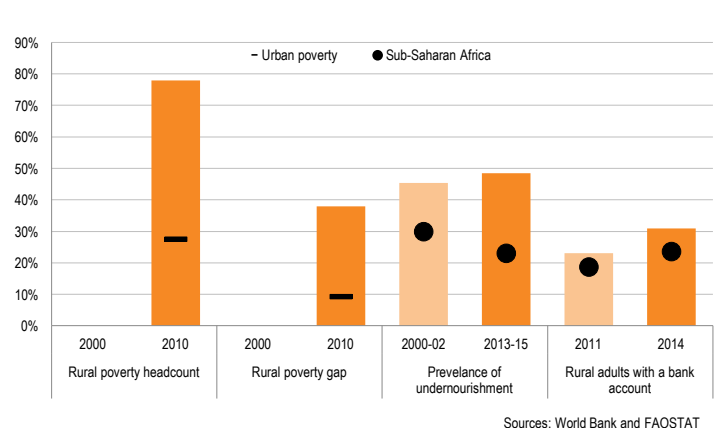
How has the sector grown?

Agricultural output increased by 170% between 1990 and 2013, with most of the increase since 2000. This is primarily due to rising yields (4.4% per annum) compared to a 0.6% increase in land. Both crop and livestock output has risen at similar rates.



How vulnerable are people to risks?

Almost 80% of the rural population are classified as living in poverty. This is much higher than the urban level. The rural poverty gap is also larger. The prevalence of undernourishment has risen since 2000-02, in contrast to most other African countries.



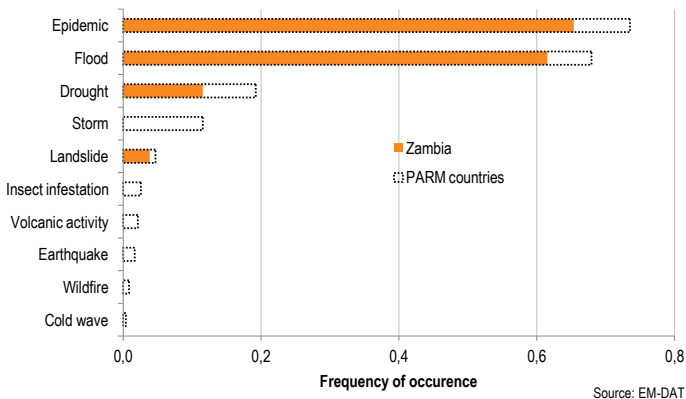
Production risks

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, epidemics and floods were the most frequent disasters to affect Zambia, occurring once every two years. A major drought is recorded as occurring once every decade. No major storm events or insect infestations were recorded.

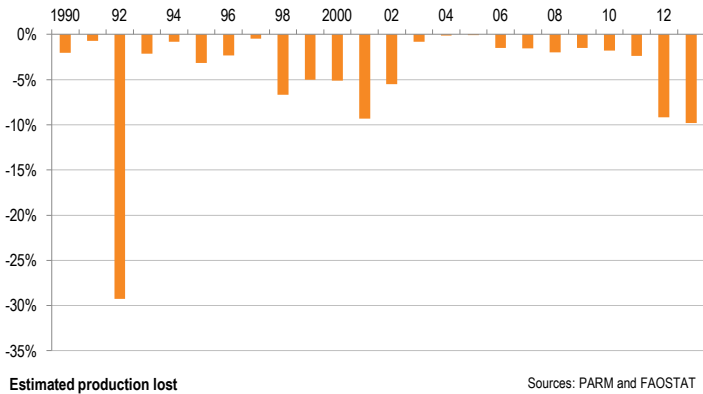


What is the likely impact of future climate change?

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. In Southern Africa, temperatures will rise in all seasons, with an average temperature 3.5-4°C higher than experienced in the late 20th century. Projected rainfall change over most of sub-Saharan Africa is uncertain due to complex topography. However, most models suggest a reduction in rainfall and drier conditions are likely in Southern Africa. Increasing temperatures and changes in precipitation are very likely to reduce cereal crop productivity, and could also adversely affect high-value perennial crops. There is also evidence in Zambia that climate change will increase human health risks, particularly cholera.

Has the risk varied over time?

