



Tropentag, September 16-18, 2026, hybrid conference

“Towards multi-functional agro-ecosystems
promoting climate resilient futures”

Agroecological agroforestry system designed for more efficient use of irrigation water by family farmers

JOEL LEANDRO QUEIROGA¹, LUIZ OCTÁVIO RAMOS FILHO¹, WALDEMORE MORICONI¹, DENISE
BITTENCOURT AMADOR², RODRIGO JUNQUEIRA BARBOSA DE CAMPOS²

¹*Brazilian Agricultural Research Corporation, Embrapa Environment, Brazil*

²*Non-Governmental Organization Mutirão Agroflorestal, Brazil*

Abstract

One of the main difficulties faced by family farmers, especially those settled through agrarian reform, is the low availability of water for food production. Crop diversification and intercropping are traditional practices in family farming, and agroforestry systems have become one of the most promising productive strategies to improve food sovereignty and security and generate income for this category of farmers, while simultaneously preserving biodiversity and natural resources. This study aimed to design an agroecological agroforestry system to reduce waste and optimise the management of irrigation water use by family farmers. This design was conceived by the agroecology team of Embrapa Meio Ambiente and the Non-Governmental Organisation Mutirão Agroflorestal in conjunction with family farmers from the Sepé Tiraju Agrarian Reform Settlement (Serrana and Serra Azul, São Paulo state, Brazil) within the scope of the Public Policy of the Sustainable Rural Development Program, implemented by the São Paulo State Secretariat for the Environment. Thirty-five agroforestry systems were implemented in the Sepé Tiaraju Settlement, totaling 25.4 hectares, in 2014. The design differs from the most widespread and adopted ones by featuring rows of trees for economic production, including fruit trees and some timber trees, interspersed with rows of native trees from various ecological groups for biomass production, with a spacing of 5 m between rows and 4 m between trees within the row. Adopting this design, in which only the rows of economically productive trees are irrigated because the native trees are better adapted and resistant to low soil moisture conditions, reduced water consumption by 50 % and irrigation material costs by 37.6 %. Another advantage of this design is the optimisation of labour use in the sequential pruning of native trees along the same line, aiming to generate biomass for distribution as ground cover in the economically important production lines. This helps conserve soil moisture, reduces labour in controlling spontaneous species, reduces soil erosion, provides nutrients for economically important species, and ensures less dependence of family farmers on external inputs, promoting greater self-sufficiency of the system, as advocated by the principles of agroecology.

Keywords: Agroecology, agroforestry, arrangement, water economy