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Maize Yield Response to *Mucuna pruriens* and *Pueraria phaseoloides* Cover Crop Fallow and Biomass Burning Versus Mulching in Farmer Managed On-farm Experiments

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Abstract

Maize was relay cropped with the cover crops *Mucuna pruriens* or *Pueraria phaseoloides* or in natural fallow for one to seven consecutive years in three sites: Ngoungoumou, an area of low land use intensity (LUI), 100km from the next major market, at Evendissi and Andok, a medium LUI area, 15km from the next mayor market. Biomass was burned or retained as mulch in all fallow types. Fallow type did not affect maize density. Biomass burning increased maize density in the low LUI site but had no effect in the other sites. Maize cob production was neither affected by fallow type nor by biomass management. Across seven crop years, marketable cob production in the low LUI site was 38.5 % higher in *Mucuna* than in natural fallow ($p < 0.06$). In the medium LUI sites, *Mucuna* and *Pueraria* fallow increased marketable cob production by 70 — 132 % ($p < 0.001$). Maize grain yield was closely related to the marketable cob production in all sites. In the low LUI site, cumulative maize grain yield over seven years was 30 % higher in *Mucuna* than in natural fallow ($p < 0.07$). This difference was in one year significant ($p < 0.05$). In the other sites maize grain yield was 65 % higher in *Mucuna* fallow ($p < 0.001$) and 69–94 % higher in *Pueraria* fallow ($p < 0.001$). Burning biomass had a cumulative grain yield advantage of 33 % at the low LUI site ($p < 0.053$), with significant ($p < 0.02$) differences in two out of seven years. Biomass burning had no effect on maize grain yield in the medium LUI sites. Fallow type and biomass management did not interact. Despite the lack of frequent significant advantages of the cover crop fallows in the low LUI site, the system can be recommended because it increases food diversity. In the medium LUI sites farmers were immediately convinced of the benefits of the system and have since moved on to grow high value vegetable crops.

Keywords: Cameroon, maize, *Mucuna pruriens*, *Pueraria phaseoloides*, Ultisol