

## **ANNEX 4**

### **COST-BENEFIT MODEL FOR MAIZE**

# COST - BENEFIT MODEL (CYPERUS ON VERTISOLS PROJECT - R6737)

Instructions: Enter figures in white boxes to produce derived values in blue boxes

Date	System	File
08-May-00	Smallholder maize, Ghana	cb model 08may

Labour costs	Cedis/ac	Cedis/ha	Cedis/0.11 ac [12 arms x 12 arms]
Hand-weeding: 1st	56,200	138,870	
2nd	48,600	120,091	
Sowing crop	28,800	71,165	
Herbicide application	20,000	49,420	
Insecticide application		0	
Fertiliser application	19,000	46,949	
Harvesting: picking cobs	30,000	74,130	
dehusking	36,667	90,604	
shelling	30,000	74,130	

Tractor and equipment hire	Cedis/ac	Cedis/ha	
3 furrow disc plough	55,000	135,905	
	Season 1 CB construction	Season 2 CB maintenance	Season 3, 4, etc CB maintenance
Polydisc (Cedis/ac)	100,000	50,000	35,000
Polydisc (Cedis/ha)	247,100	123,550	86,485

Seed, pesticides and fertilizer	Maize	Cowpea	Other
Seed (Cedis/ha)	22,000		
	Glyphosate	Lasso/atrazine	Dual
Herbicide (Cedis/litre)	28,000		
	Product A	Product B	Product C
Insecticide (Cedis/litre)			
	Starter 15:15:15	Side dressing AmSO <sub>4</sub>	Other
Fertiliser (Cedis/kg)	1,040	912	
		Cost per season [Mean of 10 seasons]	
Cost of sprayer (Cedis)	250,000	25,000	

Transport and storage	Transport	Storage & seed dressing	Exchange rate £1 = Cedis
Cost per kg (Cedis)			4,300

Crop values (Cedis/kg)	Maize	Cowpea	Other
	802		

Crop yield (kg/ha)	Source: ARS Kpong trial CROP97A (for medium input data)			
	Flat / Hand	Flat / Glyph	CB / Hand	CB / Glyph
Low input	569	1,067	645	1,259
Medium input	1,234	2,315	1,399	2,731
High input input	1,803	3,382	2,044	3,989
Typical farm yield (kg/ha)		1000		

**COST EFFECTIVENESS OF HAND-WEEDING AND GLYPHOSATE ON FLAT LAND AND CAMBER BEDS FOR THREE LEVELS OF INPUTS**

**SEASON 1**

Date: 08-May-00

Inputs	Flat						CB					
	Low		Medium		High		Low		Medium		High	
	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph
Land preparation (CB): Season 1 - CB construction Season 2 - CB maintenance Season 3, 4, etc - maintenance							247,100	247,100	247,100	247,100	247,100	247,100
Land preparation (flat): Season 1 - construction Season 2, 3, etc - maintenance	135,905	135,905	135,905	135,905	135,905	135,905						
Seeding:												
Seed cost	0	0	22,000	22,000	22,000	22,000	0	0	22,000	22,000	22,000	22,000
Labour costs for sowing	0	0	71,165	71,165	71,165	71,165	0	0	71,165	71,165	71,165	71,165
Fertiliser treatment:												
15:15:15 (full dose = 125 kg/ha)	0	0	65,000	65,000	130,000	130,000	0	0	65,000	65,000	130,000	130,000
AmSO <sub>4</sub> (full dose = 125 kg/ha)	0	0	0	0	114,000	114,000	0	0	0	0	114,000	114,000
Labour for fertiliser application	0	0	46,949	46,949	93,898	93,898	0	0	46,949	46,949	93,898	93,898
Insecticide treatment:												
Insecticide ( l/ha)	0	0	0	0	0	0	0	0	0	0	0	0
Labour for insecticide application	0	0	0	0	0	0	0	0	0	0	0	0
Weeding costs:												
1st Hand weeding	0	0	138,870	0	138,870	0	0	0	138,870	0	138,870	0
2nd Hand weeding	0	0	120,091	120,091	120,091	120,091	0	0	120,091	120,091	120,091	120,091
Glyphosate treatment (5l/ha)	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000
Lasso/atrazine	0	0	0	0	0	0	0	0	0	0	0	0
Labour cost for spraying glyph.	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420
Sprayer cost	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000
Harvesting:												
Labour cost for picking crop	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Labour cost for dehusking maize	0	0	111,806	209,749	163,326	306,401	0	0	126,755	247,440	185,164	361,460
Labour cost for shelling maize	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Transport and storage:												
Transport	0	0	0	0	0	0	0	0	0	0	0	0
Storage (inc. seed dressing)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total input cost</b>	<b>135,905</b>	<b>350,325</b>	<b>894,738</b>	<b>1,228,500</b>	<b>1,256,512</b>	<b>1,709,258</b>	<b>247,100</b>	<b>461,520</b>	<b>1,045,346</b>	<b>1,439,062</b>	<b>1,425,281</b>	<b>1,965,609</b>

