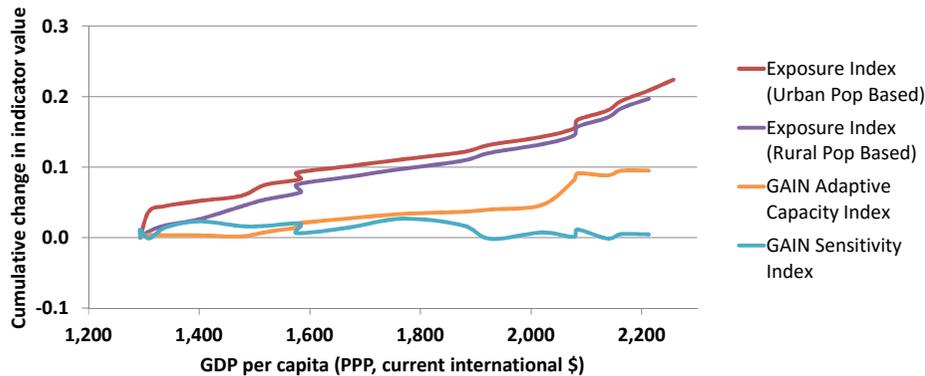


The direction and relative scale of the impacts presented in the scorecard below are subjective judgements based on quantitative data wherever possible. Due to the availability of credible and accurate data, approximations are used for each indicator which may vary by geographical focus or time period and others may draw from qualitative research. A full discussion of analytical constraints is given in the synthesis presentation.

Understanding patterns of climate-resilient economic development Senegal: A case study

Urbanisation and economic diversification are transforming the climatic risks that Senegal faces, and widening the rural-urban resilience gap. Internal migration from rural inlands to urban coastal areas, in combination with strong growth of the tertiary sector, particularly tourism, has reduced vulnerability to droughts but increased exposure and sensitivity to floods and coastal erosion. Economic diversification has also decreased sensitivity to climate variability and led to broad-based improvements in living standards, social infrastructure and adaptive capacity. However, such benefits have been concentrated among urban centres and has widened inequalities in resilience across Senegal.



Both **rural exposure** and **urban exposure**, based on approximations of the population living in areas at high risk of droughts and floods, respectively, have increased steadily with GDP per capita. **Sensitivity**, as measured by the ND-GAIN vulnerability index component, has shown some variation across the dataset, with Senegal becoming slightly more sensitive as GDP per capita surpassed \$1,300 but then decreasing to initial levels from around \$1,900. **Adaptive capacity**, from the same source, grew moderately with development until a sharp rise around \$2,000 per capita, after which it levelled off.

The case study addresses the question: *‘How has coastal and tourism development affected exposure and sensitivity to droughts and floods as well as adaptive capacity in Senegal?’* over the 1990-2015 period. It drew from desk-based research and fieldwork including the review of technical reports, policy and legal documents, national and international databases and interviews.

Change in resilience

due to change in indicator

EXPOSURE

The presence of people and assets in places that could be adversely affected by climate change.

People

Population at high risk of drought
Risk of drought

Assets

Urbanisation of coastline
Rates of coastal erosion
Risk of flood

While urban centres are also at risk of drought, the population living in rural areas highly exposed to drought remained relatively stable as rural-urban migration was masked by strong rural population growth. Decreasing average rainfall increased the likelihood of droughts though this was not attributable to economic development. Construction along the coastline rose, indicated by a higher share of urban land, exposing new assets such as hotels and shops to floods and coastal erosion. Rising sea levels intensified the risk of floods and erosion rates were accelerated due to uncoordinated protection measures such as dikes and breakwaters which concentrated erosion in vulnerable areas.

SENSITIVITY

The degree to which a system is affected by or responsive to a climate stimuli.

