Table S1. Objectives, decision variables modified, constraints applied, and exploration parameters used during the generation of alternative banana-bush bean management configurations for field experiments in eastern DR Congo.

Scenario		Original	Min	Max
All input scenarios	**Exploration Parameters**			
	Amplitude (F)	0.15		
	Probability (C_R)	0.85		
	Number of solutions	1000		
	Number of iterations	2000		
Business as usual (BaU)	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	2575		✓
	Nitrogen input (kg ha^{-1} year-^{1})	188	✓	
	Soil organic matter balance (kg ha^{-1} year-^{1})	14962		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision Variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	Subsequent goat manure added (kg)	0	0	8000
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	94	0	9999
	P balance (kg ha^{-1} year-^{1})	107	0	9999
	K balance (kg ha^{-1} year-^{1})	-131	-135	9999
Hedges (H)	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	2575		✓
	Nitrogen input (kg ha^{-1} year-^{1})	188	✓	
	Soil organic matter balance (kg ha^{-1} year-^{1})	14962		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	Calliandra hedge area (ha)	0	0	0.1
	Tithonia hedge area (ha)	0	0	0.1
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	94	0	9999
	P balance (kg ha^{-1} year-^{1})	107	0	9999
	K balance (kg ha^{-1} year-^{1})	-131	-135	9999
Inorganic fertilizer (I)	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	1403		✓

Scenario		Original	Min	Max
	Nitrogen input (kg ha^{-1} year-^{1})	500	✓	
	Soil organic matter balance (kg ha^{-1} year-^{1})	14962		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	NPK (17:17:17) (kg)	588	0	700
	CAN (26% N) (kg)	385	0	400
	DAP (kg)	65	0	70
	MOP (kg)	407	0	500
	Urea (kg)	217	0	300
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	406	0	9999
	P balance (kg ha^{-1} year-^{1})	237	0	9999
	K balance (kg ha^{-1} year-^{1})	217	0	9999
H+I	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	1403		✓
	Nitrogen input (kg ha^{-1} year-^{1})	500	✓	
	Soil organic matter balance (kg ha^{-1} year-^{1})	14962		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision Variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	Calliandra hedge area (ha)	0	0	0.1
	Tithonia hedge area (ha)	0	0	0.1
	NPK (17:17:17) (kg)	588	0	700
	CAN (26% N) (kg)	385	0	400
	DAP (kg)	65	0	70
	MOP (kg)	407	0	500
	Urea (kg)	217	0	300
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	406	0	9999
	P balance (kg ha^{-1} year-^{1})	237	0	9999
	K balance (kg ha^{-1} year-^{1})	217	0	9999
H + Goat manure (M)	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	1321		✓
	Nitrogen input (kg ha^{-1} year-^{1})	550	✓	

Scenario		Original	Min	Max
	Soil organic matter balance (kg ha^{-1} year-^{1})	18050		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision Variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	Calliandra hedge area (ha)	0	0	0.1
	Tithonia hedge area (ha)	0	0	0.1
	Subsequent goat manure added (kg)	7352	0	8000
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	456	0	9999
	P balance (kg ha^{-1} year-^{1})	240	0	9999
	K balance (kg ha^{-1} year-^{1})	220	0	9999
H+I+M	**Objectives**			
	Operating profit (US$ ha^{-1} year^{-1})	1321		✓
	Nitrogen input (kg ha^{-1} year-^{1})	550	✓	
	Soil organic matter balance (kg ha^{-1} year-^{1})	18050		✓
	Protein yield (persons ha^{-1} year^{-1})	23		✓
	Decision Variables			
	Bush bean monocrop area (ha)	0	0	1
	Banana monocrop with 4 leaves area (ha)	0	0	1
	Banana monocrop with 7 leaves area (ha)	0	0	1
	Banana monocrop with all leaves (un-pruned) area (ha)	0	0	1
	Banana-bush bean intercrop with 4 leaves area (ha)	1	0	1
	Banana-bush bean intercrop with 7 leaves area (ha)	0	0	1
	Banana-bush bean intercrop with all leaves area (ha)	0	0	1
	Calliandra hedge area (ha)	0	0	0.1
	Tithonia hedge area (ha)	0	0	0.1
	NPK (17:17:17) (kg)	588	0	700
	CAN (26% N) (kg)	385	0	400
	DAP (kg)	65	0	70
	MOP (kg)	407	0	500
	Urea (kg)	217	0	300
	Goat manure added (kg)	7353	0	8000
	Constraints			
	Total farm area (ha)	1	0.95	1
	N balance (kg ha^{-1} year-^{1})	456	0	9999
	P balance (kg ha^{-1} year-^{1})	240	0	9999
	K balance (kg ha^{-1} year-^{1})	220	0	9999