<b>Outputs</b>													
Maize yield (kg/ac)	230	432	499	937	730	1,369	261	509	566	1,105	827	1,615	
Maize yield (kg/ha)	569	1,067	1,234	2,315	1,803	3,382	645	1,259	1,399	2,731	2,044	3,989	
Yield value (Cedi/kg)	802	802	802	802	802	802	802	802	802	802	802	802	
Yield value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535	

<b>Profit</b>												
Maize value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535
Input costs	135,905	350,325	894,738	1,228,500	1,256,512	1,709,258	247,100	461,520	1,045,346	1,439,062	1,425,281	1,965,609
Profit Cedis/ha	320,163	505,265	94,930	628,130	189,195	1,002,907	269,950	547,817	76,652	751,200	213,734	1,233,926

<b>Profit (Cedis/ha)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	320,163	505,265	94,930	628,130	189,195	1,002,907
CB	269,950	547,817	76,652	751,200	213,734	1,233,926

<b>Profit (£/ha)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	74.46	117.50	22.08	146.08	44.00	233.23
CB	62.78	127.40	17.83	174.70	49.71	286.96

<b>Profit (Cedis/ac)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	129,568	204,478	38,418	254,201	76,566	405,871
CB	109,247	221,699	31,021	304,006	86,497	499,363

**Explanations:**

- Low input = Family unit using family labour (free); home-grown seed (free); no fertilizer; no insecticide; no transport and no storage costs
- Medium input = Inputs purchased for labour, fertilizer (starter but not side dressing), insecticide, transport and storage
- High input = All inputs purchased, including side- or top-dressing of fertiliser
- Inputs for all farmers = Tractor tillage, glyphosate (where appropriate)

**COST EFFECTIVENESS OF HAND-WEEDING AND GLYPHOSATE ON FLAT LAND AND CAMBER BEDS FOR THREE LEVELS OF INPUTS**

**SEASON 2**

Date: 08-May-00

Inputs	Flat						CB					
	Low		Medium		High		Low		Medium		High	
	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph
Land preparation (CB): Season 1 - CB construction Season 2 - CB maintenance Season 3, 4, etc - maintenance							123,550	123,550	123,550	123,550	123,550	123,550
Land preparation (flat): Season 1 - construction Season 2, 3, etc - maintenance	135,905	135,905	135,905	135,905	135,905	135,905						
Seeding:												
Seed cost	0	0	22,000	22,000	22,000	22,000	0	0	22,000	22,000	22,000	22,000
Labour costs for sowing	0	0	71,165	71,165	71,165	71,165	0	0	71,165	71,165	71,165	71,165
Fertiliser treatment:												
15:15:15 (full dose = 125 kg/ha)	0	0	65,000	65,000	130,000	130,000	0	0	65,000	65,000	130,000	130,000
AmSO <sub>4</sub> (full dose = 125 kg/ha)	0	0	0	0	114,000	114,000	0	0	0	0	114,000	114,000
Labour for fertilizer application	0	0	46,949	46,949	93,898	93,898	0	0	46,949	46,949	93,898	93,898
Insecticide treatment:												
Insecticide ( l/ha)	0	0	0	0	0	0	0	0	0	0	0	0
Labour for insecticide application	0	0	0	0	0	0	0	0	0	0	0	0
Weeding costs:												
1st Hand weeding	0	0	138,870	0	138,870	0	0	0	138,870	0	138,870	0
2nd Hand weeding	0	120,091	120,091	120,091	120,091	120,091	0	120,091	120,091	120,091	120,091	120,091
Glyphosate treatment (5l/ha)	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000
Lasso/atrazine	0	0	0	0	0	0	0	0	0	0	0	0
Labour cost for spraying glyph.	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420
Sprayer cost	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000
Harvesting:												
Labour cost for picking crop	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Labour cost for dehusking maize	0	0	111,806	209,749	163,326	306,401	0	0	126,755	247,440	185,164	361,460
Labour cost for shelling maize	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Transport and storage:												
Transport	0	0	0	0	0	0	0	0	0	0	0	0
Storage (inc. seed dressing)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total input cost</b>	<b>135,905</b>	<b>470,416</b>	<b>894,738</b>	<b>1,228,500</b>	<b>1,256,512</b>	<b>1,709,258</b>	<b>123,550</b>	<b>458,061</b>	<b>921,796</b>	<b>1,315,512</b>	<b>1,301,731</b>	<b>1,842,059</b>

