

WRDMAP Climate Change Studies Overall Conclusions and Recommendations

(15th April 2010)



On Climate Modelling

- Inter-model variability is still higher than inter-emissions scenario variability
- The ability of RCMs to model local climate conditions has improved significantly
- The ability of RCMs to model extremes is improving
- Future climate cannot be predicted – we can only investigate scenarios



On Hydrological Modelling of Climate Change Impacts

- Assumption in most modelling approaches at present is that a model calibrated under present conditions can be used to model response under future climatic condition
- There are issues related to changes in natural vegetation and soil characteristics



On Water Resources in the Case Study Basins



- Climate models indicate increased precipitation
- The PRECIS model appears to be a “WET” model
- Modelling results indicate no significant change in water resources availability in the Shiyang River Basin
- Modelling results indicate a potential increase in water resources in the Daling river basin
- Further modelling with alternative RCMs is required



On Water Resources in the Case Study Basins

- There is likely to be an increased flood risk in both case study basins
- Flood frequency and magnitude may increase
- In both case study basins there is a need to assess existing flood risk and create a benchmark against which potential future changes can be assessed
- There is a need for improved hydrometric monitoring



Crop Modelling Results

- In the Daling River Basin
 - Spring wheat yield increases
 - Maize yields could decline
- In the Shiyang River Basin
 - Maize yields could decline
 - Cotton yields could increase significantly



Climate change impacts on agricultural practices

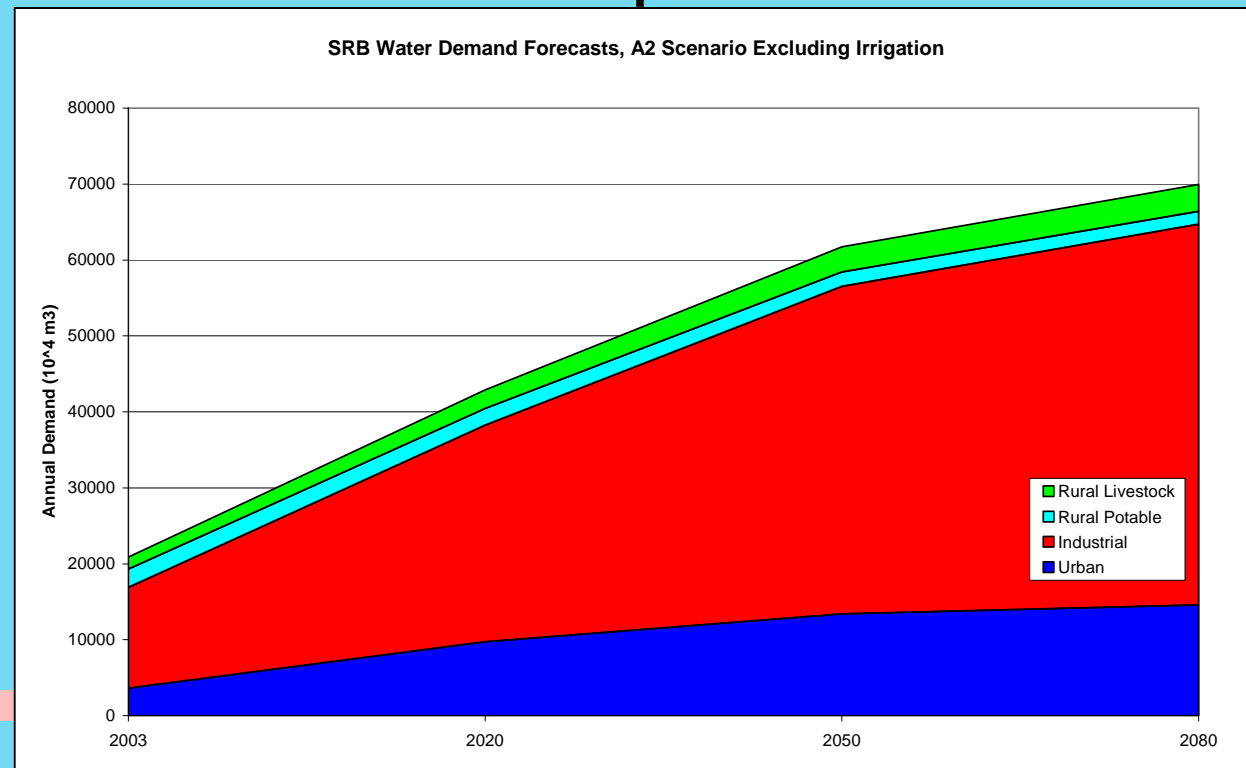


- Double cropping become possible
- Double cropping is more efficient in terms of water use
- Longer growing crop varieties become possible with better yield characteristics
- More diversity possible

