Unravelling sustainable intensification in oil-palm agroforestry on Adja plateau, Benin

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Abstract

On Adja plateau, Benin, landowners evict tenants in order to replenish soil fertility through oil-palm fallowing. As a reaction, tenants use farmyard manure and mineral fertiliser, arguing that these practices restore soil fertility, allowing them to pursue land cropping. There is little information available on the impacts of these management practices on soil fertility and on land productivity, although this information is essential input for making recommendations about how to lessen land conflicts and improve the sustainability of land-management systems. This study used a synchronic approach, selecting 12 farmers' fields in villages typical of the region, eight and four of which, respectively, represent tenants' (cropping fields) and landowners' (fallows) soil fertility management strategies. An experimental plan was designed, combining different doses of farmyard manure and inorganic fertilisation to assess maize yields and soil fertility in cropped fields compared with fallows. The results showed no significant differences between treatments on cropped fields and fallows regarding N, C, and C:N. However, soil P and K were higher in the treated plots than in the fallows. Maize grain yields under farmyard manure application were better than grain yields under mineral fertiliser alone. In addition, a double dose of farmyard manure was revealed to exceed the mineral fertiliser effect alone. Fertiliser recommendations are provided for tenants' maize production, and trade-offs between sustainability and intensification are discussed. Finally, We suggest that farmyard manure application is a practice that can create a win-win situation for both sides provided that the two actors involved formalise the agreement so that drifts are controlled and plead for governments involvement in land conflict resolution by providing institutional flexibility regarding accounting for local practices such as farmyard manure application to enable the land leasing system to facilitate adaptive governance based on ecological intensification.