

Agroforestry and biochar to offset climate change: a review

Ilan Stavi · Rattan Lal

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Abstract Expansion of agricultural land use has increased emission of greenhouse gases, exacerbating climatic changes. Most agricultural soils have lost a large portion of their antecedent soil organic carbon storage, becoming a source of atmospheric carbon-dioxide. In addition, agricultural soils can also be a major source of nitrous oxide and methane. Adoption of conservation agricultural practices may mitigate some of the adverse impacts of landuse intensification. However, optimal implementation of these practices is not feasible under all physical and biotic conditions. Of a wide range of conservation practices, the most promising options include agroforestry systems and soil application of biochar, which can efficiently sequester large amounts of carbon over the long-run. In addition, these practices also increase agronomic productivity and support a range of ecosystem services. Payments to farmers and land managers for sequestering carbon and improving ecosystem services is an important strategy for promoting the adoption of such practices, aimed at mitigating climate change while decreasing environmental footprint of agriculture and sustaining food security.

Keywords Clean development mechanism · Conservation agriculture · Ecosystem services · Global warming · Greenhouse gases · Soil organic carbon

I. Stavi (✉)
Dead Sea & Arava Science Center,
Ketura 88840, Israel
e-mail: istavi@yahoo.com

R. Lal
Carbon Management and Sequestration Center,
Ohio State University,
Columbus, OH 43210, USA