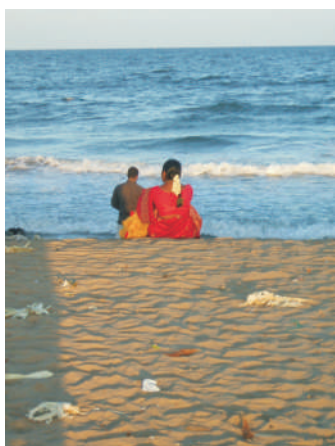


Rapid Assessment of Marine Pollution (RAMP)

A pragmatic, cost-effective approach for detecting, monitoring and assessing impacts of human activities in aquatic ecosystems. RAMP provides a means of detecting threats from the environment to human health and well-being.

Comprising a set of procedures and tools (including rapid, simple chemical measurements, bioassays, biomarkers, socio-economic and health assessment methods) RAMP allows scientists to determine ecological status, take action to protect or restore the environment and work towards sustainable development.

Why do we need RAMP?



Increasing pressure is being placed on the world's ecosystems as a result of both natural and human induced global change. In developing countries most of the population live within 50km of estuaries or seacoasts and at least 2 billion people currently rely on seafood as a primary source of protein. It is expected that population growth will cause this number to double within the next 40 years.

Consequently, coastal environmental degradation resulting from over-fishing, disposal of waste and industrial and agricultural activity is almost certain to increase dramatically with associated increases in poverty and disease.

This situation can be avoided or at least ameliorated by appropriate environmental management actions. However, conventional measures are too costly to be widely used. Therefore, there is a need for rapid, easy to use, inexpensive and ecologically relevant environmental assessment and management procedures for use where resources available for environmental protection and legislation are limited.

Our Strategy



The RAMP team is dedicated to capacity building and knowledge sharing in developing countries. By empowering local scientists and managers RAMP generates local and regional support for,

and commitment to sustainable environmental management for the protection of human and environmental health.

In the first stage of engagement with a new RAMP project we will evaluate the national policy framework within which marine monitoring might be incorporated. We will then identify and address key politicians and decision makers before engaging at a science level. A small (and carefully selected) number of the people we talk to might become part of a reference user group or advisory council that tracks the science and adapts it for national needs. With such political ownership, the chance of the science continuing after training funding has expired is greatly improved.

Initial policy-level discussions will also alert RAMP scientists to national sensitivities and priorities. Our approach will help to reassure policy makers that they are not being exposed to a one-size-fits-all approach to monitoring but one that is tailored to their national needs and existing planning.



In summary, RAMP aims to promote the efficient management of the aquatic environment by promoting the use of rapid, simple assessment methods that allow scientists and environmental managers to determine ecological status, take action to protect or restore the environment and work towards sustainable development. RAMP contributes directly,

significantly and cost-effectively to an identification of ecosystems under threat (and the nature of the threat).

RAMP tools

Habitat Mapping & Assessment

A rapid baseline inventory can provide data in the form of baseline maps and information, which is crucial for planning. Comparative statistics on habitat richness, biodiversity and ecosystem function can be derived from this data, which can be useful in understanding the scale of impacts, justifying site conservation and reviewing alternative management options. Spatial patterns, areas and extents, physical habitat features, key species composition and abundances are all important for evaluating ecosystem function. This is a vital stage in developing a well designed monitoring strategy through the identification of critical issues, suitable locations for monitoring sites, intensity of survey required to answer specific questions and, through repeat survey, the assessment of change.

Biomarkers



Indicators of the general condition of marine species e.g. Cardiac activity, lysosomal neutral red dye retention, immunotoxicity. Also biomarkers of exposure to and effects of specific classes of

chemicals e.g. Cholinesterase inhibition assay (organophosphorous and carbamate pesticides), Polyaromatic Hydrocarbons (PAH) fluorescence (to detect pyrenes and other PAHs and metabolites in urine and blood samples of crabs and clams respectively), assessment of imposex or intersex in gastropod molluscs and crustaceans (exposure to endocrine disrupting chemicals like tributyl tin and others), metal-binding protein assay (a colorimetric assay of metal-binding proteins which are often increased in marine organisms exposed to elevated concentrations of various metals), DNA damage (genotoxin), micronucleii assay (indicates exposure to genotoxins).

Chemical Analysis (Immunoassays)



PML has been using relatively inexpensive immunoassay-based tests that provide a rapid and highly selective means of measuring specific chemical compounds. Analyses can be performed by relatively unskilled personnel using simple spectrophotometers. The choice of determinands amenable to detection

by the rapid chemical analysis procedures is broad and thus the most relevant contaminants can be selected following surveys and discussions with scientists in the study region. Immunoassays can be performed on water, sediment, tissue fluid, blood and urine samples to determine the concentrations of chemicals in organisms. Immunoassays are also available for detecting bacteria associated with sewage pollution (*Escherichia coli* *Enterobacter*)

Socio-economics

PML scientists have been collecting and assessing socioeconomic information in order to assess marine pollution and inform management decisions.

Further tools include rapid assessment of human health in coastal environments. Our approach can be applied in terrestrial environments.

*For further details please contact
+44 (0)1752 633412 or email forinfo@pml.ac.uk.*