

Table S.2.1-23 Calculation of EIRR

- Rupingazi Ngerwe -

(Unit: 1,000 Ksh)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Value by Discount Rate					
						Interest= 0.16		Interest= 0.12		Interest= 0.10	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,776	317	3,093	1,256	-1,837	3,093	1,256	3,093	1,256	3,093	1,256
2	8,427	317	8,744	1,507	-7,237	8,498	1,120	8,971	1,201	7,226	1,245
3	9,636	317	9,953	2,010	-7,943	6,376	1,288	7,084	1,431	7,478	1,510
4	4,050	317	4,367	2,261	-2,106	2,412	1,249	2,775	1,437	2,983	1,544
5	2,711	317	3,028	2,512	-516	1,442	1,196	1,718	1,425	1,880	1,560
6	2,711	317	3,028	2,512	-516	1,243	1,031	1,534	1,273	1,709	1,418
7	2,352	317	2,669	2,512	-157	944	889	1,207	1,136	1,369	1,289
8	0	317	317	2,512	2,195	97	766	128	1,015	148	1,172
9	0	317	317	2,512	2,195	83	661	114	906	134	1,065
10	0	317	317	2,512	2,195	72	569	102	809	122	968
11	0	317	317	2,512	2,195	62	491	91	722	111	880
12	0	317	317	2,512	2,195	53	423	81	645	101	800
13	0	317	317	2,512	2,195	46	365	73	576	92	728
14	0	317	317	2,512	2,195	40	314	65	514	83	661
15	0	317	317	2,512	2,195	34	271	58	459	76	601
16	0	317	317	2,512	2,195	29	234	52	410	69	547
17	0	317	317	2,512	2,195	25	201	46	366	63	497
18	0	317	317	2,512	2,195	22	174	41	327	57	452
19	0	317	317	2,512	2,195	19	150	37	292	52	411
20	0	317	317	2,512	2,195	16	129	33	260	47	373
21	0	317	317	2,512	2,195	14	111	29	233	43	339
22	0	317	317	2,512	2,195	12	96	26	208	39	309
23	0	317	317	2,512	2,195	10	83	23	185	35	281
24	0	317	317	2,512	2,195	9	71	21	165	32	255
25	0	317	317	2,512	2,195	8	61	19	148	29	232
26	0	317	317	2,512	2,195	7	53	17	132	27	211
27	0	317	317	2,512	2,195	6	46	15	118	24	192
28	0	317	317	2,512	2,195	5	39	13	105	22	174
29	0	317	317	2,512	2,195	4	34	12	94	20	158
30	0	317	317	2,512	2,195	4	29	11	84	18	144
Total	32,663	9,510	42,173	72,346	30,173	22,687	13,400	25,490	17,930	27,184	21,274
						EIRR= 6.26 %					
						B/C Ratio=		16 %		0.59	
						B/C Ratio=		12 %		0.70	
						B/C Ratio=		10 %		0.78	

Table S.2.1-24 Financial Analysis for Typical Farms (Rupingazi Ngerwe)

Farm size: 1.33 ha

Without Project

Crops	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return		
						(Ksh)	(Ksh)	
Maize/Beans	0.84	1,750	1,473	11.5	16,934	10,897	14,000	
Beans/Maize	0.84	300	252	31.6	7,963			
Beans	0.47	600	284	31.6	8,970	4,134	4,837	
French Beans	0.01	3,000	30	29.6	888	491	397	
Other vegetables	0.22	4,000	880	23.0	20,240	4,057	16,183	
Coffee	0.47	4,500	2,115	25.0	52,875	5,801	47,074	
Banana	0.01	8,500	85	7.5	638	86	552	
Total	2.02						83,043	
1. Crop Income(Ksh/year)								83,043
2. Animal Income(Ksh/year)								7,415
3. Off-Farm Income(Ksh/year)								7,779
4. Living Expense(Ksh/year)-family size 7.6 persons/family								59,694
5. Disposable Income(Ksh/year)								38,543

