

WRDMAP Climate Change Studies Overall Conclusions and Recommendations

WRDMAP气候变化研究 总结与建议

(15th April 2010)



On Climate Modelling 关于气候模拟

- Inter-model variability is still higher than inter-emissions scenario variability 不同模式结果间的差异仍然要大于不同排放情景间的差异
- The ability of RCMs to model local climate conditions has improved significantly 区域气候模式模拟区域气候条件的能力显著提高
- The ability of RCMs to model extremes is improving 区域气候模拟对极端事件的模拟能力也在持续进步
- Future climate cannot be predicted – we can only investigate scenarios 不能准确预测未来的气候——我们只能对各情景方案进行研究



On Hydrological Modelling of Climate Change Impacts



关于气候变化对水文的影响模拟

- 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 当前大多数模拟方法都假定在当前条件下校准的模型是能够模拟未来气候条件下的响应的
- There are issues related to changes in natural vegetation and soil characteristics 同天然植被和土壤特性变化有关的问题



On Water Resources in the Case Study



Basins关于两研究流域的水资源

- Climate models indicate increased precipitation 气候模式表明降雨量将增加
- The PRECIS model appears to be a “WET” model PRECIS模式看起来是一个“湿润”模式
- Modelling results indicate no significant change in water resources availability in the Shiyang River Basin 模拟结果显示，石羊河流域的可用水资源量不会发生太大变化
- Modelling results indicate a potential increase in water resources in eth Daling river basin 模拟结果显示，大凌河流域的水资源量可能会有所增加
- Further modelling with alternative RCMs is required 日后应使用其他区域气候模式进行模拟



On Water Resources in the Case Study Basins

关于两案例研究流域的水资源

- There is likely to be an increased flood risk in both case study basins 两研究流域的洪水风险很可能都会有所增加
- Flood frequency and magnitude may increase 洪水频率和规模都有可能增加
- 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 两研究流域都应对当前的洪水风险进行评价，在此基础上再对未来潜在的风险变化进行评价
- There is a need for improved hydrometric monitoring 需要改善水文监测



Crop Modelling Results 作物模型模拟结果

- In the Daling River Basin 大凌河流域
 - Spring wheat yield increases 春小麦产量增加
 - Maize yields could decline 玉米产量可能会下降
- In the Shiyang River Basin 石羊河流域
 - Maize yields could decline 玉米产量可能会下降
 - Cotton yields could increase significantly 棉花产量可能会大幅提升



Climate change impacts on agricultural practices 气候变化对农耕方式的影响

- Double cropping become possible 复种成为可能（一年两熟）
- Double cropping is more efficient in terms of water use 复种的用水效率更高
- Longer growing crop varieties become possible with better yield characteristics 可能可以种植生育期更长的品种，并带来更高的作物产量
- More diversity possible 更具多样性

