Irrigation and ecosystem water use
- agricultural development scenarios for the Okavango River Basin

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ABSTRACT

The Okavango Delta is a unique and fragile wetland situated in the Kalahari Desert in Botswana, Southern Africa. The annual precipitation is low, yet the area is green and rich in animal life. This is due to the Okavango River which transports huge volumes of water from the mountainous regions in central Angola and is a vital lifeline for the Okavango Delta.

With a size of 172,000 square kilometres the catchment area is 4 times the size of Denmark, but currently only 600,000 people live here. This part of Angola is still very poor and full of traces from the long and devastating civil war which ended in 2002. The war slowed the development and left the country with an under developed agricultural sector.

Today, 8 years after the end of the civil war, the Angolan government has realised that investments in irrigation agriculture is an important step on the way to become self-sufficient and to fight poverty. However, those investments put pressure on the Okavango Delta as they reduce the inflow of water. Water is a scarce resource and history shows that the natural ecosystems suffer first. Recent advances in water resources simulation tools and remote sensing techniques enable a detailed assessment of the impact of large development projects such as Angolan agricultural development. How much water can be used for irrigation in Angola and at the same time ensure a sustainable future of the delta? And what is the extend of the area suitable for irrigated agriculture in the catchment?

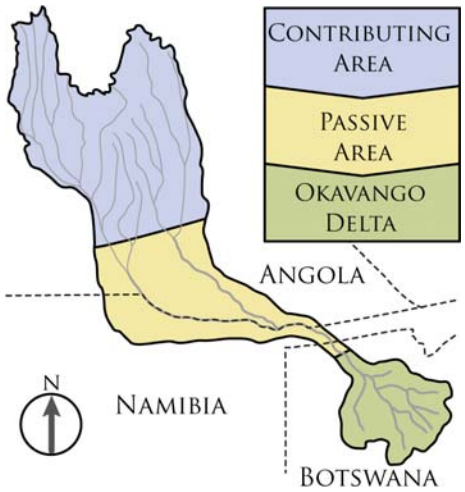

Figure 1 Overview of the catchment

In this project, a combination of remote sensing and advanced modelling tools are used in order to deal with those questions. First satellite images are classified in a 30m grid and the current irrigated agricultural area in the Okavango basin is extracted. This provides an estimate of the current agricultural development in the region. Secondly, several layers of spatially resolved information (terrain slope, soil type, etc.) are combined into a map showing the potential areas of irrigated agriculture. The local surface gradient, the surface geology and the distance to the nearest river all affect the suitability of a piece of land for irrigation agriculture. As a final step the new knowledge is integrated in a water balance model of the entire catchment. With this tool, it is possible to predict the amount of water different irrigation scenarios will remove from the Okavango Delta. The output from the model can be used in integrated policy advises and decision support in the region. Water regulative and transboundary agreements can be realised even before any serious impacts on the ecosystems occur.