



Integrative water management in the Pacific: protecting freshwater resources from agricultural intensification on the coral atoll of Tongatapu

M. van der Velde (1), M. Vanclooster (1), S.R. Green (2), V.T. Manu (3), V. Minoneti (3) and B.E. Clothier (2)

(1) Department of Environmental Sciences and Land Use Planning, Université catholique de Louvain (UCL), Belgium (2) HortResearch, New Zealand, (3) MAF Research Station, Tongatapu (vandervelde@geru.ucl.ac.be / Fax: + 32 10 57 38 33)

Tongatapu (175°12'W, 21°08'S) is a coral atoll located in the Pacific Ocean and the main island of the Kingdom of Tonga. The size in a socio-economic and biophysical sense of small island developing states (SIDS), like Tonga, makes them extremely vulnerable to fluctuations on the global market and environmental disasters. They are also likely to be one of the first to be confronted with rising sea levels which poses a threat to their water resources. Currently there are already several pressures on the freshwater resources which include waste and sewage disposal, construction works along the coast, and the impacts of intensifying agriculture. On Tongatapu (256 km²) agricultural practices have intensified since 1987 when a niche period for the export of squash into the lucrative Japanese market was identified. Over the last 10 years the export of squash has accounted for about 40% of the GDP of Tonga. With the increase in export a manifold increase in the importation and usage of agri-chemicals has occurred. This has led to increasing concerns and mounting evidence of pollution of the freshwater lenses that float underneath the island. We are currently involved in an integrated project (www.croppro.alterra.nl) involving local stakeholders, Ministry of Agriculture officials and scientists that is aiming to develop more sustained agricultural practices in constrained island systems in the Pacific region. Here we present our work on Tonga to illustrate the specific problems encountered in the domain of sustainable development in SIDS and integrative water management. Within the project we aimed to develop more sustainable agricultural practices for the squash industry on Tonga. We are in the process of predicting the leaching risks of agri-chemicals and

we developed a decision support tool that allows farmers to select the most “sustainable” pesticides for their agricultural practices in terms of long and short term leaching risks. We carried out a questionnaire to identify the perception stakeholders involved in water management on the island have on their influence on water quality and to elude farmers perception on agri-chemical use and health issues.