

## Session II – Envisioning New Approaches to Managing Great Deltas, Great Rivers, and Great Lakes

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### Integrating *Melaleuca cajuputi* with Rice in an Agro-Forestry Trial on the Seasonal Flooded Wetlands of the Mekong Delta, Vietnam

Duong Van Ni<sup>1</sup>, and Edward Maltby<sup>2</sup>

<sup>1</sup>Hoa An Research Center, Can Tho University, Can Tho City, Vietnam, Email:

[duongvani@gmail.com](mailto:duongvani@gmail.com)

<sup>2</sup>Liverpool University, Liverpool, United Kingdom

#### Abstract

Rice production of the Mekong Delta of Vietnam is challenged by two extremes of hydrology regimes: flooded in the wet season and water deficiency in the dry season. About 3.8 million hectares of paddy rice lands are on wetlands dominated by acid sulphate soil areas that often consume most of the fresh water sources of the Mekong river and release acid water at the end of the dry season. It is a threat to water source of the Mekong River and sustainable rice production of Vietnam when there is a lack of water of a suitable quantity and quality for irrigation. This study was conducted to determine whether land where *Melaleuca* (*Melaleuca cajuputi*) grows could be used as a reservoir filter-sink to keep flood water during the wet season while improving the quality of drainage acid water and supply it in sufficient quantities for irrigation of rice in the dry season.

*Melaleuca* trees were established on land adjacent to the rice field. Floodwater was kept in the *Melaleuca* land during the wet season and used to irrigate the rice land in the dry season. Acidified drainage water from the rice land was passed through the *Melaleuca* land and afterwards it was re-used for irrigating rice. Rice crops were grown in the land irrigated by water from the *Melaleuca* woodland. Floodwater stored in the *Melaleuca* land was sufficient for the rice crop in the normal and even prolonged dry seasons. Evapo-transpiration (ET) and Seepage and Percolation (S&P) of the *Melaleuca* land were calculated at 5.6 and 1.4 mm respectively per day, and in the rice land at 5 and 1.9 mm per day, respectively. *Melaleuca* land improved pH values, decreased Fe, Al, and SO<sub>4</sub> in the water drained from the rice land. It increased the pH from 3.0 to 6.0, decreased Fe from 2.0 to 0 ppm, Al from 2.7 to 0 ppm, and SO<sub>4</sub> from 300 to 50 ppm. Therefore, acidified water drained from the rice land and passed through the *Melaleuca* land was acceptable for irrigation.

In practice, one hectare of *Melaleuca* land can hold enough floodwater for the irrigation of 1.5 hectares rice land. In addition it could improve the quality of acid waters from a

larger area of rice land to values acceptable for irrigation. If this model is applied to restore 7000,000 ha of *Melaleuca* forest in the seasonal deep flooded wetlands dominated by acid sulphate soil areas at the Mekong delta, it will supply enough irrigating water for 1 million hectares of paddy rice lands and will save at least 10,500 million cubic meters (m<sup>3</sup>) of fresh water of the Mekong River.