School of Civil and Environmental Engineering

Gauging environmental improvement - The Development and Application of an Assessment Framework for Water Quality Management

Background

China has recently moved into its 13th Five Year Plan (FYP). A key goal for this FYP is to "reach the turning point in environmental quality management". Particular issues identified include surface water quality and sustainability assessment.

In many Chinese provinces surface water quality is degrading. China needs to consider a holistic approach encompassing environmental, economic and social dimensions. Currently, there is no decision-making framework available for determining appropriate requirements for WWTP performance in specific circumstances. It has been suggested that instead of mandating uniform water quality based on the four quality indicators, it may make sense to implement a risk-based approach whereby the requirements of the WWTP are tailored to specific circumstances such as the nature of the receiving environment. Aspects such as ambient water quality, dilution potential and subsequent uses of the water could all be factors in a decision making process. Furthermore, sustainability assessment itself has been identified as an important research need: over each 5-year term, a case to show that environmental quality has improved, rather than degraded, will need to be presented. However, there is currently no broadly applicable, or widely accepted, framework or 'tool' with which to make such an assessment. Factors such as water, air, soil and biosystem quality would all need to be considered alongside associated social-economics aspects. This has been identified as a clear research gap and has been recognised as a potential area for collaboration.

Aim of proposal

It is proposed that UNSW GWI collaborate with a leading Chinese institute to develop and apply a sustainability assessment framework with a focus on water quality, possibly for showcasing in the Jiangsu Province. The province would like to become an "ecological civilisation demonstration province" and, as such, would be a good location to implement a new framework.

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Approach

Develop a framework for assessing and monitoring the current state of the environment in respect to water quality. Aspects such as ambient water quality, dilution potential and subsequent uses of the water are all anticipated to be factors that should be considered in the decision making process. The Australian State of the Environment report will be used as a basis[1]. The following method is recommended:

1) Assessment of the current state, including water flows, water quality and ecological processes.

2) Assessment of pressures and risks impacting the environment, including

- climate and climate change
- water resource management including extraction;
- point and diffuse sources of pollution to the catchment.

3) Sustainability Assessment Framework Development

This will incorporate both current environmental state and the risk assessment to develop the risk-based sustainability assessment framework that will detail strategies to mitigate the risk of environmental pollution in a selected region as well as environmental monitoring protocols that will ensure the catchment is examined using the most appropriate methods given the local context and anticipated risks to the region. In this way, strategies to assist in meeting the 10 Measures of water for 2020 to 2030 can be developed. This rigorous approach should ensure a sustainable approach to water management into the future beyond the current 5 year plan.

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