

Participatory Yield Assessment of Climbing and Bush Beans under Different Management Options in Malawi

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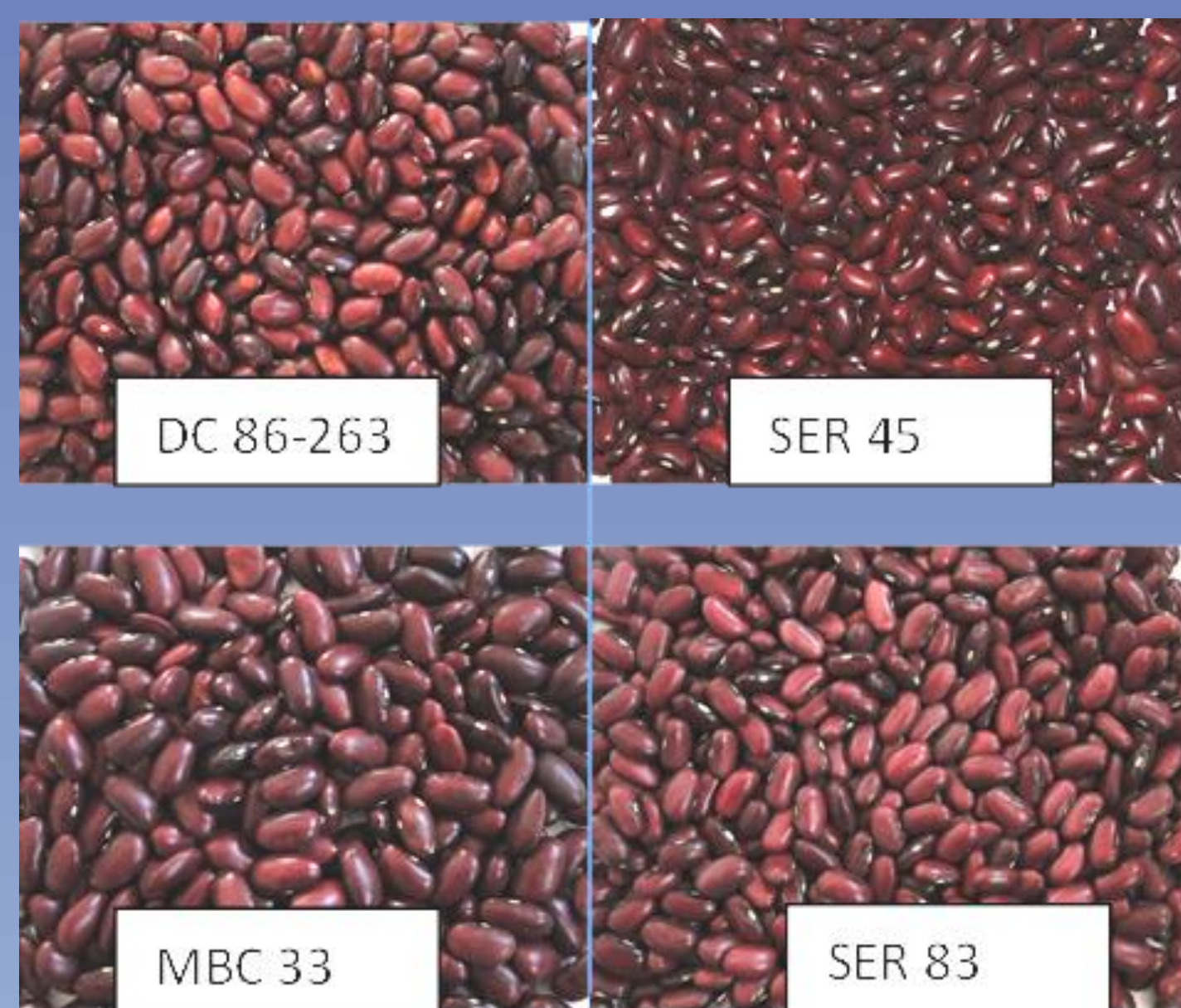
1. Introduction

Common bean is the cheapest source of proteins for the rural poor who cannot afford to buy meat in Sub Saharan Africa. However, in Malawi, the average productivity over the last ten years stands at less than 0.5 Mg ha⁻¹ despite having the potential of 2 Mg ha⁻¹ under proper management and use of good seed. The study was initiated to demonstrate the effect of different management options on the yield of climbing and bush bean genotypes grown under smallholder farming systems.

