



Adaptation research needs and priorities in South Africa - towards addressing uncertainties

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Key points

- Adaptation actions much more difficult to define and quantify than mitigation actions
- Adaptation planning and actions much more subject to uncertainty in scenarios, projections – increasing resilience, no regrets important
- Defining adaptation priorities limited by the above, AND understanding of the economics of impacts, responses and avoided damages, esp. local level
- Classical economic approaches “under-value” the relative impacts on the poor, most vulnerable



SOUTH AFRICA'S VULNERABILITIES

The socio-economic factors that increase vulnerability to climate change:

- Large proportion of population has low resilience to extreme climate events (poverty; high disease burden; inadequate housing infrastructure and location, dependence on subsistence/natural resource-dependent livelihoods)
- Climate related extreme events often exacerbate existing socio-economic challenges, inequalities and vulnerabilities
- Much of SA (and Africa) has low and variable rainfall
- Significant proportion of surface water resources already fully allocated in SA
- Agriculture and fisheries important for food security and local livelihoods, and natural resource allocations already under strain

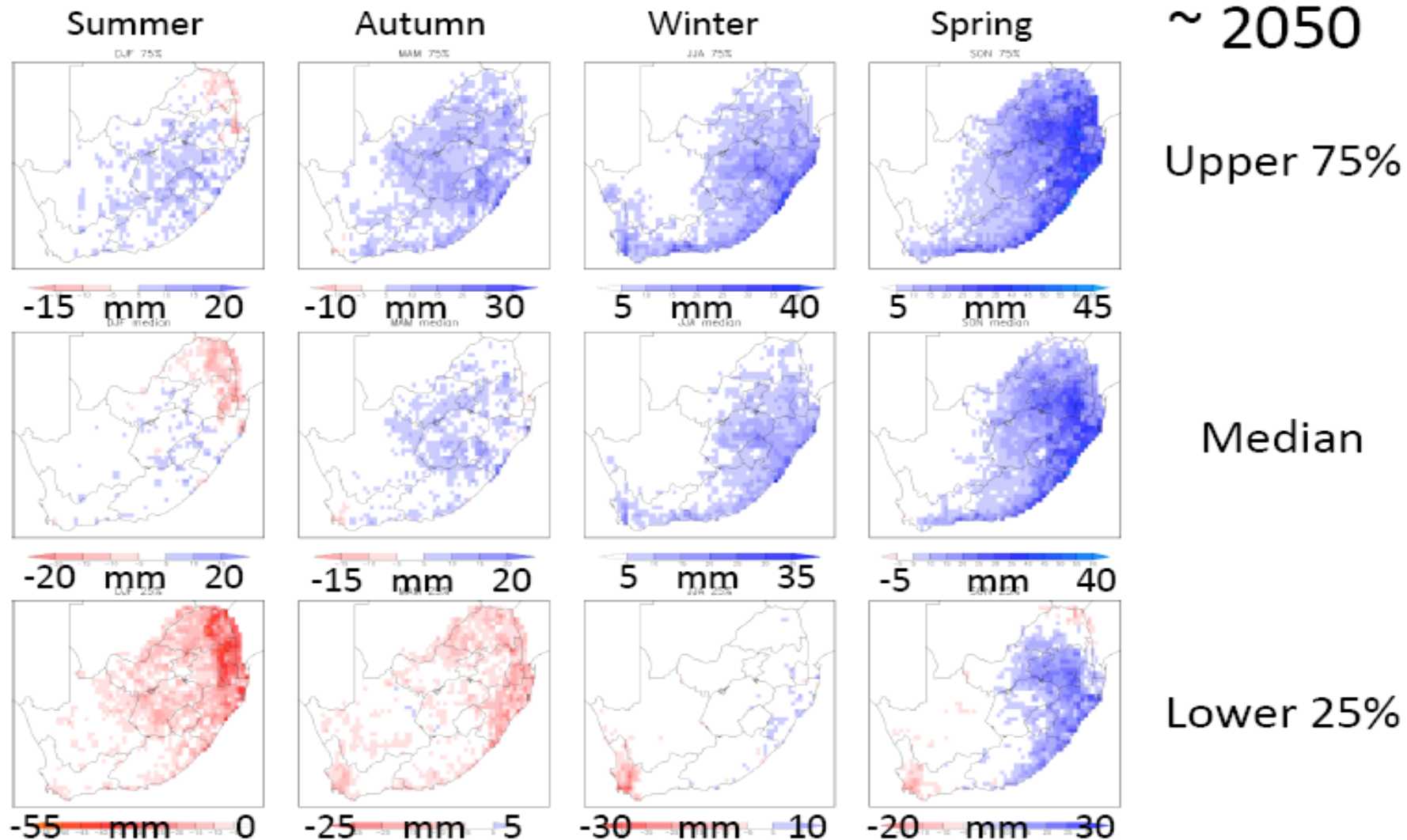


Damage costs due to extreme weather-related events (flooding, wildfire, storms and drought) are conservatively estimated at approx.1 billion rand per year between 2000 and 2009 (probably at least twice that number = 0.07-0.15% GDP) – localized impacts significant, very “patchy” data, impacts on poor inadequately reflected, drought post 2009 not yet reflected



Uncertainty in Rainfall Projections for South Africa

14 climate models, downscaled, SRES A2 (> 2°C global)



AGRICULTURE – preliminary CC impact cost estimates accounting for ~ 80% climate scenario uncertainty under SRES A2

Early estimates climate change impact costs 3 commercial sub-sectors – (linear extrapolation):

- field crops (predominantly cereals) are most severely impacted (24% to 48% drop in profits);
- Animal husbandry sub sector profit losses of between 14 and 26%;
- Horticultural profits (no change to a 15% drop in profits).
- Profit losses translate to risk of a total aggregated cost of approx R 5 billion, about 9% of sectoral GDP annually in total by 2050
- Estimates ignore overlaid impacts of extreme climate events, “break points” in extrapolation
- Quantifying full range of plausible impacts due to uncertainty vs focusing on fine-scale impacts?



Water sector adaptation costs

- Maintenance of supply of water, and damages to infrastructure due to extreme storm and flood events, add R 3.6 billion y^{-1} on top of a business as usual cost of R 3.4 billion y^{-1} (costs levelised, expressed in 2010 values).
- Maintaining a sustainable supply of water of current quality nationally could increase from R 2.7 billion y^{-1} to R 3.5 billion y^{-1} .
- Municipality case study - 8% reduction in rainfall by 2035 results in 30-36% reduction in available water. Capital investment costs increase 4x relative to base case scenario; tariff increases 25% between 2006-2035. Burden falls on middle and low-end users, delivery of the free 6 kl of water per household is potentially compromised.
- Biggest projected cost impact due to flood damage to infrastructure, estimated increase 400% from a conservative current estimate of R 670 million y^{-1} to R 3.5 billion y^{-1} ($\sim 0.6\%$ of GDP).



Research gaps and needs

- How to quantify and cost impacts, avoided damages and adaptation actions, accounting for uncertainties, where information is limited, in relation to global goal
- How to incorporate combined effects of extremes, semi-decadal change with long term climate changes in impacts assessments
- How to define effective adaptation action choices that account for all of these uncertainties – resilience building actions (such as ecosystem-based adaptation), especially at local level – vulnerability vs impacts focus?
- Developing alternative impact assessment approaches and adaptation responses that quantify and reflect the relative impacts on the poor and most vulnerable