<b>Outputs</b>													
Maize yield (kg/ac)	230	432	499	937	730	1,369	261	509	566	1,105	827	1,615	
Maize yield (kg/ha)	569	1,067	1,234	2,315	1,803	3,382	645	1,259	1,399	2,731	2,044	3,989	
Yield value (Cedi/kg)	802	802	802	802	802	802	802	802	802	802	802	802	
Yield value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535	

<b>Profit</b>													
Maize value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535	
Input costs	135,905	470,416	894,738	1,228,500	1,256,512	1,709,258	123,550	458,061	921,796	1,315,512	1,301,731	1,842,059	
Profit Cedis/ha	320,163	385,174	94,930	628,130	189,195	1,002,907	393,500	551,277	200,202	874,750	337,284	1,357,476	

Profit (Cedis/ha)	Low input	Low input	Medium input	Medium input	High input	High input
	Hand	Glyphosate	Hand	Glyphosate	Hand	Glyphosate
Flat	320,163	385,174	94,930	628,130	189,195	1,002,907
CB	393,500	551,277	200,202	874,750	337,284	1,357,476

Profit (£/ha)	Low input	Low input	Medium input	Medium input	High input	High input
	Hand	Glyphosate	Hand	Glyphosate	Hand	Glyphosate
Flat	74.46	89.58	22.08	146.08	44.00	233.23
CB	91.51	128.20	46.56	203.43	78.44	315.69

Profit (Cedis/ac)	Low input	Low input	Medium input	Medium input	High input	High input
	Hand	Glyphosate	Hand	Glyphosate	Hand	Glyphosate
Flat	129,568	155,878	38,418	254,201	76,566	405,871
CB	159,247	223,099	81,021	354,006	136,497	549,363

**Explanations:**

- Low input = Family unit using family labour (free); home-grown seed (free); no fertilizer; no insecticide; no transport and no storage costs
- Medium input = Inputs purchased for labour, fertilizer (starter but not side dressing), insectide, transport and storage
- High input = All inputs purchased, including side- or top-dressing of fertiliser
- Inputs for all farmers = Tractor tillage, glyphosate (where appropriate)

