



## **How resilient are ecosystems in adapting to climate variability**

Hubert H.G. Savenije

Delft University of Technology, Water Resources Section, Department Water Management, Delft, Netherlands  
(h.h.g.savenije@tudelft.nl)

The conclusion often drawn in the media is that ecosystems may perish as a result of climate change. Although climatic trends may indeed lead to shifts in ecosystem composition, the challenge to adjust to climatic variability – even if there is no trend – is larger, particularly in semi-arid or topical climates where climatic variability is large compared to temperate climates. How do ecosystems buffer for climatic variability? The most powerful mechanism is to invest in root zone storage capacity, so as to guarantee access to water and nutrients during period of drought. This investment comes at a cost of having less energy available to invest in growth or formation of fruits. Ecosystems are expected to create sufficient buffer to overcome critical periods of drought, but not more than is necessary to survive or reproduce. Based on this concept, a methodology has been developed to estimate ecosystem root zone storage capacity at local, regional and global scale. These estimates correspond well with estimates made by combining soil and ecosystem information, but are more accurate and more detailed. The methodology shows that ecosystems have intrinsic capacity to adjust to climatic variability and hence have a high resilience to both climatic variability and climatic trends.