Testing Hydrological Suitability for Mangrove Restoration in Vietnam and Indonesia

*Anne Frederike Van Loon[1], Bram Te Brake[2,3], Marjolein H.J. Van Huijgevoort[4], Roel Dijksma[3]

1. School of Geography, Earth and Environmental Sciences, University of Birmingham, Birmingham, United Kingdom, 2. Land Environmental Engineering, Ede, the Netherlands, 3. Hydrology and Quantitative Water Management Group, Wageningen University, Wageningen, the Netherlands, 4. Program in Atmospheric and Oceanic Sciences, Princeton University, Princeton, USA

Mangrove restoration projects, aimed at restoring important values of mangrove forests after degradation, often fail because hydrological conditions are not properly restored. We present a simple, but robust methodology to determine hydrological suitability for mangrove species, which can guide restoration practice. In 15 natural and 8 disturbed sites (i.e. disused shrimp ponds) in three case study regions in south-east Asia, water levels were measured and vegetation species composition was determined. Using a hydrological classification for mangroves, sites were classified into hydrological classes, based on duration of inundation, and vegetation classes, based on occurrence of mangrove species. In the natural sites, hydrological and vegetation classes were similar, showing a clear differentiation of mangrove species between wet and dry sites. Application of the classification to disturbed sites showed that in some locations hydrological conditions had been restored enough for mangrove vegetation to establish, in some locations hydrological conditions were suitable for various mangrove species but vegetation had not established naturally, and in some locations hydrological conditions were too wet for any mangrove species (natural or planted) to grow. We quantified the effect that removal of obstructions such as dams would have on the hydrology and found that failure of a restoration project at one site could have been prevented. In this presentation we will discuss the use of a hydrological classification in mangrove restoration projects compared to using elevation only. We conclude that the hydrological classification gives important information about how to restore the hydrology to suitable conditions to improve natural regeneration or to plant mangrove species, which could not have been obtained by estimating elevation only. Based on this research a number of recommendations are given to improve the effectiveness of mangrove restoration projects.

Keywords: mangrove, restoration, hydrological classification, Vietnam, Indonesia