**COST EFFECTIVENESS OF HAND-WEEDING AND GLYPHOSATE ON FLAT LAND AND CAMBER BEDS FOR THREE LEVELS OF INPUTS**

**SEASON 3, 4, ETC.**

Date: 08-May-00

Inputs	Flat						CB					
	Low		Medium		High		Low		Medium		High	
	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph	Hand	Glyph
Land preparation (CB): Season 1 - CB construction Season 2 - CB maintenance Season 3, 4, etc - maintenance							86,485	86,485	86,485	86,485	86,485	86,485
Land preparation (flat): Season 1 - construction Season 2, 3, etc - maintenance	135,905	135,905	135,905	135,905	135,905	135,905						
Seeding:												
Seed cost	0	0	22,000	22,000	22,000	22,000	0	0	22,000	22,000	22,000	22,000
Labour costs for sowing	0	0	71,165	71,165	71,165	71,165	0	0	71,165	71,165	71,165	71,165
Fertiliser treatment:												
15:15:15 (full dose = 125 kg/ha)	0	0	65,000	65,000	130,000	130,000	0	0	65,000	65,000	130,000	130,000
AmSO <sub>4</sub> (full dose = 125 kg/ha)	0	0	0	0	114,000	114,000	0	0	0	0	114,000	114,000
Labour for fertilizer application	0	0	46,949	46,949	93,898	93,898	0	0	46,949	46,949	93,898	93,898
Insecticide treatment:												
Insecticide ( l/ha)	0	0	0	0	0	0	0	0	0	0	0	0
Labour for insecticide application	0	0	0	0	0	0	0	0	0	0	0	0
Weeding costs:												
1st Hand weeding	0	0	138,870	0	138,870	0	0	0	138,870	0	138,870	0
2nd Hand weeding	0	120,091	120,091	120,091	120,091	120,091	0	120,091	120,091	120,091	120,091	120,091
Glyphosate treatment (5l/ha)	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000	0	140,000
Lasso/atrazine	0	0	0	0	0	0	0	0	0	0	0	0
Labour cost for spraying glyph.	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420	0	49,420
Sprayer cost	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000	0	25,000
Harvesting:												
Labour cost for picking crop	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Labour cost for dehusking maize	0	0	111,806	209,749	163,326	306,401	0	0	126,755	247,440	185,164	361,460
Labour cost for shelling maize	0	0	91,476	171,611	133,629	250,689	0	0	103,708	202,449	151,496	295,738
Transport and storage:												
Transport	0	0	0	0	0	0	0	0	0	0	0	0
Storage (inc. seed dressing)	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total input cost</b>	<b>135,905</b>	<b>470,416</b>	<b>894,738</b>	<b>1,228,500</b>	<b>1,256,512</b>	<b>1,709,258</b>	<b>86,485</b>	<b>420,996</b>	<b>884,731</b>	<b>1,278,447</b>	<b>1,264,666</b>	<b>1,804,994</b>

<b>Outputs</b>													
Maize yield (kg/ac)	230	432	499	937	730	1,369	261	509	566	1,105	827	1,615	
Maize yield (kg/ha)	569	1,067	1,234	2,315	1,803	3,382	645	1,259	1,399	2,731	2,044	3,989	
Yield value (Cedi/kg)	802	802	802	802	802	802	802	802	802	802	802	802	
Yield value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535	

<b>Profit</b>												
Maize value	456,068	855,590	989,668	1,856,630	1,445,707	2,712,165	517,050	1,009,337	1,121,998	2,190,262	1,639,015	3,199,535
Input costs	135,905	470,416	894,738	1,228,500	1,256,512	1,709,258	86,485	420,996	884,731	1,278,447	1,264,666	1,804,994
Profit Cedis/ha	320,163	385,174	94,930	628,130	189,195	1,002,907	430,565	588,342	237,267	911,815	374,349	1,394,541

<b>Profit (Cedis/ha)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	320,163	385,174	94,930	628,130	189,195	1,002,907
CB	430,565	588,342	237,267	911,815	374,349	1,394,541

<b>Profit (£/ha)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	74.46	89.58	22.08	146.08	44.00	233.23
CB	100.13	136.82	55.18	212.05	87.06	324.31

<b>Profit (Cedis/ac)</b>	<b>Low input</b>	<b>Low input</b>	<b>Medium input</b>	<b>Medium input</b>	<b>High input</b>	<b>High input</b>
	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>	<b>Hand</b>	<b>Glyphosate</b>
Flat	129,568	155,878	38,418	254,201	76,566	405,871
CB	174,247	238,099	96,021	369,006	151,497	564,363

**Explanations:**

- Low input = Family unit using family labour (free); home-grown seed (free); no fertilizer; no insecticide; no transport and no storage costs
- Medium input = Inputs purchased for labour, fertilizer (starter but not side dressing), insecticide, transport and storage
- High input = All inputs purchased, including side- or top-dressing of fertiliser
- Inputs for all farmers = Tractor tillage, glyphosate (where appropriate)



GROSS MARGINS (£/HA) FOR SEASONS 1, 2 AND 3 ONWARDS

Date: 08-May-00

SEASON 1

	Hand weed	Glyphosate	Hand weed	Glyphosate	Hand weed	Glyphosate
	Low input	Low input	Medium input	Medium input	High input	High input
Flat	74.46	117.50	22.08	146.08	44.00	233.23
CB	62.78	127.40	17.83	174.70	49.71	286.96

SEASON 2

	Hand weed	Glyphosate	Hand weed	Glyphosate	Hand weed	Glyphosate
	Low input	Low input	Medium input	Medium input	High input	High input
Flat	74.46	89.58	22.08	146.08	44.00	233.23
CB	91.51	128.20	46.56	203.43	78.44	315.69

