

Partnership Opportunities for Public Interest Groups with Government in the Pacific Regions For the Design & Implementation of Monitoring Programs for Effectiveness Evaluation

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INTRODUCTION

Following concerns about the perceived degradation of lagoon water quality in Rarotonga in December 2003, Ms Imogen Ingram (President at the time of a national environmental NGO) prepared a project proposal for funds from NZAID to test lagoon seawater for the presence of nine pesticides listed under the Stockholm Convention. At the time, there was no baseline data available to lend weight to the anecdotal likelihood of degradation of lagoon water caused by run-off from pesticides used in agriculture.

The Cook Islands Ministry of Marine Resources was supportive of the proposal, which complemented its own program to run local tests for marine water for other potential pollutants. However, there was no laboratory in the Cook Islands capable of testing for the presence of POPs. The bulk of the funds were needed to cover the cost of airfreight dispatch of the samples and the cost of analysis by the laboratory in Auckland, New Zealand. The application for financial assistance was successful, and in November 2004 collection of water samples by community-based volunteers commenced.

Six sites were selected, in consultation with the Cook Islands Ministry of Marine Resources, because of their proximity to the mouths of streams. Local knowledge indicated that the watersheds of these streams were areas where it was likely that residues from agricultural sprays or other POPs were likely to be found.

RESULTS

This first study to assess the concentration of POPs in Rarotonga lagoon has shown the presence of seven PAHs, two phthalates - bis(2ethylhexyl)phthalate (DEHP) and di-n-octyl phthalate, and two organochlorine pesticides namely - 4,4'-DDT and methoxychlor.

Of these analytes, only DEHP was found at all sites, indicating wide distribution of the compound and possibly a wide range of sources. Detected concentrations

range from 2 – 40 µg/L, magnitudes at least 2 to 4 times greater than maximum limits recommended under ANZECC guidelines, USEPA water quality criteria and a number of drinking water guidelines.

Organochlorine pesticides detected are 4,4'-DDT and Methoxychlor at 0.7µg/L and 0.5 µg/L respectively. The DDT concentration found is 1750 times more than that set under the ANZECC aquatic environment guidelines. Methoxychlor found was 125 times more than the ANZECC aquatic guidelines. The high concentrations detected indicate that the most continued contribution of pollutants is from the old solid waste dump near the East Airport sampling site (given that the use of malathion and DDT were prohibited years ago). It appears that leachate from this abandoned site seeps into the lagoon environment, and will provide an important sampling site for future study.

Of the seven PAHs detected, BaP is the most potent carcinogen and was found at two sites (Totokoitu and Avana) in January 2005. The remainder are categorised by the International Agency for Research on Cancer as “probably carcinogenic” or “possibly carcinogenic”. The detected levels for BaP were, at best 10 times more than recommended limits, and at worst, 263 times more than the limit. The toxic and carcinogenic effects of BaP and other PAHs detected suggest the need for further work to isolate the most likely sources, and for increased attention to existing and potential risks to human health.

The report also suggested options for further study. A holistic study approach that seeks to assess levels of POPs in lagoon sediments and human tissue is encouraged. In any case, continuous assessment would allow mapping of changes in temporal and spatial distribution of pollutants and determine the likelihood of risk to humans and marine organisms into the future.

LESSONS LEARNED

Over a 12-month period, this study has sought to assess the level of POPs in the Rarotonga lagoon. It provides much needed data that can be used as a starting point for comparison in later studies. Given that POPs are more soluble in fatty tissue than in seawater, they are more likely to be present in other media. It is suggested that further studies would provide a better picture of the presence of POPs in seawater, lagoon sediments, and human and animal tissue (particularly marine invertebrates).

In any case, some continuity in analysis of lagoon water is highly recommended. Continuous assessments would allow mapping of changes in temporal and spatial distribution of pollutants and also permit assessment of the likely future risk to humans and marine organisms.

This collaboration between a national environmental NGO and a government department has proved very successful, and provides a basis for future beneficial

partnerships between government and public interest organizations. It is suggested that such partnerships of this nature could be modified to suit national requirements and then replicated within regional groups, especially in developing countries where overburdened National Focal Points can be assisted by public interest groups to assess needs and design projects to evaluate the effectiveness of chemical management programs through environmental and human monitoring programs.