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The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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Securing Water for Wetland Conservation in China – An Assessment of Policy Options

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Wetlands are one of the world's most ecologically important and productive ecosystems. They face many challenges, one of the most significant being the disruption of the water supplies that feed them. As the flow of water entering a wetland is diverted to other uses, the wetland's ecosystem is damaged. This problem affects many wetland areas in China. →

A summary of EEPSEA Research Report No. 2009-RR6: 'Cost Effectiveness Of Policy Options For Sustainable Wetland Conservation: A Case Study Of Qixinghe Wetland, China' by Wu Jian, Wang Xiaoxia, Niu Kunyu and Li Shushan, School of Environment and Natural Resources, Renmin University of China, Research Building A-803, No. 59, Zhongguancun Street, Haidian District, Beijing 100872 P.R.China
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The Qixinghe Wetlands

region. In 2000, the Qixinghe National Nature Reserve (QNNR) was set up to preserve the area, however nothing has been done to stop any disruption to the water supplies that feed the wetlands.

A number of factors exacerbate the impact of agricultural water use. Firstly, agriculture water demand is highest in the spring, which is also the

The situation is expected to get worse. According to local planning estimates, during 2006-2010, the total water demand in the areas surrounding the Qixinghe Wetlands will increase from 119 million m³ to 206 million m³. Agricultural water use will increase from 92 million m³ to 153 million m³.

The study assesses the best way to reduce the conflict between wetland conservation and off-site water use in the Qixinghe Wetlands and its surroundings. Its overall aim is to help policy makers to decide how best to balance economic development with wetland conservation in the area.

The policy options were highlighted through consultation with local officials

reconstruct the nearby irrigation system.”

and experts. One of the key factors that was considered in designing these options was that they should be able to be implemented on a local level and that they would not involve too much political or bureaucratic complexity. The four policy options the study assesses are as follows:

- Option I is the reconstruction and improvement of the irrigation systems in those areas where agriculture competes for water with the wetlands. This work will make the irrigation systems more effective at conserving water.
- Option II is the construction of a dam to store and control floodwater to relieve seasonal water scarcity.
- Option III is the promotion of water-saving planting practices through the provision of training classes to farmers.
- In Option IV, water saving would be achieved by converting some paddy fields to dry land crops.

Each of the se policies is designed to increase water supply to the wetlands. When the water requirements of the wetlands are assessed, it

is clear that off-site agriculture water use must be reduced by about 8 million m³ water (which accounts for about 20% of the ecological water demand of the wetlands). Such a reduction would ultimately improve the ecology of the wetlands and so support its protection and conservation.

A wide range of methods were used to get information for this study, these include household surveys in the area around the nature reserve and satellite data. The research area covered by the study mainly consists of agricultural townships, villages and state-owned farms.

Which Option is Best?

The assessment of the four policy options produces the following key findings:

- Reconstructing the irrigation systems in the area surrounding the Qixinghe Wetlands (Option I) is the governments' most favored strategy, but is the second least cost effective option. It would cost 0.164 yuan per m³ of water saved.
- The construction of a dam to store and control floodwater to relieve

seasonal water scarcity (Option II) is the most reliable way to achieve the overall water saving goal. If the reservoir is built, it is pretty certain that it will be able to save the amount of water the wetlands require. This is also the farmers' most favored strategy. However, it is the least cost-effective (at 0.819 yuan/ m³) and also imposes high capital investment costs on the local government. It therefore does not receive strong governmental support.

- Promoting the adoption of water-saving practices by providing training classes to farmers (Option III) is the most cost effective option (at 0.008yuan/m³). However, it is not a reliable method for saving water as there are concerns about the willingness of local farmers to learn and apply the necessary techniques and practices. Moreover, this option does not receive strong support from farmers and government and, therefore, is not likely to be selected politically.
- Converting some paddy fields to dry land crops is politically unfeasible because it is the least preferred strategy of both the local government and farmers. It is also the least reliable

Criteria	Option I: ISR	Option II: EWC	Option III: WSP	Option IV: PTD
Effects (10 ⁶ m ³)	8	6.94	8	8
Cost-effectiveness	0.164	0.819	0.008	0.089
Reliability of the Effects	-high -need good operation to support -need mechanism to guarantee supplying wetland	-high -need mechanism to guarantee supplying wetland	-medium -need incentive	-low -need incentive -unstable in long-run
Government's Attitude	-high -match with policy priority, potential funding mechanism	-medium -technically support, but no financial capacity	-high -not independent	-low -politically, as well as economically
Farmers' Acceptability	-high -not sure about cost burden	-high -no cost	medium	-low

Trade-offs of Policy Options

option for achieving the overall water-saving goal. This is because farmers will choose to switch farming methods based on the price of rice and dry crops. These prices fluctuate. Consequently, this option will be not be sustainable or reliable in the long-term.

Among the four policy options it is clear that Option I: Irrigation System Reconstruction (ISR) is the optimal policy choice. The promotion of Water-saving Planting Practices (WPP) is the second best choice and could be implemented as a complementary measure alongside Option I.

Putting Policy into Action

In light of these findings, the study recommends that the local government reconstructs the irrigation system in the area surrounding the Qixinghe Wetlands as soon as possible. At the same time water saving practices should be continually promoted; this should be done by providing regular training to farmers.

There already exist potential funding mechanisms for this work in the national budget. For example, the local government could apply for money from the National Funding for Neo-village Construction scheme. Agriculture water saving is one of the priorities of this funding mechanism.

Two other key issues must be taken into account: Both the ISR and WPP options require the reform of water pricing policy and the improvement of

the district irrigation management system.

The current water pricing system (in which the charge is based on acreage) results in a low overall water charge. The water fee collection rate is also low. This means that the total amount of money collected is insufficient to cover the running costs of the irrigation systems in the region. This has led to poor maintenance and system failures. So, if the water pricing policy is not strengthened, the irrigation system will still be under resourced and compromised, even if it is reconstructed.

The same is true for the promotion of water-saving planting practices: under the low water price policy, there is no stimulus for farmers to undertake water-saving activities. This means that water pricing policy reform is needed to drive the implementation of water conservation best practice by local farmers.

Funding Water Conservation

If all the suggested conservation policies are implemented, there will be competition for any water 'saved' by these policies. Because of this, the local water resource management authority will need to co-ordinate efforts to make sure that the necessary water gets to the wetland areas. Moreover, as agriculture develops in the future and water demand increases, the water resource will get more valuable and competition for it

will get more intense.

This provides another reason to have a robust funding mechanism to guarantee the supply of water to the wetlands. In view of the benefits that the wetlands provide to the environment and society at large, the government should guarantee these funds. What is more, the current funding mechanism for wetland conservation does not take full account of the wetlands' water resource demands. The study therefore suggests that the central government sets up a special budget for dealing with water shortage problems, as part of its conservation funding mechanism.

District irrigation management systems should also be reformed so that they can effectively manage the new water pricing policy and other incentive measures. Appropriate institutional arrangement should also be set up at the provincial level.

Overall, the reconstruction of the region's irrigation systems and the promotion of water-saving farming practices should be conducted in unison with irrigation management reform and the revamp of water pricing policy. All these initiatives will promote sustainable conservation of the Qixinghe Wetlands.

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