SEASONS 3, 4 ONWARDS

	Hand weed	Glyphosate	Hand weed	Glyphosate	Hand weed	Glyphosate
	Low input	Low input	Medium input	Medium input	High input	High input
Flat	74.46	89.58	22.08	146.08	44.00	233.23
CB	100.13	136.82	55.18	212.05	87.06	324.31

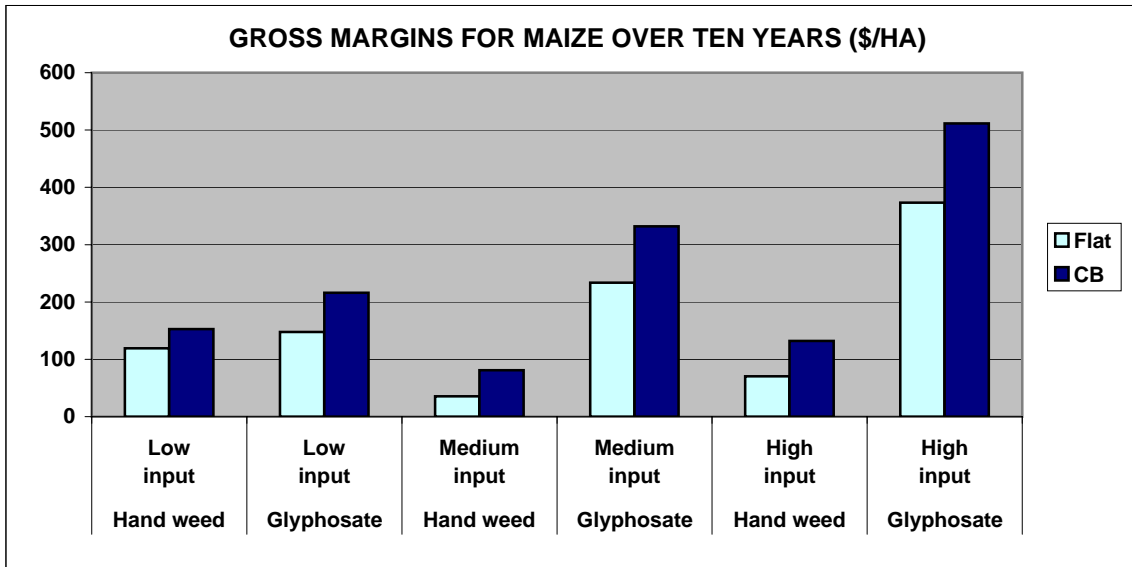
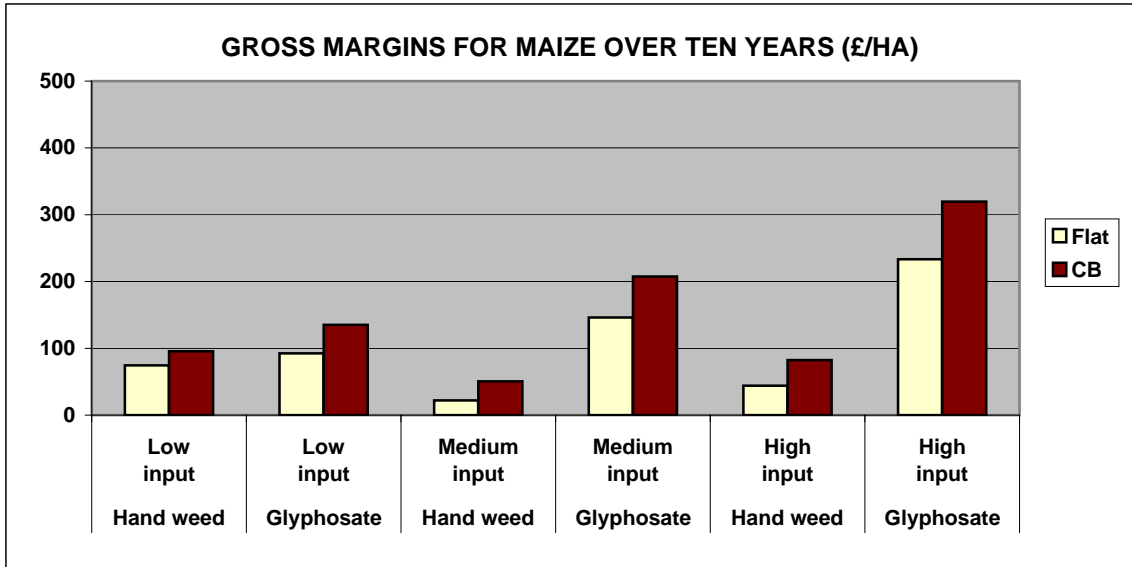
SEASONS 1-10 (MEAN)

