China’s Yellow River has suffered in recent decades, but research involving the University of Oxford is helping revitalise it. The Yellow River is famously the cradle of Chinese civilization and is a fundamental water resource, but has over recent decades experienced water shortages and pollution. Changes in land-use, warming of the central-Asian climate, and a doubling of water consumption in the 1990s caused drought and raised the risk of floods. Contaminated effluent discharged into the river greatly lowered its water quality. So, in 2000, China’s Minister for Water Resources proposed that the Yellow River must flow every day, should not flood, and that its water quality should meet the national standard.

Building on over a decade of collaborative research between Professor Alistair Borthwick at the University of Oxford and Professor Jinren Ni at Peking University, in 2010 the Singapore government funded the $63 million Singapore–Peking–Oxford Research Enterprise (SPORE) for Water Eco-efficiency. The University of Oxford’s contribution will apply the latest thinking in chemistry and engineering to a range of environmental problems, including river rehabilitation and fair resource allocation.

Within SPORE, researchers in the Chemistry Department are developing new technologies capable of producing large volumes of safe drinking water. The team intends to develop electrolysis reactions, using sunlight to catalyse the processes, in order to create reliable, cost-effective devices that require little maintenance. In the Department of Engineering Science, researchers are developing microorganism-based technologies for treating waste water using bacteria that feed on effluent. Some of these microorganisms even produce electricity as a by-product, making it possible to simultaneously treat water and create power.

A major aim of SPORE at the University of Oxford is to create quantitative methods which can be used to assess the sustainability of large rivers, using composite indexes. By combining simple measurements, such systems can accurately monitor the health of river networks across China. A similar, small-scale project by the same researchers has already been used to predict optimal resource allocation, given flood-risk information and current sustainability of the river.

The results of these studies are being used by the Chinese government to inform its policy-making, so the researchers behind SPORE are confident that their future work will help keep the Yellow River sustainable.

’SPORE brings together the academic and research expertise of three top universities in the world to address the global challenges of water scarcity and sustainable water resource management.’

Mr Khoo Teng Chye, Executive Director of the Environment & Water Industry Programme Office