2. Methodology

Maize-legume intensification trials were undertaken in the Linthipe and Kandeu Extension Planning Areas (EPAs) respectively in Dedza and Ntcheu districts, in the 2013/14 cropping season. Linthipe is a medium altitude sub-humid site (1200 – 1300 masl), while Kandeu is a low altitude semi-arid site (900 – 950 masl). The trials were laid out in split-plot design. The bean varieties, of bush or climbing growth habits were the main plots while management options were sub-plots. Trials were replicated three times. The climbing bean varieties were DC86-263 and MBC33 whereas the bush bean varieties were SER45 and SER83. Maize seed (DK8033) was used in maize-bean intercrop treatments. Management options included: mono-cropping maize or bean, bean intercrop with maize or pigeon peas, chicken manure application (two handfuls per planting station), inorganic fertilizer application (92kgNha⁻¹ using 23:21:0+4S), and a combination of manure and fertilizer. The staking options for climbing bean fields were stick stakes, live maize crop or pigeon pea plants. Data was collected on 4.5 m² net plot and samples of grains dried at 65°C constant temperature to determine yield on dry matter basis. Farmer participatory selection of the management options was also conducted at both sites. Analysis of variance was carried out using Genstat package, 16th Edition.

Map of central Malawi showing Study Sites



Common bean seed genotypes used during the study



A young crop: An intercrop of bush bean and maize



An intercrop of climbing bean and maize



Heavy climbing bean staked with sticks

3. Results

- DC86-263 performed well under maize intercrop with the use of NPK only or NPK+ Manure (Fig. 1). Maize yield followed similar trend (Fig. 2a).
- MBC33 produced the highest yield in pure stand where stick stakes and manure were used (Fig. 1). Maize yields were highest under bean-maize intercrop when either manure, NPK or their combination was used (Fig. 2a and b).
- Intercropping was preferred by farmers because of the overall high yield from both crops in association.