With Project

I. Rainfed Area

Crops	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return	
						(Ksh)	(Ksh)
Maize/Beans	0.69	2,000	1,380	11.5	15,870	11,989	12,622
Beans/Maize	0.69	400	276	31.6	8,722		
Beans	0.50	650	325	31.6	10,270	4,597	5,673
Other vegetables	0.19	4,500	855	23.0	19,665	3,743	15,922
Coffee	0.44	4,500	1,980	25.0	49,500	8,716	40,784
Banana	0.01	8,500	85	7.5	638	94	544
Sub-Total	1.83						75,545

II. Irrigated Area

Crops	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return		
						(Ksh)	(Ksh)	
Maize/Beans	0.16	2,250	360	11.5	4,140	3,547	3,627	
Beans/Maize	0.16	600	96	31.6	3,034			
Maize green	0.02	4,000	80	10.0	800	245	35	
Beans	0.01	750	8	31.6	253	111	142	
French Beans	0.05	4,000	200	29.6	5,920	2,646	3,274	
Other vegetables	0.03	6,000	180	23.0	4,140	915	3,225	
Sweet Potato	0.03	8,500	255	5.0	1,275	499	776	
Coffee	0.05	5,000	250	25.0	6,250	1,174	5,076	
Banana	0.02	10,000	200	7.5	1,500	228	1,272	
Sub-Total	0.37						17,427	
1. Total Crop Income(Ksh/year)								92,972
2. Animal Income(Ksh/year)								7,415
3. Off-Farm Income(Ksh/year)								7,779
4. Living Expense(Ksh/year)-family size 7.6 persons/family								59,694
5. Disposable Income(Ksh/year)								48,472

Table S.2.1-25 Cost Recovery (Rupingazi Ngerwe)

Case-1 Present condition	<u>Excluding Map Preparation</u>	<u>Including Map Pre.</u>
1) Number of beneficiaries	200 farm households	
2) Total project cost to be paid by the beneficiaries of which, irrigation facilities	34,971,577 Ksh 4,456,625 Ksh	4,976,563
3) Loan per farm household	22,283 Ksh	24,883
4) Repayment Period(years)	4 48 (months)	
5) Annual interest rate(%)	16 per year	
6) Monthly interest ratre(%)	1.33 (16/12)	
7) Monthly repayment(Ksh)	<u>632 Ksh/month</u>	<u>705</u>

Alternative Plans for Loan Repayment

Case-2		
1) Loan per farm household(Ksh)	22,283	24,883
2) Repayment Period(years)	6 72 (months)	
3) Annual interest rate(%)	12 per year	
4) Monthly interest ratre(%)	1.00 (12/12)	
5) Monthly repayment(Ksh)	<u>436 Ksh/month</u>	<u>486</u>

Case-3		
1) Loan per farm household(Ksh)	22,283	24,883
2) Repayment Period(years)	8 96 (months)	
3) Annual interest rate(%)	10 per year	
4) Monthly interest ratre(%)	0.83 (10/12)	
5) Monthly repayment(Ksh)	<u>338 Ksh/month</u>	<u>378</u>

Case-4		
1) Loan per farm household(Ksh)	22,283	24,883
2) Repayment Period(years)	10 120 (months)	
3) Annual interest rate(%)	5 per year	
4) Monthly interest ratre(%)	0.42 (5/12)	
5) Monthly repayment(Ksh)	<u>236 Ksh/month</u>	<u>264</u>

Case-5		
1) Loan per farm household(Ksh)	22,283	24,883
2) Repayment Period(years)	4 48 (months)	
3) Annual interest rate(%)	30 per year	
4) Monthly interest ratre(%)	2.50 (30/12)	
5) Monthly repayment(Ksh)	<u>802 Ksh/month</u>	<u>896</u>

Repayment under the Current Situation(Rupingazi Ngerwe)

Case-6		
1) Loan per farm household	22,283 Ksh	24,883
2) Repayment Period(years)	4 48 (months)	
3) Annual interest rate(%)	16 (% per year)	
4) Monthly interest ratre(%)	1.33 (16/12)	
5) Monthly repayment(Ksh)	<u>632 (Ksh/month)</u>	<u>705</u>
6) Monthly repayment and disposable income(Ksh)		

	Repayment	Disposable Income
1st year	632	83 (farm economic survey 1998)
2nd year	632	2,020
3rd year	632	2,830
4th year	632	4,039

Table S.2.1-26 Estimation of Charge (Rupingazi Ngerwe)

(Unit:Ksh)

