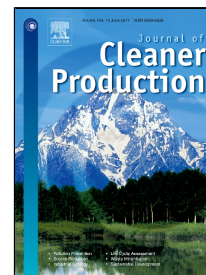


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Integrated energy and economic evaluation of lotus-root production systems on reclaimed wetlands surrounding the Pearl River Estuary, China



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## **Integrated energy and economic evaluation of lotus-root production systems on reclaimed wetlands surrounding the Pearl River Estuary, China**

Hong-Fang Lu<sup>a</sup>, Yao-Wen Tan<sup>b</sup>, Wen-Sheng Zhang<sup>b</sup>, Yan-Chun Qiao<sup>b</sup>, Daniel E. Campbell<sup>c</sup>, Lang Zhong<sup>a</sup>, Hai Ren<sup>a\*</sup>

<sup>a</sup> Key Laboratory of Vegetation Restoration and Management of Degraded Ecosystems, South China Botanical Garden, Chinese Academy of Sciences, Guangzhou 510650, China;

<sup>b</sup> Guangzhou Academy of Agriculture Science, Guangzhou 510308, China

<sup>c</sup> US EPA, Office of Research and Development, National Health and Environmental Effects Research Laboratory, Atlantic Ecology Division, 27 Tarzwell Drive, Narragansett, RI, USA

**Abstract:** Lotus (*Neumbo nucifera*, Gaertn) is the most important aquatic vegetable in China, with a cultivation history of over 3000 years. The energy, energy, material, and money flows of three lotus root cultivation modes in Wanqingsha, Nansha District, Guangzhou, China were examined using Energy Systems Language models and energy evaluation to better understand their ecological and economic characteristics on multiple spatial and temporal scales. The natural resource foundations, economic characteristics and sustainability of these modes were evaluated and compared. The results showed that although all three modes were highly dependent on purchased energy inputs, their potential impacts as measured by the local (ELR<sub>L</sub>) and global (ELR<sub>W</sub>) environmental loading ratios were less than 1.2 and 0.7, respectively. The lotus-fish mode was the most sustainable with its energy index of sustainable development (EISD) 2.09 and 2.13 times that of the pure lotus and lotus-shrimp modes, respectively. All three lotus-root production modes had superior economic viability, since their Output/Input ratio ranged from 2.56 to 4.95. The results indicated that agricultural systems may have different environmental impacts and sustainability characteristics at different spatial and temporal scales, and that these impacts and characteristics can be simultaneously explored using integrated energy and economic evaluations.

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