

# SA-TIED Dialogues - Research into Policy

## Climate-related investments: now or later?

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During the dialogue your microphone will be muted and camera will be turned off, however you can send questions to the speakers using the Q&A button.

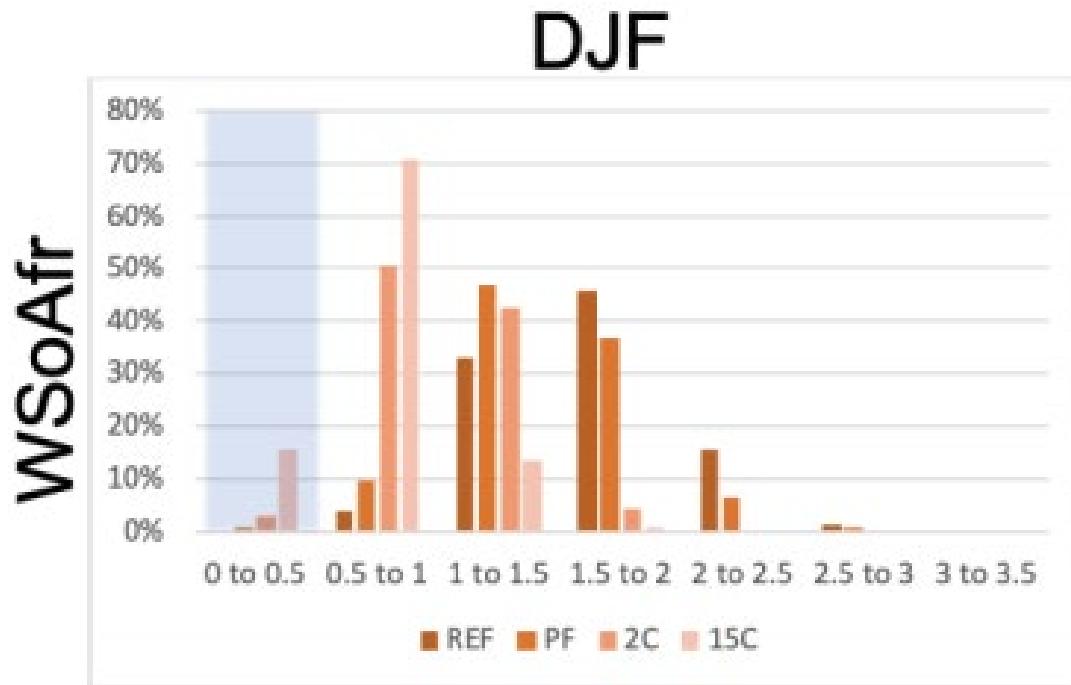
At the end of the dialogue there will be a 15 minute Q&A session, during this time you may turn on your camera and microphone.

The speaker column can be minimized using the options in the top left corner of the tab.

This dialogue will be recorded and the recording will be added on UNU-WIDER YouTube channel as well as the SA-TIED website.

