

# Protected Areas Resilient to Climate Change, PARCC West Africa



2015

## Climate Change and Ecosystem Services Fact Sheet: The Gambia



ENGLISH

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## Table of Contents

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INTRODUCTION..... 4

CLIMATE PROJECTIONS..... 5

ECOSYSTEM SERVICES..... 6

PILOT SITE ..... 7

ADVICE FOR NATIONAL PLANNING..... 7

## Introduction

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To assist West African protected areas in building their resilience to climate change, the PARCC-WA project has assessed future climate impacts of land use change on ecosystem services in The Gambia. This includes applying five spatially detailed regional climate model projections developed for the project and three scenarios of future land use change.

This fact sheet summarises the main features of projected climate impacts on ecosystem services and their implications for focus project areas in The Gambia and future national planning. Findings from the latest assessment report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) are referred to in order to provide guidance on the way to interpret these results – which should be viewed either as:

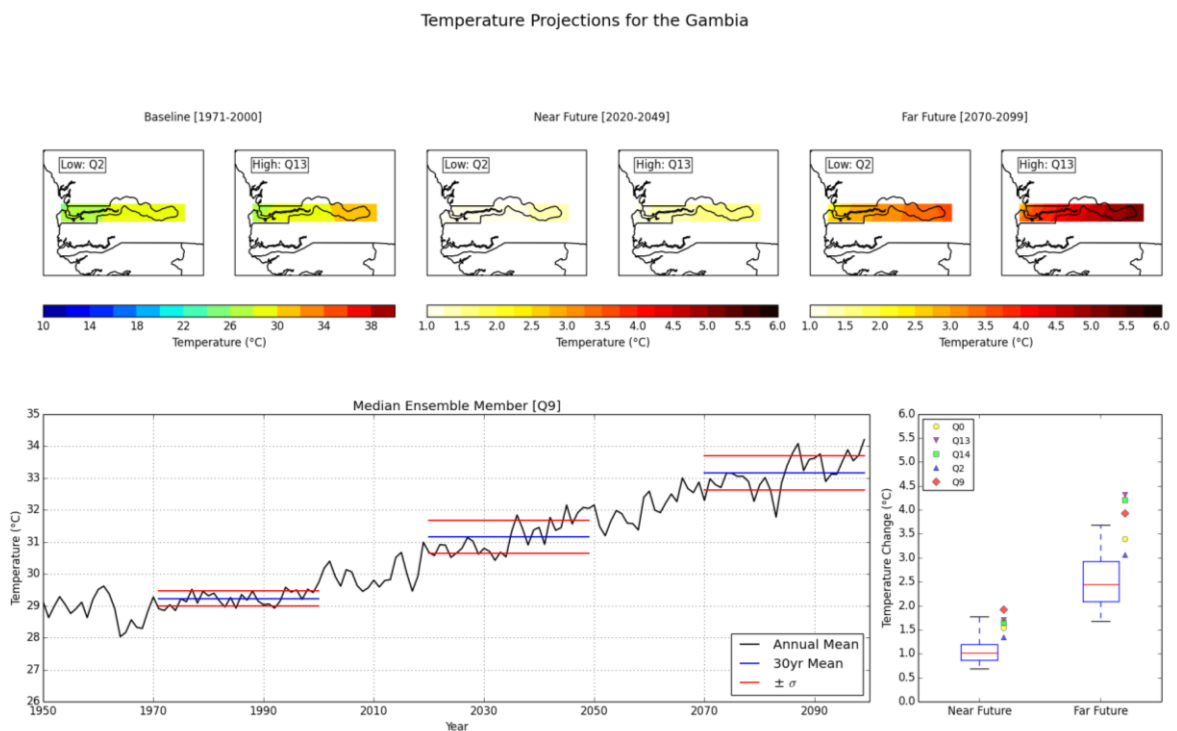
(a) Results we have *high confidence* in because of high agreement between the models and a physical understanding of the projected change; or

(b) *Plausible* results we cannot exclude as being wrong, but which we have low confidence in due to lack of consensus between the model projections.

## Climate Projections

- The projections for mean annual temperature in The Gambia for the end of the 21<sup>st</sup> century are for significant increases (high confidence):
  - From the PARCC regional climate projections: increases of 3 to 4.5 °C
  - From global climate models assessed in IPCC AR5: increases of 1.5 to 4 °C
- Projections for wet season (July-August-September) total precipitation used in the project are considered plausible/low confidence:
  - From the PARCC regional climate projections: changes of -35 to -20%
  - From global climate models assessed in IPCC AR5: changes of -45 to +80%
- Within the regional climate model projection results:
  - Highest temperature increases are expected furthest inland due to the greater distance from the regulating influence of the ocean.

