

RESEARCH WITH IMPACT

THE CHALLENGE:

Olive trees are one of the most important fruit crops in Morocco. Its olive-growing region is currently estimated at around one million hectares (ha). The country's fruit production has nearly doubled in the last ten years. But this higher production is mainly due to increased tree planting as yields remain low. The average olive yield is about 1 t/ha under rainfed conditions and 2 t/ha when grown with irrigation. Nutrient deficiencies and imbalanced fertilization remain a primary constraint to higher yields. In most cases, fertilizers are applied without an understanding of the nutritional needs of the trees in individual orchards.

THE RESEARCH SOLUTION:

IPNI cooperated within a study that evaluated current farmer practices for 36 olive orchards. The goal was to test whether improved fertilizer recommendations could boost olive production. Twenty higher density (204 trees/ha) irrigated orchards in Marrakech Province and 16 lower density (25 trees/ha) rainfed orchards in Essaouira Province were selected for this two-year evaluation.

In each orchard, local farmer fertilization practice was compared with (1) fertilization based on replacing the amount of nitrogen (N), phosphorus (P), and potassium (K) removed each year in the harvested crop, or (2) fertilization based on analyzing leaf nutrient concentration, which was compared with known critical concentrations.



Olive orchards under rainfed (left) and irrigated (right) growing conditions in Morocco.

Improved Fertilization Boosts Olive Production in Morocco

Analysis of leaf tissue revealed that approximately 70% of the trees were deficient in N, all trees were deficient in P, and K was deficient in all rainfed trees and 90% of the irrigated trees.

methods, respectively. In irrigated orchards, fruit yields were improved by 22% and 30% for the first and second years, respectively, using leaf analysis.

THE RESULTS:

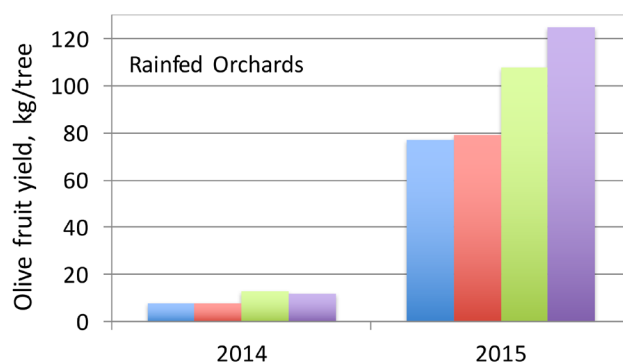
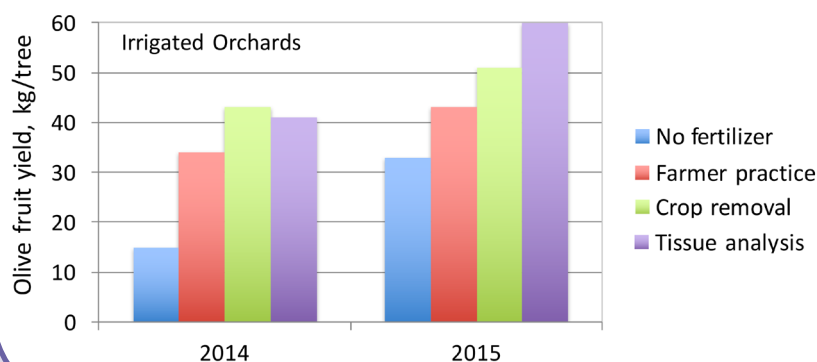
In both 2014 and 2015, applying N, P, and K fertilizer based on either crop removal or leaf analysis resulted in a large increase in fruit yields over any farmer practice. Additionally, the olive oil content was increased by 16% in the irrigated orchards and 6% in the rainfed orchards by following the improved fertilizer recommendations.

In rainfed orchards, olive fruit yields were improved by 58% and 36% through the use of crop removal- and leaf analysis-based



This research demonstrates the ability to enhance the production of olive fruit and oil with improved fertilization practices. Although not all farmers can access lab facilities needed to determine the nutrient status of their trees, all farmers can apply fertilizer based on how much fruit was harvested from the field in the previous year.

Simple improvements to fertilization practices have the potential for large improvements in olive production in Morocco, resulting in a significant boost to farmer incomes.



Olive fruit yields from irrigated (left chart) and rainfed (right chart) orchards receiving fertilizer based on current farmer practice or improved nutrient recommendations. The large yield increase measured in rainfed orchards in 2015 was due to additional rainfall and the alternate year-bearing nature of olive trees.



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