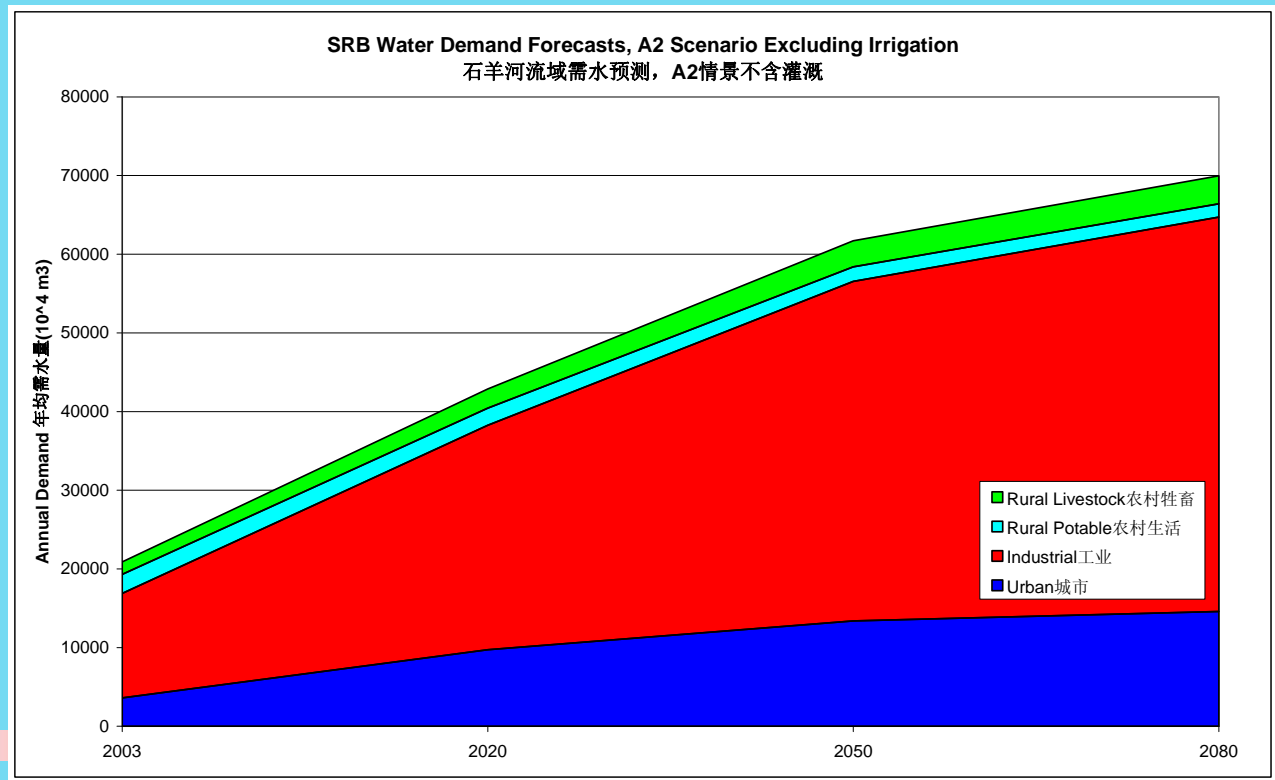


Climate change impacts on industrial and potable water requirements

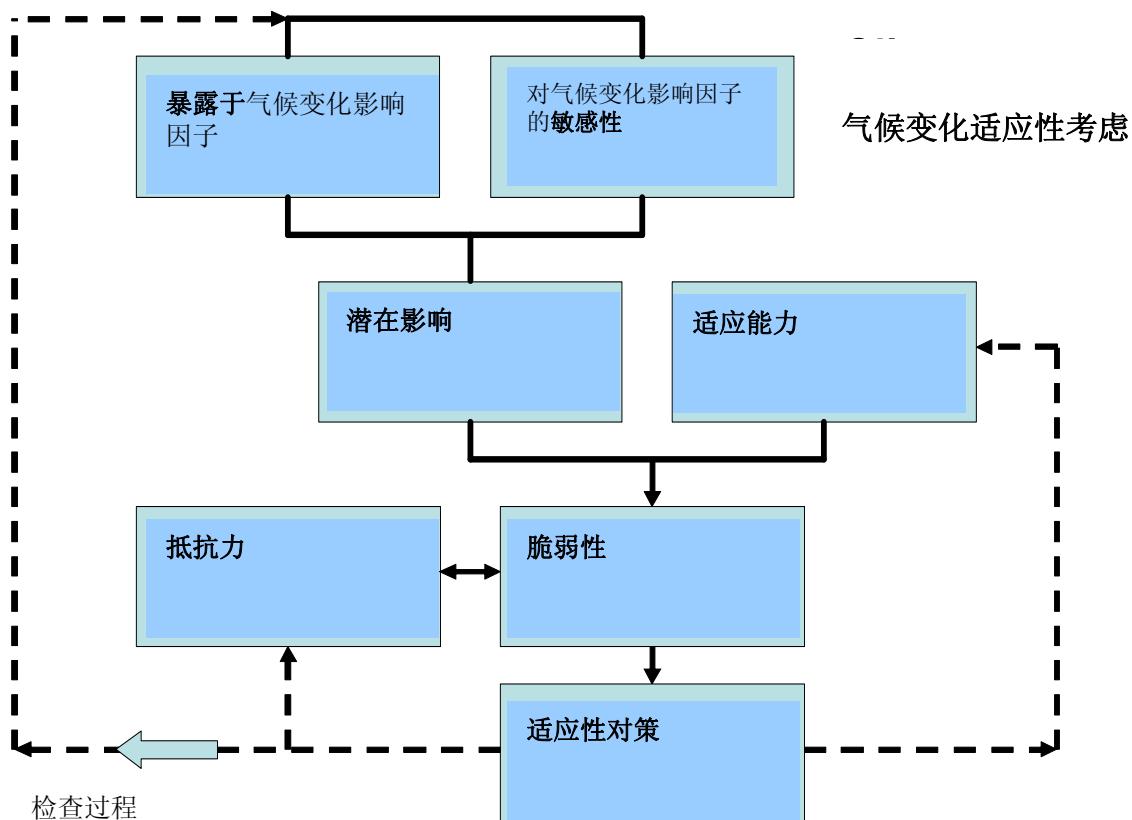
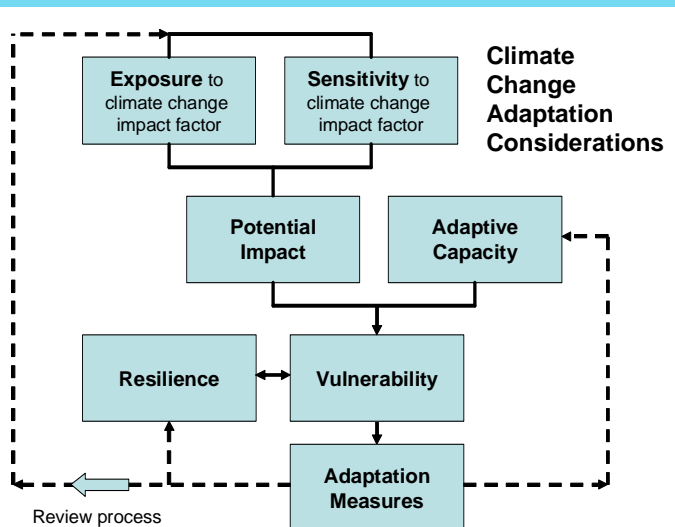