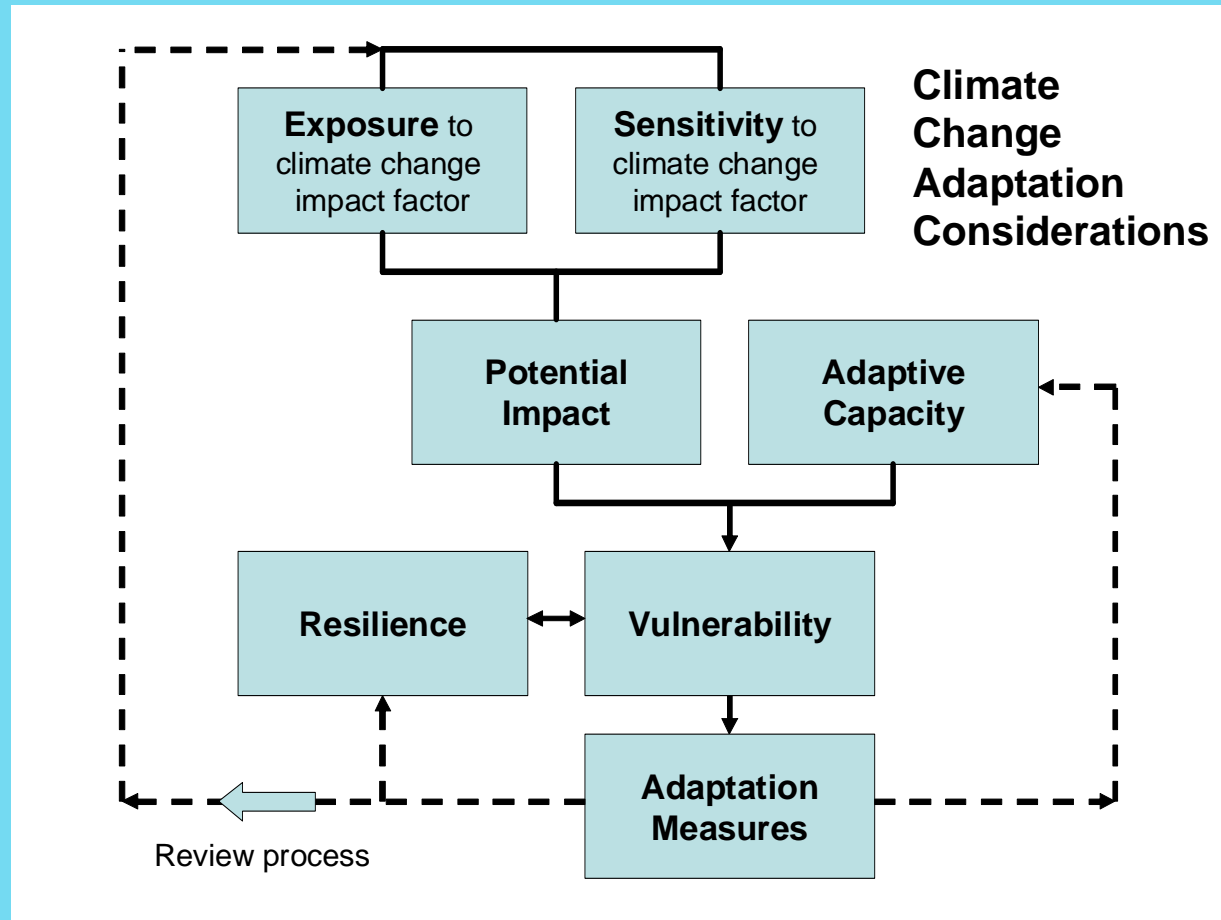


Climate change impacts on industrial and potable water requirements

- Almost none.
- Socio-economic development is the key driver of future industrial and potable demand



Process for Developing Adaptation Measures



Impacts and Adaptation Needs

- Higher air temperatures:
 - new crops and varieties may be possible – production should increase. Mostly beneficial but needs monitoring
 - livestock husbandry and fishery may require some changes
 - Health risks will need to be monitored and mitigated (especially the conjunction between higher temperatures and increased dust storms)



Impacts and Adaptation Needs

- Reduction in number of cold days – creates some scope to improve agriculture
- Increase in number of hot days – many options for agricultural improvements which should be investigated
- Increased water temperature – this will have mixed impacts on the environment of water bodies, which need to be monitored so that any adaptation needs can be assessed



Impacts and Adaptation Needs

- Increased rainfall
 - Increased runoff, soil moisture and recharge
 - Risk of flooding to be planned / designed for
- Increased evaporation – this will reduce the benefit from increased rainfall
- Increased sandstorms – shelter belts and protection to oasis/desert fringe needed
- Increased CO₂ - potentially beneficial to agriculture



Short Term Adaptation

- Establish climate change working groups
- Raise public awareness (agricultural extension etc.)
- Assess existing flood hazards
- Review ecological water allocations
- Improve model predictions
- Improve monitoring



Particular Factors to Consider

- Adequacy of the existing hydrometric networks
- Modelling uncertainty
- Requirement to support the ongoing and developing science