	Hand weed	Glyphosate	Hand weed	Glyphosate	Hand weed	Glyphosate
	Low input	Low input	Medium input	Medium input	High input	High input
Flat	74.46	92.37	22.08	146.08	44.00	233.23
CB	95.53	135.02	50.58	207.45	82.46	319.71

SEASONS 1-10 (MEAN) (US\$)

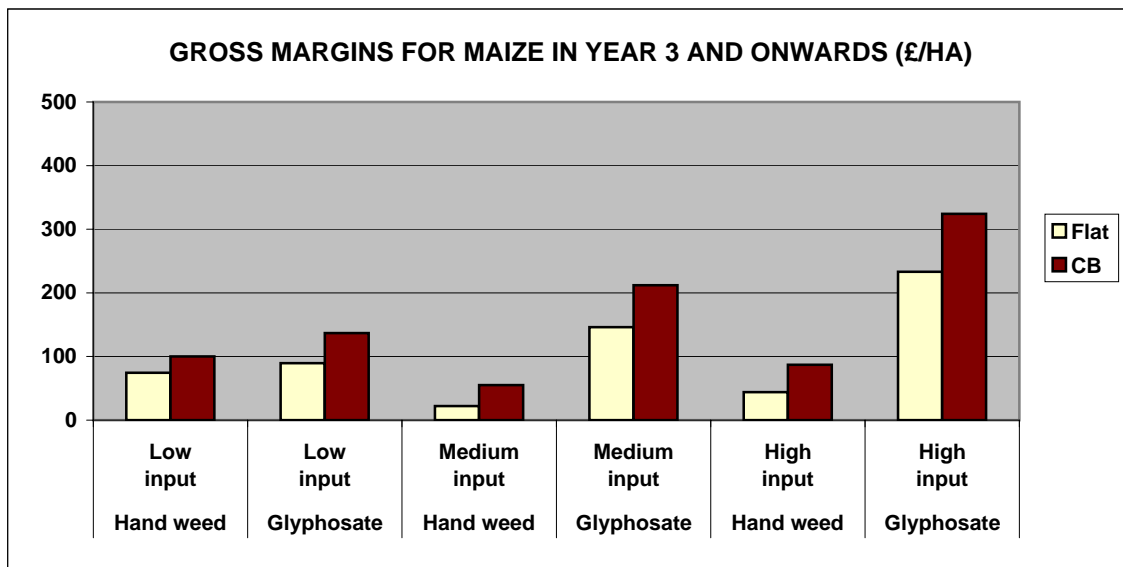