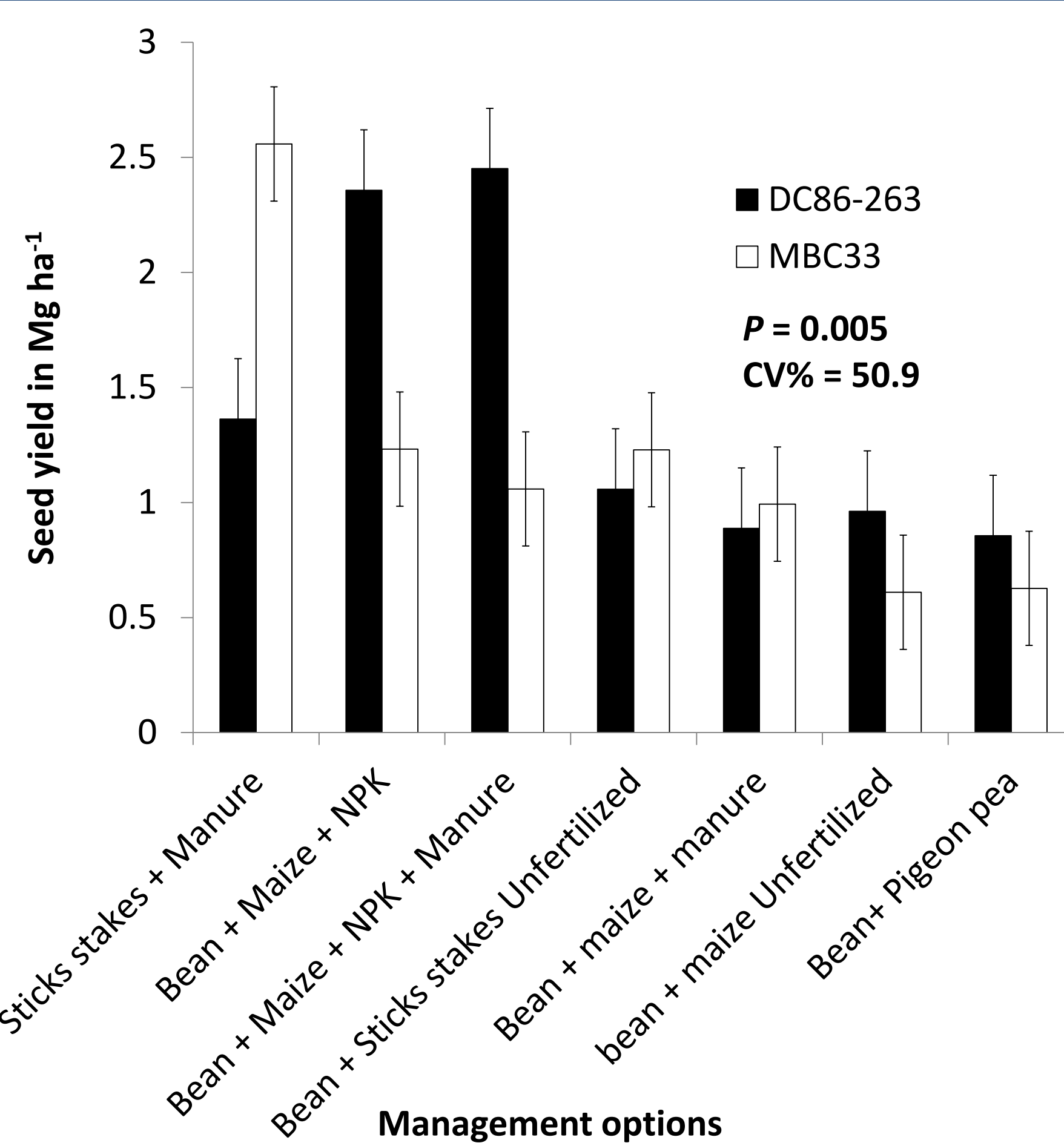


Figure 1: Yield response of climbing bean varieties under different management options at Kandeu (Mgha⁻¹)

