

Agroforestry and yield

Reference 9

Akinnifesi, FK; Ajayi, OC; Sileshi, G; Chirwa, PW; Chianu, J. 2011 Fertiliser Trees for Sustainable Food Security in the Maize-Based Production Systems of East and Southern Africa. Sustainable Agriculture 2: 129-146 doi: 10.1007/978-94-007-0394-0_9

Background and objective

It includes different types of fertiliser tree systems (including intercropping) that have been developed and promoted in East and Southern Africa. Biomass transfer using fertiliser tree species is a more sustainable means for maintaining nutrient balances in maize and vegetable-based production systems. To review several studies conducted both on-station and on-farm and synthesise the results in terms of improvements in soil physical, chemical and biological properties, and crop yield in response to fertiliser trees. Here we focus only on the meta-analysis to assess the effect of fertilizer trees on maize yields.

Search strategy and selection criteria

not available not available

Data and analysis

not available

| Number of papers | Population | Intervention | Comparator | Outcome | Quality score |
|-------------------------|---|--|---------------------------------------|--|---------------|
| 94 peer-reviewed papers | Maize with fertiliser tree systems (Faidherbia Albida, Sequential Tree Fallow, Annual Relay Intercropping and Gliricidia Intercropping) | Agroforestry with fertiliser trees (Gliricida, Sesbania and Tephrosia) | Unfertilised maize grown continuously | Average yield and yield increase (t ha ⁻¹). Yield increase is the yield difference between the treatment (T) plot and the unfertilised control (C) plot, which is farmers' de facto practice. Percentage increase (%I) was calculated as follows: %I = 100((T-C)/C). | 19% |

Results

- On average, gliricidia gave 55–350% yield increase over the control, while sesbania gave 160–583% increase. Yield increases with tephrosia spp were modest, and ranged from 180% to 233%
- NA
- NA
- NA
- NA

Factors influencing effect sizes

Time after tree establishment: Increase in yield is more apparent from the third year after tree establishment and onwards. Rainfall and soil fertility: The results from the meta-analysis indicate that they are generally best-performing in low to medium potential sites in terms of rainfall and fertility.

Conclusion

The meta-analysis provided conclusive evidence that with good management, fertiliser trees can double maize yields compared with local farmer practices of maize cultivation without addition of external fertilisation.