

# The economic value of wetlands in agricultural landscapes: A meta-analysis

Luke Brander<sup>1,2</sup>, Roy Brouwer<sup>1</sup>

<sup>1</sup> Institute for Environmental Studies, VU University Amsterdam

<sup>2</sup> Division of Environment, Hong Kong University of Science and Technology

## Abstract

This paper presents a meta-analysis of the economic valuation literature on ecosystem services provided by wetlands in agricultural landscapes. We focus on the value of three regulating services, namely flood control, water supply and nutrient recycling. We construct a database containing 93 value estimates, mainly for wetlands in the US and Europe but also a substantial number in developing countries (22). Values are standardised to USD per hectare per year. The mean (and median) values are found to be 8,836 (720) USD/ha/yr for flood control; 4,756 (75) USD/ha/yr for water supply; and 10,095 (442) USD/ha/yr for nutrient recycling. The values of these services are highly variable across individual wetland sites due to, amongst other factors, differences in wetland type, size, the scarcity of other wetlands in the surrounding landscape, and the socio-economic characteristics of the beneficiaries of these services. We include explanatory variables in the meta-analysis to account for these influences on estimated wetland value. A GIS is used to quantify potentially important spatial variables such as the abundance of other wetlands, abundance of other ecosystems (rivers and lakes), and a measure of human appropriation of net primary product (which might reflect intensity of agricultural activity). A meta-regression is used to produce a value function for wetland regulating services, which can be used to transfer values to other wetland sites while controlling for site specific and context specific characteristics. The role of wetlands and wetland valuation in the EU Water Framework Directive is discussed.