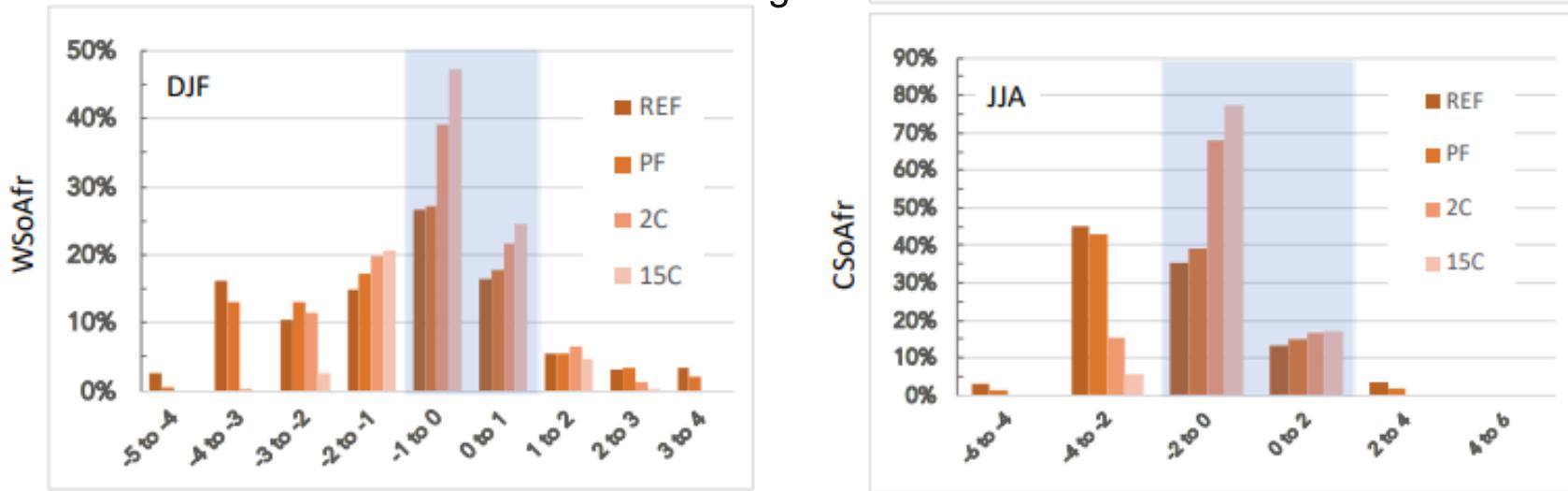
# Temperature Change by Scenario

Average in December, January, and February of 2050-59 for Western Southern Africa



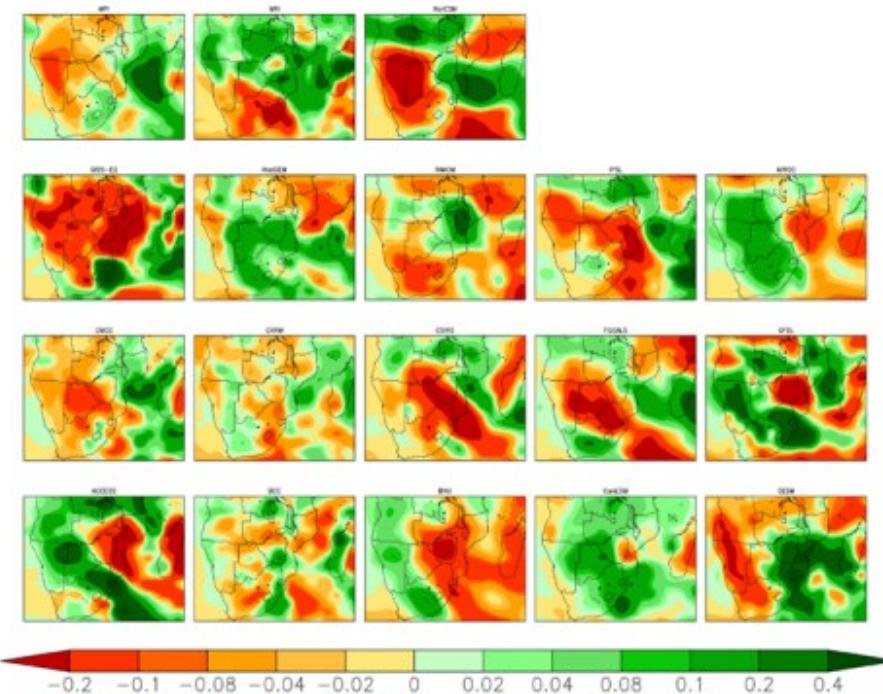
# Precipitation Change by Scenario

Average of 2050-59



**Figure 15.** HFDs of seasonal-, decadal- and area-averaged precipitation change for 2065-2074 relative to last decade of the 20<sup>th</sup> century. Left: December-February (DJF), WSoAfr region. Right: June-August (JJA), CSoAfr region. All four IGSM scenarios shown. Units in mm/decad (decad=10 days). Blue shaded regions denote the bin for which changes in temperature are less than 2 times the standard deviation estimated from observations in the 1979-2019 period (see Table 1).

# Precipitation change patterns across multiple general circulation models by the 2050s



**Figure 8.** Maps of southern Africa from each model of the CMIP5 collection showing pattern-change kernel (PCK) coefficients,  $dC_{x,y}/dT_{Global}$  (units of  $K^{-1}$ ) for seasonally averaged precipitation pattern shifts for December–February (DJF).

