Developing Local Capacity and Ensuring Relevance in Risk Assessment for Tropical Wetlands

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Introduction

The article by Taylor et al. (2002; *SETAC Globe* 3(1), 27-28) on the need for greater ecological relevance in risk assessment in tropical wetlands raised many points of interest to wetland researchers and managers associated with the *National Centre for Tropical Wetland Research* (NCTWR) in Darwin, Australia. Taylor et al. outlined a dire situation of high pesticide use and low level of relevant environmental risk assessment in tropical, less-developed countries (LDCs – as termed by Taylor et al.), before promoting an integrated approach to developing methods and tools for evaluating environmental risk from pesticides in tropical wetlands. Below, we have paraphrased from Taylor et al. what we see as key points for consideration when planning research in tropical wetlands:

- There is an absence of research into environmental risks from pesticides and other chemicals;
- There are large differences in environmental conditions between tropical and temperate ecosystems;
- There is an urgent need for improved methods/tools for evaluation of environmental risk in tropical wetlands, including ecotoxicological tests with ecological relevance to tropical wetlands and species;
- Tropical wetlands are extensively used by local communities and the continued livelihood of these communities depends on making wise use of the services obtained from the wetlands; and
- There is a need to develop in-country capacity and expertise.

We support the views of Taylor et al. and offer a few examples of our own efforts to similarly develop integrated approaches for wetland inventory, (risk) assessment and monitoring in tropical wetlands.

Integrated Tools for Wetland Management

In discussing these points we introduce an overarching, integrated model for wetland inventory, assessment and monitoring (WIAM; Figure 1; Finlayson 2003) that with the addition of capacity building and training encompasses the proposals made by Taylor et al. The model has been developed on the basis of accumulated experience in tropical countries and is linked intricately with the activities undertaken by Wetlands International, an international NGO with offices and projects in many countries (www.wetlands.org). The WIAM model is based around the inter-relatedness and multi-scalar nature of the three components and can be summarised as: inventory is used to collect information to describe the ecological character of wetlands; assessment considers the pressures and associated risk of adverse change in ecological character; and monitoring provides information on the extent of any change.

Supporting the WIAM approach, the Ramsar Wetlands Convention (www.ramsar.org) has developed formal guidance for undertaking wetland inventory, risk assessment and monitoring programs (Finlayson 2003). This suite of tools can be readily utilised to enable more effective wetland management in tropical LDCs.

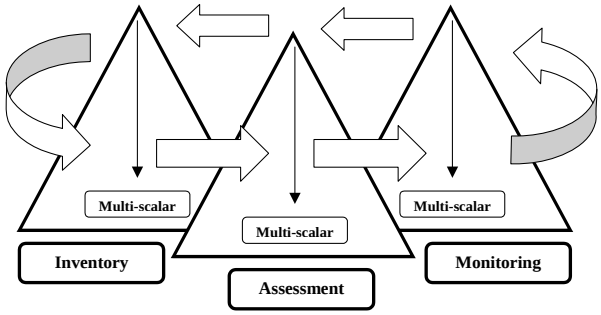

Figure 1. Concept of a multi-scalar, inter-related wetland inventory, assessment and monitoring model (WIAM; Finlayson 2003).

Ecological Risk Assessment in Tropical Australia

As Taylor et al. noted, there is a pressing need for improved ecotoxicological and other tools for risk assessment of tropical wetlands, particularly in LDCs. Our ecotoxicology, biological monitoring and risk assessment research program is as extensive a capability for tropical freshwater ecosystems as we are aware of (see Riethmuller et al. 2003 and van Dam et al. 2002), and has evolved over 20 years of R&D towards an integrated aquatic ecosystem assessment and monitoring program for ensuring the protection of World Heritage listed wetlands in tropical northern Australia from the impacts of uranium mining operations. The basis and rationale behind our approach was used to underpin the approach adopted by the *2000 Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

We have been able to draw on our tropical expertise and knowledge to quantitatively assess risks to tropical wetlands for at least one herbicide (van Dam et al. submitted) and are continuing to do so for other toxicants as well as non-chemical hazards. Thus, we have accumulated a large body of knowledge and understanding of the status and assessment of risks to tropical wetlands, that is applicable elsewhere.

Developing Understanding & Capacity

Given our experience in tropical wetland research and our proximity to south-eastern Asia, we feel a responsibility and see an opportunity to develop

relevant ecotoxicology, risk assessment and other (eg. biological monitoring) capacities in the region, particularly in the context of the WIAM model described above.

As an example of efforts to date, NCTWR has supported actions in Viet Nam to control the invasive wetland weed *Mimosa pigra* principally using the knowledge-base from northern Australia where this same species has invaded the extensive monsoonally inundated floodplains. Noting the biotic similarities but vastly different land uses, weed control experts have provided training in Viet Nam and encouraged the use of integrated control regimes which include the application of herbicides as well as consideration of their environmental risks and impacts (Ashley 2001). The effort in Viet Nam was also assisted by a semi-quantitative risk assessment of Mimosa undertaken in Australia, noting the need for information that was applicable to Viet Nam.

This situation has led us to seek collaborators and propose the development of an ecotoxicological capacity in tropical south-eastern Asia. Within this, we are aware of the need for ensuring assessment methods (eg. ecotoxicological tests) have local relevance and are practical and feasible (logistically and financially) under south-eastern Asian conditions. In support of this ideal we have undertaken training exercises in wetland monitoring and assessment, including ecotoxicology and risk assessment, and are seeking to secure an ongoing program to both fund the initial research and ongoing capacity building that we see as necessary. In this manner we have started to address the points raised by Taylor et al.

Through experience, we emphasise that capacity building efforts in tropical LDCs need to be holistic and encompass research and assessment as well as training and ongoing assistance (eg. for subsequent monitoring or capacity retention activities). This process will only occur if there is a realistic and altruistic linking with local, like-minded institutions in order to develop the local capacity and to ensure that this is retained by instilling ownership of research and development initiatives by people in-country. We are not convinced that this is being successfully done on a regular basis – the syndrome of highly resourced "fly-in–fly-out" scientists and experts from temperate or distant locations whilst undoubtedly needed is not sufficient. It takes time to adapt or learn about tropical conditions and species, and to build effective, long-term relationships. We are still learning, however, the training component of our strategy is one way in which we hope to contribute to the broad goal of developing local capacity to ensure better environmental management in tropical locations.

Concluding Remarks

We welcomed the ideas put forward by Taylor et al. and look forward to developing opportunities that incorporate and develop our views on tropical research and training for solving immediate problems and for developing local capacity, particularly in tropical LDCs. We welcome any further thoughts, examples, exchanges and initiatives to address the key gaps. Interested parties can access our publication list at www.ea.gov.au/ssd/publications and seek specific information from www.nctwr.org.au.

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