Societal resilience

DRRM activities
Pressure on water resources

Economic resilience

Economic diversification
Dependence on agriculture
Development of flood-sensitive activities

The tertiary sector continued to be the main driver of GDP growth, accounting for 73 per cent of growth between 2006 and 2014, indicating economic diversification away from climate-sensitive agriculture, which declined as a % of GDP. In particular, the tourism sector grew substantially though this also increased sensitivity to floods and coastal erosion and placed additional pressure on already scarce water resources. However, initial disaster risk reduction and management (DRRM) activities such as flood defences and early warning systems helped to mitigate these risks.

ADAPTIVE CAPACITY

The potential or capability of a system to adapt to, or alter to better suit, climatic stimuli or their effects or impacts.

Poverty incidence
Depth of poverty
Education and training
Inequality

Urbanisation and the growth of the tertiary sector drove increases in income and economic development which, combined with small declines in inequality as indicated by a lower GINI index, helped build adaptive capacity. Both national rates of poverty and the average income gap to the poverty line also declined. Migration to urban areas raised national educational attainment, as reflected in literacy rates, and the quality of health care but widened the gap in adaptive capacity between the rural and urban population.



Are impacts different for the poorest?

Migration is often unaffordable for the poorest and their resilience has remained low as a result. The rural poverty rate and gap are approximately double those in urban centres and access to electricity, water and sanitation facilities are significantly lower. **Even when rural households can afford to migrate, it is typical for men to migrate leaving women and children vulnerable** and draining remote areas of young, skilled labour and income.

Even within urban centres, exposure and sensitivity to floods varies across income groups. **The poorest tend to settle in low-lying informal settlements with little social infrastructure or service provision amplifying the damage caused by climatic events.** Formal and planned areas, such as the historic centre of Dakar which is only accessible to the rich, often benefit from higher locations and effective flood defences.

The poorest also tend to find seasonal or casual work in agriculture or tourism, both sectors which are highly sensitive to climate variability and consequently, offer little job security. If harvests are low, farmers will hire fewer seasonal workers **leaving the poor with no income and severely limited adaptive capacity.**



Are impacts locked in?

The absence of a legal land use framework and inadequate urban planning in Senegal has contributed to much of its urban construction being exposed to climate risks. Developing such a framework is complex, costly and requires multi-stakeholder approval, and thus **its absence may cause political lock-in of low adaptive capacity.** Without this framework, informal settlements and construction could expand further into high-risk areas and coastal zones will be increasingly degraded.

The densely developed port of Dakar has caused physical lock-in of high exposure and sensitivity. As an international trade hub, the port is central to Senegal's economy. Little available land in the city (due to geographical characteristics) has caused development in areas prone to floods and coastal erosion. This has made relocation or coastal defence programmes highly expensive, if at all possible.

The growing tourism sector may also lead to economic lock-in of high sensitivity due to its high water consumption. Water supply in Senegal is often threatened by droughts. While current supply appears to be sufficient, a water management plan is required to manage increased competition among sectors, particularly with climate variability is set to increase.



What are the policy implications?

Economic diversification is a powerful climate risk mitigation tool. In Senegal, diversification away from agriculture and towards the tertiary sector has substantially reduced sensitivity to droughts although also introduced new risks associated with growing sectors. For example, the rapid expansion of tourism along the Senegalese coastline has created an increase in sensitivity to floods and coastal erosion. However, as the agricultural sector is a larger share of GDP, the impact of a drought is likely to be more severe than that of a flood. Therefore, Senegal is judged to have become less sensitive overall. From a risk perspective, standard economic policy may also encourage judicious diversification, but this is given greater emphasis by a climate resilience lens.

A legal framework for land use which accounts for climate risks may help focus development in low risk locations, increasing the resilience of assets. As much development in Senegal has been concentrated along the coastline, the value of assets exposed to floods and erosion has significantly increased. Due to a lack of information regarding climate risks, development decisions are often made without concern for resilience. A land use framework may have ensured that people and businesses accounted for climate risk and limited the development of informal settlements and tourism infrastructure in high risk areas. Such factors are unlikely to factor into standard economic development policy.