# Combining climate and weather

- **Problems with typical approach:**
  - Most studies only have 2 climate scenarios
  - Most focus on the mean or median weather
- **We combine stochastic climate and weather**
  - Our approach captures more of the tails of distributions (i.e., low frequency, high impact events)

## Combining climate and weather scenarios

1

Start with 4 emissions scenarios with 7,200 climates each (2020-2069)



2

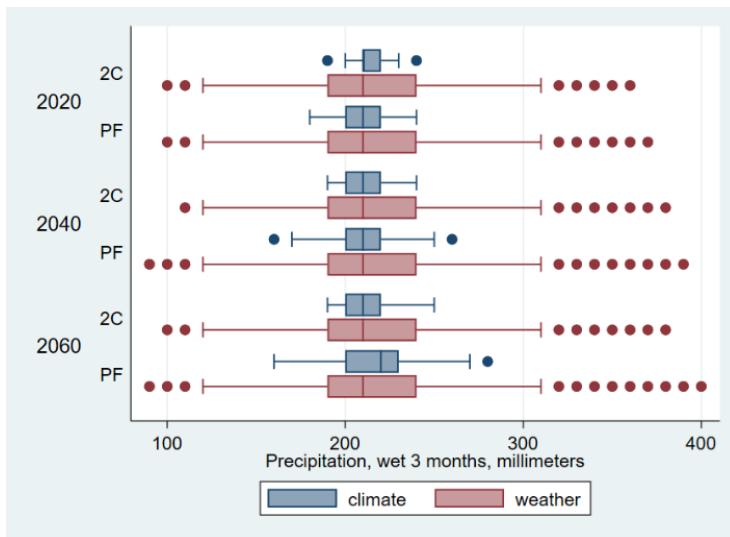
Randomly draw 100 50-yr weathers

3

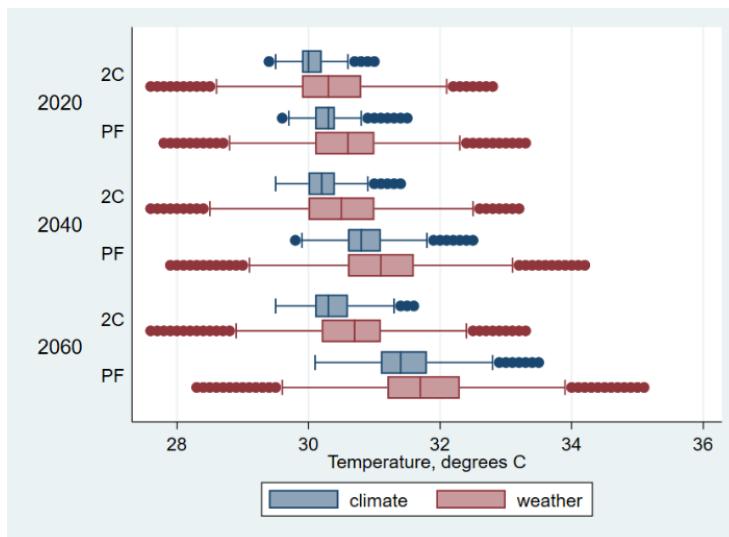
All possible combinations gives 720,000 weathers for each scenario (at 0.25° or 25 km)

# Variation in precipitation and temperature for RSA by year and scenario

Precipitation (mm)  
during wettest 3  
months of the year for  
each pixel and decade