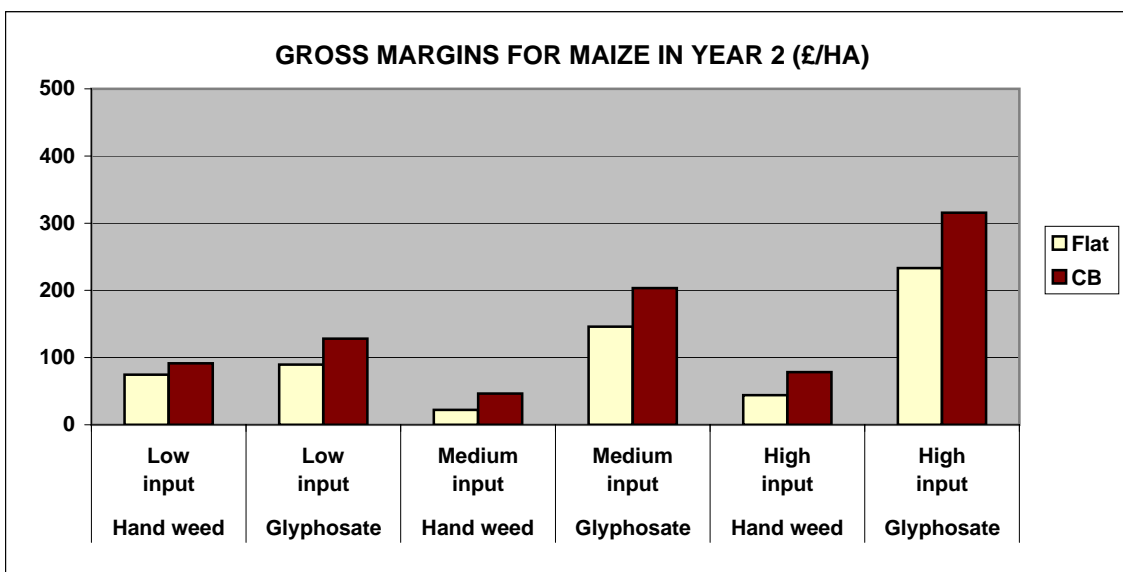
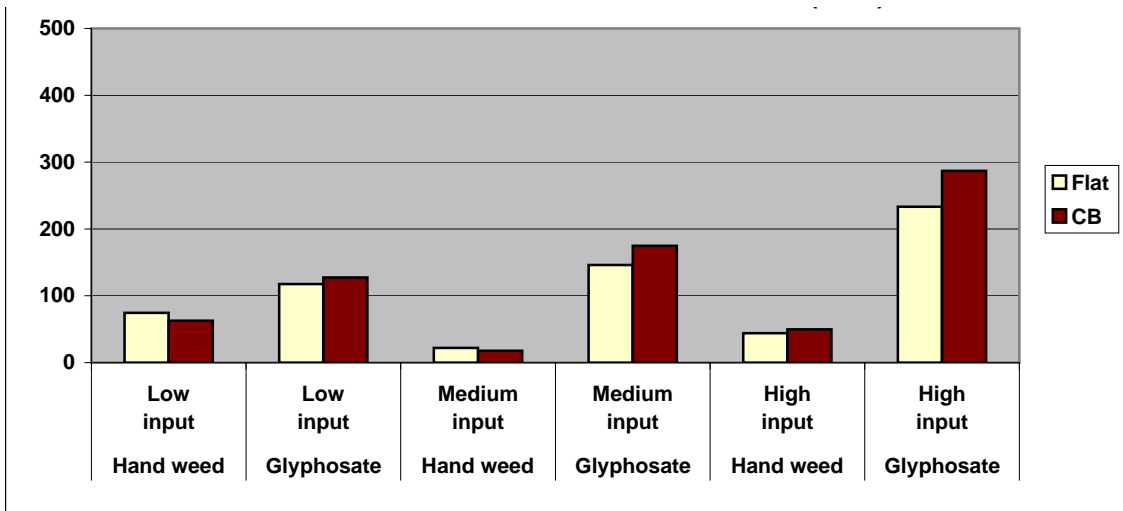
	Hand weed	Glyphosate	Hand weed	Glyphosate	Hand weed	Glyphosate
	Low input	Low input	Medium input	Medium input	High input	High input
Flat	119.13	147.79	35.32	233.72	70.40	373.17
CB	152.85	216.03	80.93	331.92	131.94	511.54

