A case study on aquatic-terrestrial ecosystems of the Huanghe delta of the Yellow River, China: an agro-ecological engineering model

By S. Zhenjun, C. Shaoyi, S. Savic, N. Djukic and S. Maletin

With 2 tables in the text

Abstract

This case study provided an applicable agro-ecological engineering model for environmental protection and agricultural sustainable development in a tributary basin of the Yellow River. In constructing this model, the principles of multi-species symbiosis and cycling or regenerating of substances were used. Methods of diagnosis, design and examination, as well as implementation to artificial ecosystems, were adopted. On the basis of conditions in this regulated river, the former single-species fish-farming system was converted into a compound, multi-species river and wetland farming system by means of agro-ecological engineering techniques, resulting in benefits to both the ecology and local economy.

Introduction

Ecological engineering, one of the branches of applied ecology, is a fast-developing subject (Ma 1985a). It provides applicable techniques with low consumption, high efficiency and zero discharge-production for environmental protection and agricultural sustainable development (Yan 1987). The definition of agro-ecological engineering (AEE) emphasises that people should manage their agricultural land and waterbodies by employing the principles of multi-species symbiosis, and the cycling or regeneration of substances in an ecosystem, to gain synchronous increases in both economic and ecological values (Ma 1985b). In the last decade, hundreds of new AEE models were successfully established in China, and most of them have become a powerful potential to promote sustainable development in the rural areas of China (Ma 1987, Yan & Ma 1991, Yan et al. 1993).

The Huanghe delta (Huanghe is the Chinese name for the Yellow River) in the Wudi section of the Yellow River represents a most complex, diverse and biologically productive area of interactions between aquatic and terrestrial ecosystems in Shandong Province, China. Three types of local landscape were included in this study on the Huanghe delta and its surrounding region by using the AEE approach. Each type equally occupies about one-third of the total area in the study region.