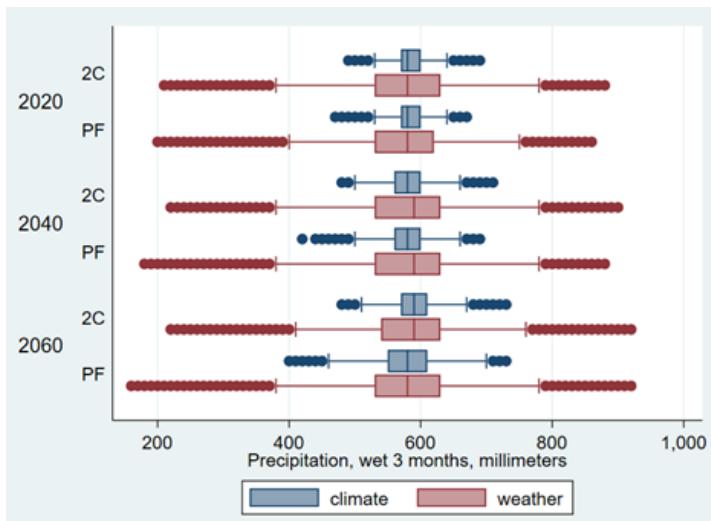


Mean daily temperature  
for warmest month  
during wettest 3  
months of the year for  
each pixel and decade

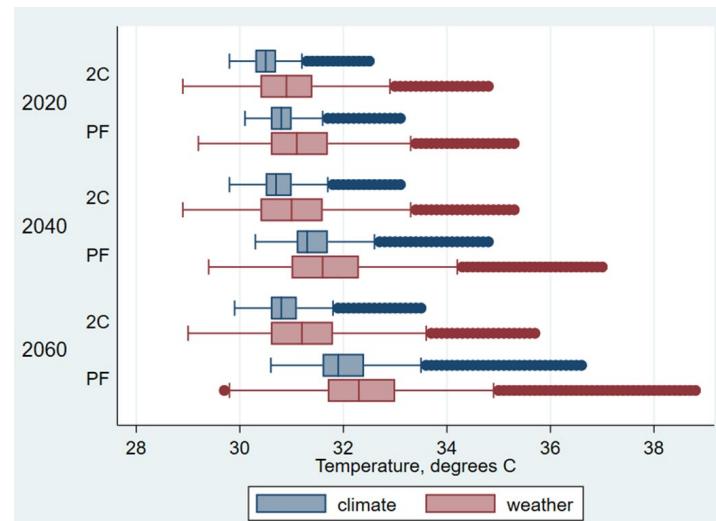


# Variation in precipitation and temperature for Zambia by year and scenario

Precipitation (mm)  
during wettest 3  
months of the year for  
each pixel and decade



Mean daily temperature  
for warmest month  
during wettest 3  
months of the year for  
each pixel and decade



# Twenty year maize yield extreme event

	1p5C	1p5C	2C	2C	PF	PF	REF	REF
Area	2040s	2060s	2040s	2060s	2040s	2060s	2040s	2060s
Region	15.3	16.3	13.3	13.1	11.7	6.5	9.6	3.5
Angola	20.7	33.7	20.1	21.0	13.9	12.3	12.7	7.1
Botswana	18.1	14.9	14.3	10.8	10.8	6.3	10.8	5.0
Eswatini	17.8	17.1	15.5	12.1	11.6	7.1	13.8	6.3
Lesotho	20.9	14.3	16.0	14.8	23.1	12.7	12.8	10.2
Malawi	16.8	21.8	10.6	17.1	15.3	8.0	11.2	4.7
Mozambique	16.5	18.7	16.5	16.1	12.9	7.1	9.9	4.2
Namibia	14.1	14.1	14.5	12.9	10.9	5.5	14.6	5.6
South Africa	16.7	16.6	11.9	12.3	10.3	8.2	10.2	6.7
Zambia	19.5	19.8	12.3	9.1	10.6	5.1	7.1	3.3
Zimbabwe	19.4	21.4	15.2	14.0	12.3	8.1	8.8	5.2

# Climate-related investments: Now or later?

- Examples of things to do now and their characteristics
  - Agricultural research
    - High returns under multiple future climates but long lags between investment and benefit
  - Shift over time from coal fired electricity generation to renewables
    - Something South Africa should do over time independent of climate change. But, climate change strongly reinforces the case for action.
  - Maintain South Africa's water infrastructure, especially storage and the ability to transfer water between river basins.
    - An important asset that becomes more important with CC

# Climate-related investments: Now or later?

- Examples of things to do later or after careful consideration or never
  - Large new hydropower investments
    - Big initial investment that may not yield over time
  - Protective infrastructure
    - Checkered history even without change
  - Strive for food self-sufficiency
    - Climate change strongly favors open trade

# Thank you!