



Tropentag, September 11-13, 2024, hybrid conference

“Exploring opportunities ...  
for managing natural resources and a better life for all”

## Effects of different coffee cropping systems on nutrient status and yield of arabica coffee

THANCHANOK YOSEN<sup>1</sup>, NIPON MAWAN<sup>2</sup>, NUTTAPON KHONGDEE<sup>2</sup>, KRIT KHETANUN<sup>3</sup>, YUPA CHROMKAEW<sup>4</sup>

<sup>1</sup>*Chiang Mai University, Central Laboratory, Thailand*

<sup>2</sup>*Chiang Mai University, Dept. of Highland Agric. and Natural Resources, Thailand*

<sup>3</sup>*Chiang Mai University, Agricultural Innovation Research, Integration, Demonstration and Training Center, Thailand*

<sup>4</sup>*Chiang Mai University, Dept. of Plant and Soil Science, Thailand*

### Abstract

The current trend of increasing coffee consumption has led to a higher demand for coffee beans. As a result, in Thailand, farmers are increasingly turning to coffee cultivation with different cropping systems, including coffee monoculture, coffee agroforestry (coffee intercropped with forest trees), and coffee intercropped with economic fruit trees such as mango and banana. Therefore, this study aimed to study the nutrient levels in the soil, leaves, and coffee yield under different coffee cultivation systems. The soils were randomly sampled from three different coffee cropping systems, including 1) coffee monoculture, 2) coffee agroforestry, and 3) coffee cultivated with economic fruit trees. Soil samples were analysed for some soil chemical properties. For plant nutrients, leaf samples were collected during the fruiting stage, while coffee yields were recorded at harvest. The results showed that the soil pH under coffee cultivation with economic fruit trees had the highest pH ( $6.10 \pm 0.07$ ), which was significantly higher than the soil pH under coffee monoculture ( $5.74 \pm 0.10$ ) and coffee agroforestry ( $5.72 \pm 0.08$ ) ( $p < 0.05$ ). However, there were no significant differences in the soil nutrient levels (N, P, K, Ca, Mg) and leaf nutrient levels among the different coffee cropping systems. Regarding the coffee yield, coffee monoculture had the highest yield at  $16.81 \pm 2.56 \text{ kg ha}^{-1}$ , significantly higher than the yield of coffee cultivation with economic fruit trees ( $7.62 \pm 2.16 \text{ kg ha}^{-1}$ ) and coffee cultivation with forest trees ( $2.16 \pm 0.58 \text{ kg ha}^{-1}$ ). In the present study, a negative correlation was found between soil potassium and coffee yield, but no significant correlation was found between leaf nutrient levels and coffee yield.

**Keywords:** Coffee cultivation systems, coffee yield, leaf nutrient levels, soil nutrient levels