Limited evidence on agroforestry interventions shows positive impacts on agricultural yield and income

Agroforestry interventions may lead to a large, positive impact on yield, though there is high variations in findings. Agroforestry interventions may also lead to a small, positive impact on income. There is insufficient evidence on nutrition, food security and environmental outcomes. Equity concerns of agroforestry interventions appeared in many of the studies, with mixed results, indicating that additional consideration of equity in agroforestry interventions is needed.

What is this review about?
Agroforestry is defined as the integration of trees and woody shrubs in crop and livestock production systems. It is widely promoted as a conservation and development tool to sequester carbon, improve soil fertility, and conserve biodiversity on agricultural lands while generating economic benefits for farmers. Agroforestry is promoted through a range of interventions, including farmer capacity development, provision of tree germplasm, and financial or tenure security provision.

This review examines the evidence on the impacts of any type of agroforestry intervention in low- and middle-income countries (LMICs) on three broad outcomes: agricultural productivity, ecosystem services, and human well-being.

What studies are included?
This review includes studies that evaluate the effect of agroforestry interventions on agricultural productivity, ecosystem services, and human well-being in LMICs. All the studies had methodological weaknesses and high risk of bias. No evaluations using randomised controlled trials for agroforestry interventions were identified.

The review summarises the findings from 11 impact evaluations covering 15 programmes in Brazil, China, Colombia, Indonesia, Kenya, Malawi, Mozambique, Nicaragua, and Zambia.

Eight of the studies evaluated farmer capacity development programmes, which provided extension services and technical training, and five incorporated tree germplasm provision.
Four studies evaluated incentive programmes, including payments for ecosystem services, certification schemes, and tenure security.

The practices that were promoted by the interventions included improved fallow systems, incorporating trees in crop fields, silvopasture, coffee agroforestry, and agrosilvopastoral systems.

**What are the main findings of this review?**

There is a large, positive overall effect of agroforestry interventions on agricultural yields, although there is large variation in the results. The largest positive impacts of agroforestry on yields are associated with less fertile lands, and negative impacts are associated with highly productive lands.

There is a very small, positive overall effect of agroforestry interventions on income. Increased or neutral income effects are associated with either increased yields providing additional income, or incentive payments offsetting the costs associated with decreased yields.

Few impact evaluations considered the impacts of agroforestry interventions on nutrition and food security. Qualitative assessment suggests that agroforestry interventions may lead to positive or neutral nutrition and dietary diversity outcomes and may lead to positive food security outcomes.

Few studies considered the impacts of agroforestry interventions on ecosystem services. However, the effects of agroforestry practices on ecosystem services are well-documented in the broader agroforestry literature.

In areas with limited soil fertility, agroforestry interventions provided technical support through extension and training programmes, and in some cases provided access to tree germplasm, to support farmers to adopt agroforestry practices intended to increase yields and incomes. In higher productivity areas, agroforestry interventions provided incentives – such as payments for ecosystem services, certification schemes, and tenure security – to adopt agroforestry practices intended for conservation that may reduce overall yields.

**What do the findings of the review mean?**

The existing evidence suggests that there may be positive impacts on agricultural yields and incomes as well as food security and ecosystem services, but appropriate intervention design is dependent on local biophysical and socio-economic characteristics.