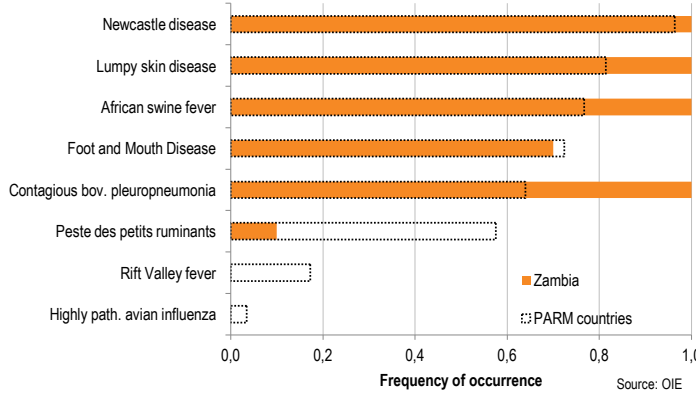
Totalling the annual value of production losses for the 12 crops provides an indicative production risk profile for the period. Annual production losses averaged 6%, ranging from 0-29%. The largest loss occurred in 1992 when most of the 12 crops experienced losses.



Sources: PARM and FAOSTAT

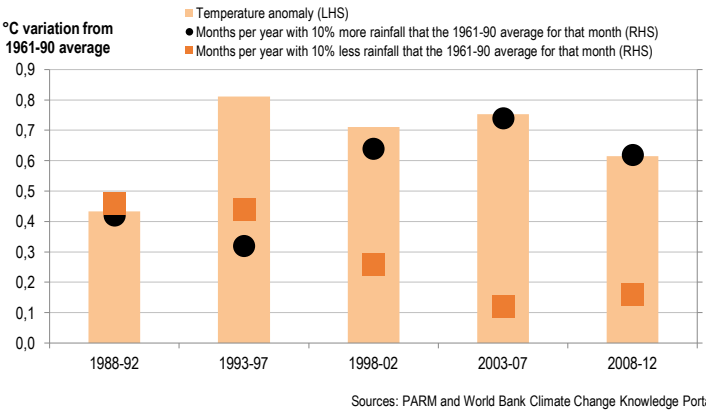
What animal diseases are present?

Of the eight animal diseases analysed over the period 2005-2015, four could be considered endemic. Rift valley fever and Highly pathogenic avian influenza has never been reported. Only in one year has Peste des petits ruminants been recorded as present.



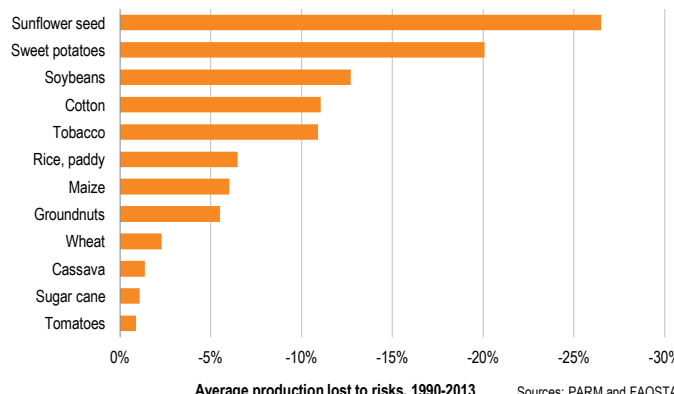
Are weather anomalies increasing?

Temperature levels are higher than the 1961-1990 average, although no upward trend is observed using five-year averages. The number of wetter than average months has risen while the number of drier months has fallen.



Which crops appear most at risk?

Sunflower seeds, sweet potatoes, soybeans, cotton and tobacco are the crops most affected by estimated yield losses. Annual yield losses averaged over 20% of production for the first two (average losses of 60% every 2-3 years).





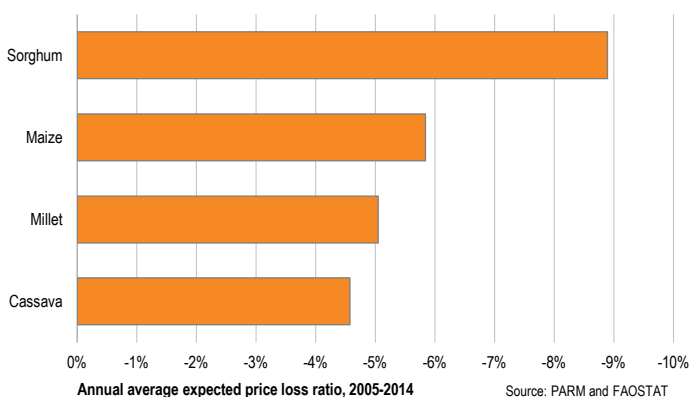
Market risks

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?