气候变化对工业和饮用水需求的影响

- Almost none. 几乎没有
- Socio-economic development is the key driver of future industrial and potable demand 社会经济发展是未来工业及饮用水需求的主要驱动因素



Process for Developing Adaptation Measures 适应性措施的制定过程



Impacts and Adaptation Needs

气候变化影响及适应性需求

- Higher air temperatures: 气温升高:
 - new crops and varieties may be possible – production should increase. Mostly beneficial but needs monitoring
种植新型作物和品种成为了可能——产量将增加。大体上来说应当是正面影响，但需要进行监测。
 - livestock husbandry and fishery may require some changes
牲畜养殖和渔业可能需要做出一些改变
 - Health risks will need to be monitored and mitigated (especially the conjunction between higher temperatures and increased dust storms)
需要监测并降低健康风险（尤其是伴随着气温升高和沙尘暴的增多）



Impacts and Adaptation Needs

气候变化影响及适应性需求

- Reduction in number of cold days – creates some scope to improve agriculture 寒冷天数减少——给改善农业创造了一些机会
- Increase in number of hot days – many options for agricultural improvements which should be investigated 酷热天数增多——为改善农业提供了更多选择，但需要对此进行研究
- 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 水温升高——会对水环境产生多种影响，应对此进行监测，在此基础上再对适应性需求进行评价



Impacts and Adaptation Needs

气候变化影响及适应性需求

- Increased rainfall 降水量增加
 - Increased runoff, soil moisture and recharge 径流量、土壤墒情和补给量都会增加
 - Risk of flooding to be planned / designed for 需对洪水风险进行规划/设计
- Increased evaporation – this will reduce the benefit from increased rainfall 蒸发量加大——一定程度上抵消了降水量增加带来的好处
- Increased sandstorms – shelter belts and protection to oasis/desert fringe needed 沙尘暴有所增加——需要种植防护林带，并对绿洲/沙漠周边提供保护
- Increased CO₂ - potentially beneficial to agriculture CO₂ 含量增加——可能会对农业有利



Short Term Adaptation 短期适应性

- Establish climate change working groups 成立气候变化工作小组
- Raise public awareness (agricultural extension etc.) 提高公众意识（农业技术推广等）
- Assess existing flood hazards 对现有洪水危害进行评价
- Review ecological water allocations 重新检查生态配水量
- Improve model predictions 提高模型预测能力
- Improve monitoring 改善监测



Particular Factors to Consider

需考虑的特殊因素

- Adequacy of the existing hydrometric networks 现有的水文测站是够充足
- Modelling uncertainty 模型模拟中的不确定性
- Requirement to support the ongoing and developing science 需要对持续开展科学研究提供支持