Date of model: 08-May-00



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**EXPLANATORY NOTES FOR COST-BENEFIT MODEL**

**Date:** 08-May-00

Page	Group	Item	Explanation
Costs and values	Labour costs	Hand weeding	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000
		Sowing cop	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000
		Herbicide applic.	Guesstimate. Assumed to be similar to fertiliser application
		Insecticide applic.	No data available
		Fertiliser applic.	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000 Labour costs for basal and top dressing are assumed to be the same
		Harvesting: picking cobs	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000
		Harvesting: dehusking	As above
		Harvesting: shelling	As above
	Tractor and equipment hire	3-furrow disc plough	Only used on flat plots Data from ARS Kpong and experience from IBSRAM project. TJW file: Cpsys-Costs-24Mar2k
		Polydisc	Used to make and maintain camber beds. Data from ARS Kpong and experience from IBSRAM project. TJW file: Cpsys-Costs-24Mar2k Season 1: CB construction Season2: tillage and maintenance of CB Season 3 onwards: polydisc tillage
	Seeds, pesticides and fertiliser	Seed	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000 Seed rates vary for maize from 8 to 12 kg/ac and seed costs vary from 2,000 to 3,000 Cedis/kg. The cost of Cedis 22,000/ac is an average value
		Herbicide	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000 Glyphosate costs vary from Cedis 26,000 to 28,000/litre. Application rates of 5l/ha are assumed.
		Insecticide	Usage and costs are not available.
		Fertiliser	Data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k Data collected 14-22 March 2000 Info available in ' <i>The 12 steps to a good maize harvest</i> ', published by the Ghana Grains Development Project Products available: ~ 15:15:15 Dose 50 kg (1 bag)/ac, 125 kg/ha; Price varies from 50,000 to 60,000 Cedis with a mean of 52,000/bag ~ AmSO <sub>4</sub> Dose 50 kg (1 bag)/ac, 125 kg/ha; Price varies from 30,000 to 68,000 Cedis with a mean of 45,600/bag ~ Urea (1 bage is equivalent to 2 bags of AmSO <sub>4</sub> ) Dose 25 kg/ac, 62.5 kg/ha
		Cost of sprayer	Estimated price of Cedis 250,000. Estimated life 10 seasons.
	Transport and storage	Transport	No figures available
		Storage and seed dressing	No figures available
	Exchange rate	July 1998: £1 = Cedis 4,300	
	Crop values	Values based below on data from ARS Kpong. TJW file: Cpsys-Costs-24Mar2k	
		Maize (for food)	667 to 1,000 Cedis/kg, mean value = 802 Cedis/kg
		Cowpea	1,400 to 1,600 Cedis/kg; mean value = 1,500 Cedis/kg

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Page	Group	Item	Explanation
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Costs and values	Crop yield	Medium input	Based on yields from on-station trial at ARS Kpong in the major season of 1997, i.e. a reasonably good cropping season where half rate fertiliser was used. See file: crop97a.xls.
		Low input	Yields estimated as (medium input divided by 2.17). This is the factor derived from the IBSRAM project. (See notes for Harvesting above).
		High input	Yields estimated as (low input x 3.17). This is the factor derived from the IBSRAM project. (See notes for Harvesting above).
		Typical farm yield	This figure is an estimate. Kwadzo (1995) gave yields of 1,125 to 2,500 kg/ha; Ellenbroek et al. (1997) gave 280 to 1,350 kg/ha; Ahenkorah (1995) gave 970 kg/ha without fertiliser; project on-farm trials averaged 1592 kg/ha for low-input, flat farms; project on-station trial averaged 909 kg/ha for the hand-weeded, flat plots.
Season 1 onwards	Land preparation (CB)	CB construction and maintenance	Year 1 only. Same cost for all farmers to hire 3-furrow disc plough in Year 1. Thereafter, CBs are maintained with polydiscs
		Land preparation (flat)	Construction and maintenance
	Seeding	Seed cost	Low input farmers use their own seed. Others purchase seed.
		Labour cost for seeding	Low input farmers use own labour at no cost.
	Fertiliser treatment	15:15:15	Starter dressing not used by low input farmers. Half rate used by medium input farmers. Full rate used by high input farmers.
		AmSO <sub>4</sub>	Side dressing not used by low input and medium input farmers. Full rate used by high input farmers.
		Labour for fertiliser application	No costs for low input farmers Costs for half rate application are assumed to be the same as for the full rate.
	Insecticide treatment	Insecticide (l/ha)	No information available on products and application rates.
		Labour for insect-icide application	No information.
	Weeding costs	1st hand weeding	Low input farmers use own labour at no cost. Glyphosate removes the need for a first weeding.
		2nd hand weeding	Low input farmers use own labour at no cost. Supplementary weeding is assumed for glyphosate treatments.
		Glyphosate	A dose of 5 l/ha (= 1.8 kg a.e./ha) is assumed for a single, overall application every year. In reality, spot treatments or no herbicide need be applied after the <i>Cyperus</i> is controlled, in which case, a first weeding will probably be required.
		Lasso/atrazine	Not used by farmers.
		Sprayer cost	Cost of sprayer is assumed to be Cedis 500,000 divided by 10 seasons.
	Harvesting	Labour cost for picking crop	Low input farmers use own labour at no cost. Cost are assumed to be proportional to yield. Harvesting costs (i.e. picking, dehusking and shelling) are assumed to be higher when yields are higher. Basic labour costs are assumed to be for harvesting the typical on-farm yield (see bottom box on page 1). Hence, costs for harvesting other yields are calculated as follows: (actual yield / typical yield) x basic cost
		Labour cost for dehusking maize	As above
		Labour cost for shelling maize	As above
	Transport and storage	Transport	No information
		Storage and seed dressing	No information