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## Evaporation under Lychee Trees — Determination of Evaporation Coefficients

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### Abstract

In the north-western part of Thailand, lychee production became an important income source for highland farmers. However, water scarcity during dry season bears conflict potentials between highland and lowland farmers. One solution to encounter this problem is the introduction of site adapted and more efficient irrigation performances. A simple method of irrigation scheduling for different crops displays the FAO-24 crop coefficient ( $K_c$ -value) approach. Thereby the potential evapotranspiration of a crop can be computed by multiplying a crop specific  $K_c$  value with a potential reference evapotranspiration ( $ET_0$ ). Since especially in irrigated agriculture water demand is underpredicted, the FAO-56 dual crop coefficient approach was introduced. The  $K_c$ -value is thereby calculated by the sum of a transpiration ( $K_{cb}$ ) and an evaporation coefficient ( $K_e$ ).

Within the framework of the Uplands Program “Research for Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia”,  $K_{cb}$ -values of lychee trees were already successfully determined by means of sapflow measurements. The objective of this study is to investigate the evaporation under lychee trees in order to determine precise  $K_e$ -values. Therefore, the potential evaporation under the vegetation-free trees will be measured with self made evaporimeters on strategically positions. Replicates on slope and plateau accounts for the variability, both, between trees and induced by topography. The measured potential evaporation serves as boundary condition for the subsequent determination of the actual evaporation by means of soil water balance modelling. Soil water characteristics for modelling have been defined by soil water balance investigations. The  $K_e$ -value can be finally computed using  $ET_0$  data (provided by a weather station in the lychee orchard) and the modelled actual evaporation.

**Keywords:** Evaporation, lychee,  $K_e$ -values, Thailand