Sorghum appears to be the commodity most affected by output price risks, although data for only four commodities and for a limited time period was available. Sorghum had an annual average price loss of almost 9%, an average loss of 30% every 3 years.



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

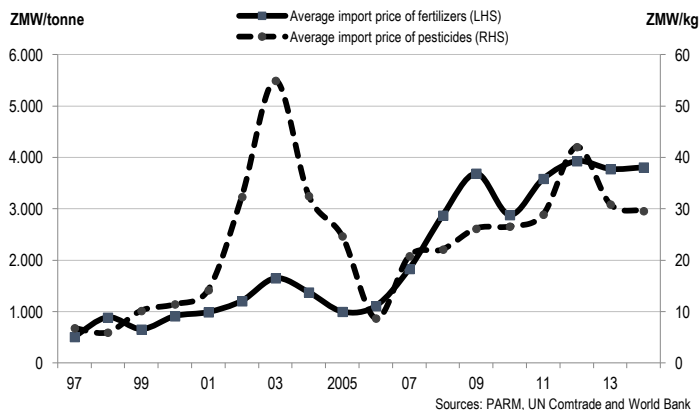
Indicative estimates of production and output price risks are calculated in a similar way. A loss threshold of 0.33 times the standard deviation below the trend value in either yield or prices is calculated to set a benchmark for identifying the losses resulting from production and market risks respectively.

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 are added together across the crop commodities only.

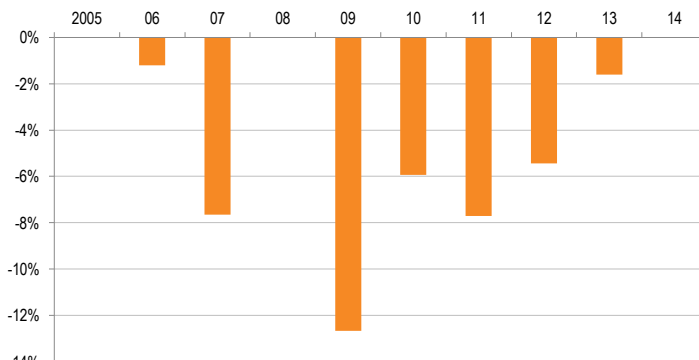
How variable are input prices?

Variations in annual average import prices suggest farmers face some input price risks. Since 1995 import prices have risen by 15% or more at least once every two years for both fertilisers and pesticides.



Has price risk changed over time?

Totalling the estimated revenue lost due to output price risks for the crops provides an indicative market risk profile for the period. The average annual revenue loss is 5%, with a maximum loss of almost 12% in 2009. Output price losses have fallen since then.

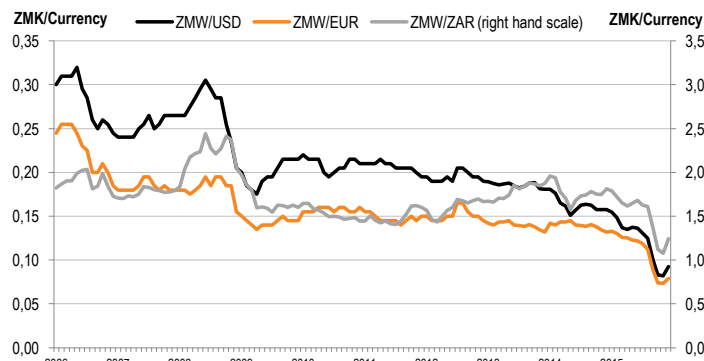


Estimated revenue lost

Source: PARM and FAOSTAT

Is there an exchange rate risk?