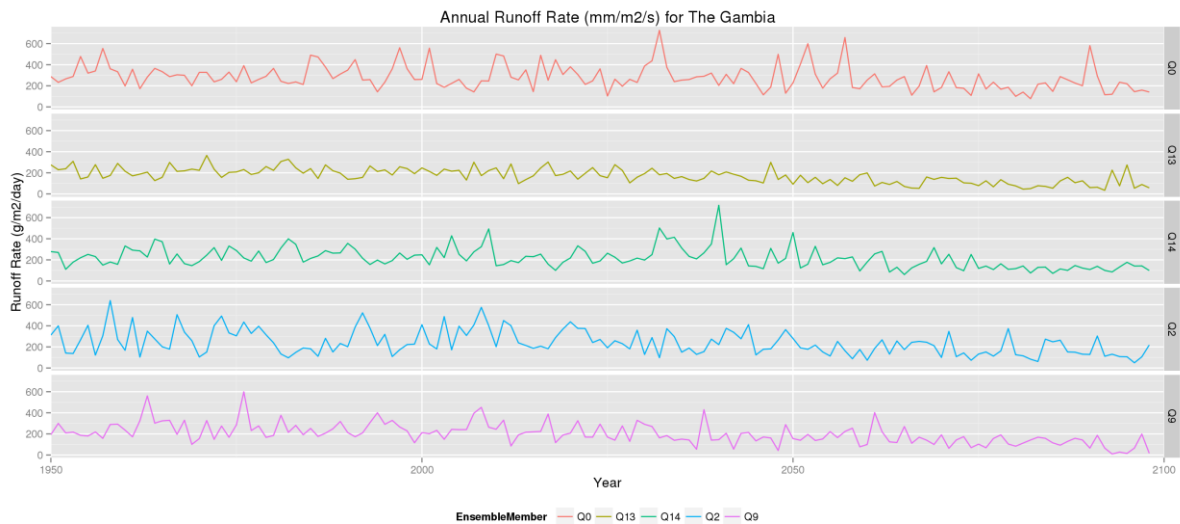
Generally, projections are for little change in precipitation over coming decades but for decreases towards the end of the century.



**Figure 1. Temperature projections for The Gambia. (Top 6 panels) Annually averaged surface temperature (°C) for the baseline period (1971-2000), and projected changes for the near future (2020-2049) and far future (2070-2099), for the RCM models with the lowest and highest projected sensitivities in the far future time period (for The Gambia, these are Q2 and Q13 respectively). (Bottom left panel) Evolution of annual mean surface temperature from 1950-2100 for the median ensemble member of the five models (Q9), as well as the 30-year mean and associated standard deviations for the baseline, near and far future periods defined above. (Bottom right panel) Annually averaged temperature changes for the near and far future time periods, for the five RCM experiments as well as 18 CMIP5 GCM experiments using RCP6.0.**

## Ecosystem Services

- Projections of future grass cover and bare soil fraction in Gambia demonstrate high sensitivity to precipitation variability, indicated by both year-to-year variability and decade-to-decade variability in vegetation cover (high confidence)
- In Gambia, projections for an increase in the bare soil fraction, replacing grass cover, as well as a small reduction in vegetation productivity, is related to a projected decrease in western Sahelian precipitation and thus is low confidence but plausible.
- Surface runoff, an indicator of river discharge rate, is projected to decrease in Gambia, however, this is strongly related to projected changes in precipitation, and thus is low confidence but plausible. Projections show that historical levels of variability in surface runoff will continue into the far future.



**Figure 2. Variability and change in surface runoff for each ensemble member for the whole of Gambia for the period 1950 to 2100. These projections are strongly related to precipitation, and therefore should be interpreted as low confidence but *plausible*.**

## Pilot Site

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- In the Niimi National Park, which is transboundary with the *Parc National du Delta du Saloum* in Senegal, the relatively strong signal for a reduction in monsoon (July-August-September) precipitation in the PARCC regional climate model ensemble leads to a projected reduction in surface runoff in the far future for all ensemble members (plausible but low confidence)

## Advice for National Planning

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- Planning should account for the possibility that total monsoon precipitation may decrease in the far future in Gambia (plausible). However, given the lack of robust evidence to support this projection, it would be prudent to plan in the coming decades to experience climate variability and extremes as have been observed in the last three decades.
- National planners should be aware that the east of Gambia is projected to experience the largest increases in mean annual temperature (up to 5.5°C in the far future; high confidence).