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Andes • Ganges • Limpopo • Mekong • Nile • Volta

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Climate Change and Environmental Drivers

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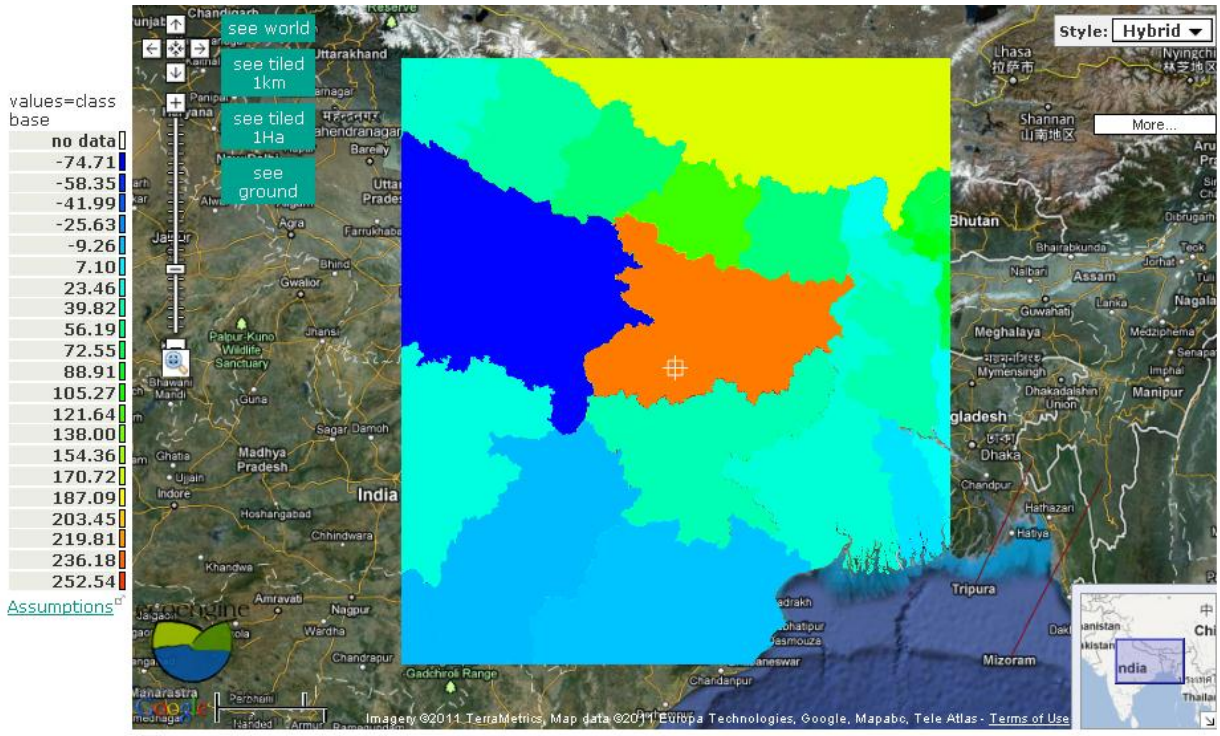
Session: Global Drivers



SCREENSHOT FROM THE AGUAANDES/WATERWORLD POLICY SUPPORT SHOWING CHANGE IN ANNUAL TOTAL WATER BALANCE (MM/YR) BETWEEN THE BASELINE (1950-2000) AND AN A2a MEAN OF 17 GCM ENSEMBLE SCENARIO TO 2080. THE WATER BALANCES ARE AVERAGE OVER REGIONAL ADMINISTRATIVE REGIONS SUCH THAT BLUE REGIONS INDICATE DRYING INTO THE FUTURE AND GREEN/RED INDICATE WETTING.

Key Message

Environmental drivers are fundamental in basins. Of the many environmental drivers, climate is probably the one which is most clearly exogeneous to basins. Climate change will be an important climate driver for most CPWF basins over the coming decades and should be considered in long term planning for basin studies.

Summary

I present global environmental drivers and indicate their relevance to understanding the water resource baseline and future dynamics in basins. Environmental drivers are fundamental and sometimes provide a constraint to development that cannot be managed (i.e. where there is insufficient rainfall). They are highly spatially and temporally variable over time and space. Their influence on basins is filtered through ecosystems that buffer their impacts on populations. This buffering capacity is reduced as ecosystems are degraded and their capacity to deliver ecosystem services reduced.

We provide a framework to analyse the impacts of global environmental drivers throughout basins using the WaterWorld Policy Support System and examine climate change impacts throughout the basins using these tools and data. I apply IPCC scenarios using ensemble mean of 17 GCMs to reduce uncertainty. Temperature will likely increase across all basins but the changes in rainfall expected are variable in both magnitude and direction between and within basins. There is great uncertainty in the magnitudes of rainfall change between basins with much disagreement between GCMs. I show how climate might change across the basins and the implications on water balance. Many of the basins show increases in water availability because of increased rainfall and short term inputs through enhanced snowmelt. Some basins and parts of others show drying. In many basins there are climatic flip-flops between 2040 and 2080 with wetting to 2040 (relative to the 1950-2000 baseline) and wetting relative to that baseline afterwards.

Coping strategies for such changes will require continuous adaptation into the future and careful planning of interventions such that they are climate change compatible. The conditions for climate change compatibility are discussed in the presentation.