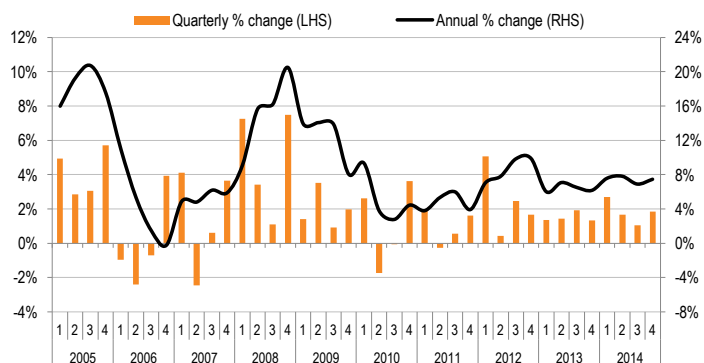
Zambia's currency, the kwacha (ZMW), has been steadily depreciating against the USD, Euro and South African rand. The downward trend has generally been within a narrow range, although there have been some large falls such as in 2009.



Source: OANDA

Do food prices vary for consumers?

Over 2005-14, the food component of the consumer price index recorded an average annual increase of 9%. The highest annual rate of 20% was recorded in December 2008. Prices have risen more slowly since 2010 but fluctuate to the same extent.



Source: ILO

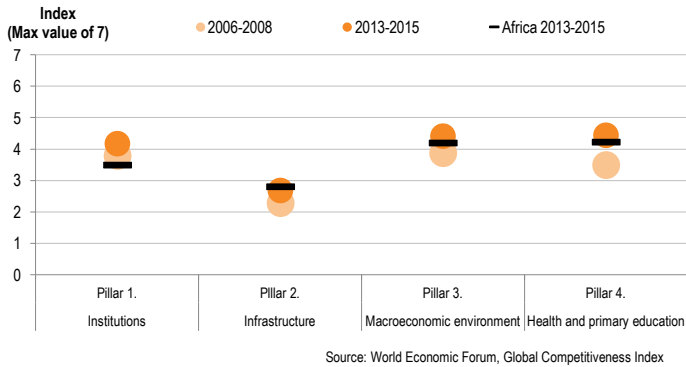
Macro level risks

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.

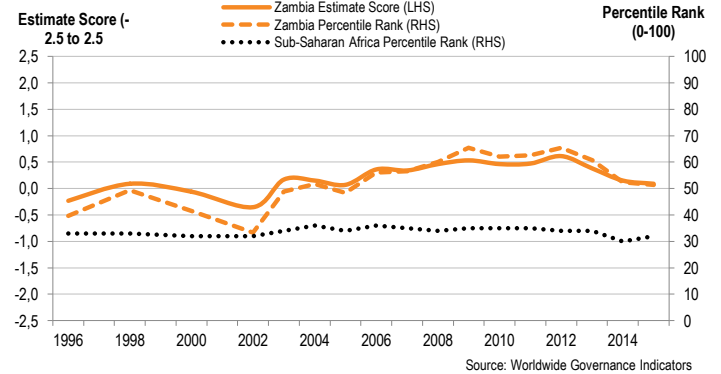
Are basic requirements in place?

Index scores for the basic requirement pillars place Zambia above the African average for three pillars. Index scores have lifted for all four pillars, particularly in health and primary education.



Is the political environment stable?

Zambia scores above the Sub-Saharan Africa average in the political stability and absence of violence index. Its ranking shows a slight upward trend over the period, although there has been a noticeable fall since a peak of 65 in 2012.



Overall risk assessment

The PARM process

A detailed risk assessment is carried out as part of the PARM process, in partnership with NEPAD and the relevant African government. It is a rigorous consultation process involving a risk assessment report drafted by international and local experts, followed by a national validation workshop with the participation of stakeholders including farmers, private sector companies and government. Risks are identified at a detailed level, e.g. droughts, raids, etc.

A detailed risk assessment has yet to occur for Zambia. Consequently, the overall risk assessment is conducted at a higher level based on the analysis contained in this profile.

What are the main agricultural risks?

The analysis suggests that overall production risks are greater than output price risks. While output price risks occur more frequently, their severity is not as large as the extent of losses associated with production risks, both on average and in the worst-case scenario recorded.

RISK	VARIABLE	AVERAGE FREQUENCY	AVERAGE SEVERITY	WORST-CASE SCENARIO
PRODUCTION	RAW SCORE	0.33	-17%	-54%
	RISK LEVEL	● HIGH	● MEDIUM	● VERY HIGH
OUTPUT PRICE	RAW SCORE	0.38	-14%	-28%
	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. Flooding is a clear example of one risk that can trigger others in Zambia. Not only do floods destroy crops, they can also damage roads and bridges, further limiting the supply of food to the market and aggravating spikes in food prices.

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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