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Economic Assessment of Water Saving Irrigation Methods in Longan Production in Northern Thailand

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Abstract

With a total acreage of more than 100,000 ha longan (*Dimocarpus longan* Lour.) is one of the most important fruit crops cultivated in northern Thailand. With flowering and main fruit development taking place during the dry season, irrigation is needed to ensure high yields and optimal produce quality. Water for irrigation is an increasingly scarce resource in the region as a whole and for the single farmers irrigation is related to high energy costs for pumping. Deficit irrigation strategies present an interesting alternative to increase water use efficiency (WUE), wherever water is a limiting factor to production. Therefore, at Mae Jo University, Thailand in cooperation with Hohenheim University, Germany, deficit irrigation strategies are tested in tropical fruit tree orchards and evaluated with respect to yield and plant responses to drought stress. Over two years of field experiments it was documented, that under “partial rootzone drying (PRD)” high yield can be obtained with 33% reduced irrigation water use. Responding to farmers’ request, a farmer controlled experiment was set up, where conventional irrigation was compared to deficit irrigation under field conditions. 180 trees have been split in to three groups: a. Farmer’s irrigation (control), b. Optimised irrigation based on open pan evaporation and c. PRD with 60% of calculated optimal irrigation, alternately applied to different parts of the rootzone. Irrigation frequency and water consumption was recorded during the irrigation period. Total yield and yield per tree was measured, as well as fruit size and colour, as the most relevant quality parameters. Based on this data and under consideration of the current market prices for longan, an analysis of the economic suitability of deficit irrigation was carried out. The specific costs of irrigation were calculated under different scenarios regarding energy costs and possible water prices. It was shown, that mainly the reduced costs for pumping make deficit irrigation attractive to farmers. Despite slightly lower yields, PRD was more cost effective due to energy savings. Different scenarios of water pricing offer institutional instruments to promote water saving irrigation practices.

Keywords: Deficit irrigation, dimocarpus longan, fruit quality, PRD, yield