Principle 5: The adoption of agroforestry principles will enhance ecosystem services and generate other benefits for farmers and their families.

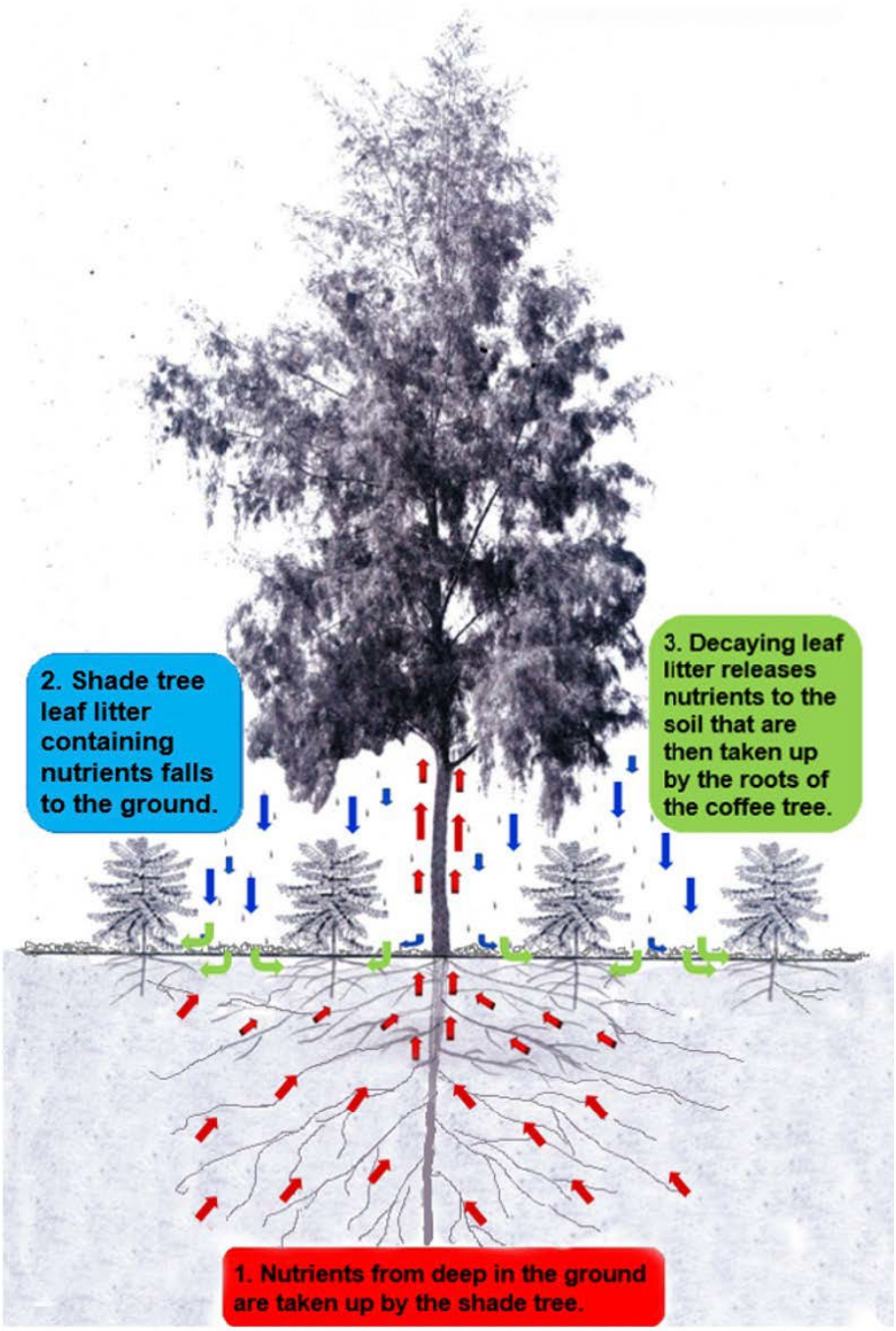
It is becoming clear to researchers that many of the traditional farming techniques of farmers in PNG and elsewhere were highly sustainable, providing stable production through time, without a dependence on costly external inputs. Traditional farming methods are often based on agroforestry principles, which are becoming increasingly recognised throughout the world as contributing to the resilience of farming systems, especially in the context of climate change. Agroforestry has been practised successfully in PNG for thousands of years, and some of the key principles contributing to sustainable low input systems of coffee production are emphasised throughout the modules.

The importance of shade trees is highlighted in the modules. Shade trees not only improve the supply of soil nutrients (e.g. from shade tree leaf fall and nitrogen fixation), but may also save labour in weeding through weed suppression from shading and mulch, and provide a wide array of valuable resources such as firewood and timber, and a source of supplementary income.

Throughout the modules there is an emphasis on coffee farming methods that generate ecosystem services which in turn improve the sustainability of coffee production (ecosystem services being the benefits provided by the environment). Considered in these modules are low-cost, labour-efficient methods to diversify incomes, promote ecosystem services which enhance nutrient recycling, reduce the impact of pests and diseases, suppress weeds, and reduce the need for fertilisers, pesticides and herbicides.

Weeds present under little shade
(Credit: Leo Aroga)

Few weeds under appropriate shade
(Credit: Leo Aroga)



Coffee shade trees play an important role in nutrient cycling while also reducing weed growth, improving biodiversity, and pest and disease and climate change resilience *(Credit: Bob Kora)*.

Further reading:

Tilden, G.M., Aranka, J.N. and Curry, G.N. (2023). Ecosystem services in coffee agroforestry: their potential to improve labour efficiency amongst smallholder coffee producers. *Agroforestry Systems* **98**, 383-400. https://doi.org/10.1007/s10457-023-00917-0