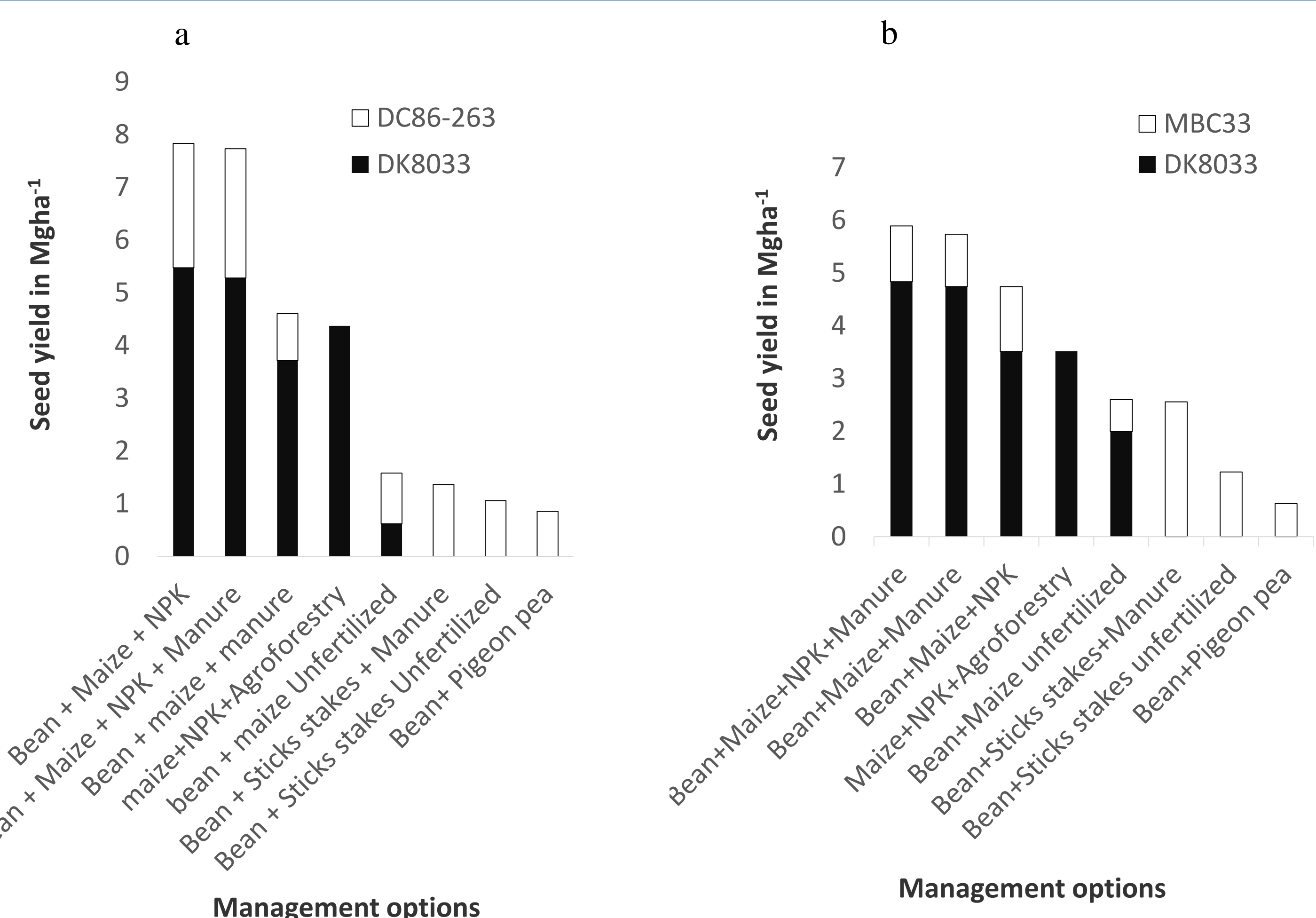


Figure 2a and b: Relative performance of both maize and climbing beans under different management options (Mgha⁻¹)

Table 1: Yield performance of bush beans in Linthipe extension planning area

Management Options	Seed Yield Mgha ⁻¹		100 Seed Wt (g)	
	SER45	SER83	SER45	SER83
Bean+Maize Unfertilized	1.076 ^a	0.517 ^{cd}	26	31
Bean+Maize+Manure	0.359 ^{cd}	0.897 ^{ab}	30	29
Bean +Maize +NPK+Manure	0.206 ^d	0.884 ^{ab}	34	26
Bean + Maize +NPK	0.593 ^{bc}	0.354 ^c	33	30
Genotype mean	0.567	0.636	34	29
LSD _{0.001} (Genotype x Management option)	0.356			
CV%	35			

SER45 performed better under maize without fertilizer, while SER83 did well with addition of manure in maize intercrop system indicating that SER varieties respond differently to soil fertility amendments.

4. Conclusion

Bean varieties responded significantly different to management options. DC86-263 (climber) produced the highest seed yield under maize + NPK + manure cropping system whereas MBC33 did well in pure stand under stick stakes + manure application. In bush bean, SER45 had the highest seed yield under unfertilized maize-bean intercrop, while SER83 was responsive to manure application.

5. Acknowledgement

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