Year	Initial Cost	O & M Cost	Repleo- ment Cost	Total	Present Value by Discount Rate												
					Int= 0.16			Int= 0.15			Int= 0.20						
					Intial Cost	O&M Cost	Repleo- ment	Total	Intial Cost	O&M Cost	Repleo- ment	Total	Intial Cost	O&M Cost	Repleo- ment		
1	0	74,000	0	74,000	0	74,000	0	74,000	0	74,000	0	74,000	0	74,000	0	74,000	0
2	2,228,312	74,000	0	2,302,312	1,655,999	54,994	0	1,710,993	1,684,924	55,955	0	1,740,879	1,547,439	51,389	0	1,598,828	0
3	2,228,313	74,000	0	2,302,313	1,427,586	47,409	0	1,474,994	1,485,152	48,656	0	1,513,808	1,289,533	42,824	0	1,332,357	0
4	0	74,000	0	74,000	0	40,870	0	40,870	0	42,310	0	42,310	0	35,687	0	35,687	0
5	0	74,000	0	74,000	0	35,232	0	35,232	0	36,791	0	36,791	0	29,739	0	29,739	0
6	0	74,000	0	74,000	0	30,373	0	30,373	0	31,992	0	31,992	0	24,782	0	24,782	0
7	0	74,000	0	74,000	0	26,183	0	26,183	0	27,819	0	27,819	0	20,652	0	20,652	0
8	0	74,000	0	74,000	0	22,572	0	22,572	0	24,191	0	24,191	0	17,210	0	17,210	0
9	0	74,000	0	74,000	0	19,459	0	19,459	0	21,035	0	21,035	0	14,342	0	14,342	0
10	0	74,000	0	74,000	0	16,775	0	16,775	0	18,292	0	18,292	0	11,951	0	11,951	0
11	0	74,000	0	74,000	0	14,461	0	14,461	0	15,906	0	15,906	0	9,960	0	9,960	0
12	0	74,000	0	74,000	0	12,486	0	12,486	0	13,831	0	13,831	0	8,300	0	8,300	0
13	0	74,000	0	74,000	0	10,747	0	10,747	0	12,027	0	12,027	0	6,916	0	6,916	0
14	0	74,000	0	74,000	0	9,284	0	9,284	0	10,458	0	10,458	0	5,784	0	5,784	0
15	0	74,000	0	74,000	0	7,987	0	7,987	0	9,094	0	9,094	0	4,803	0	4,803	0
16	0	74,000	0	74,000	0	6,885	0	6,885	0	7,906	0	7,906	0	4,003	0	4,003	0
17	0	74,000	0	74,000	0	5,935	0	5,935	0	6,877	0	6,877	0	3,335	0	3,335	0
18	0	74,000	0	74,000	0	5,117	0	5,117	0	5,960	0	5,960	0	2,780	0	2,780	0
19	0	74,000	0	74,000	0	4,411	0	4,411	0	5,200	0	5,200	0	2,316	0	2,316	0
20	0	74,000	0	74,000	0	3,803	0	3,803	0	4,521	0	4,521	0	1,930	0	1,930	0
21	0	74,000	0	74,000	0	3,278	0	3,278	0	3,932	0	3,932	0	1,609	0	1,609	0
22	0	74,000	0	74,000	0	2,826	0	2,826	0	3,419	0	3,419	0	1,340	0	1,340	0
23	0	74,000	0	74,000	0	2,438	0	2,438	0	2,973	0	2,973	0	1,117	0	1,117	0
24	0	74,000	0	74,000	0	2,100	0	2,100	0	2,585	0	2,585	0	931	0	931	0
25	0	74,000	0	74,000	0	1,810	0	1,810	0	2,248	0	2,248	0	776	0	776	0
26	0	74,000	0	74,000	0	1,561	0	1,561	0	1,955	0	1,955	0	646	0	646	0
27	0	74,000	0	74,000	0	1,345	0	1,345	0	1,700	0	1,700	0	539	0	539	0
28	0	74,000	0	74,000	0	1,160	0	1,160	0	1,478	0	1,478	0	449	0	449	0
29	0	74,000	0	74,000	0	1,000	0	1,000	0	1,285	0	1,285	0	374	0	374	0
30	0	74,000	0	74,000	0	862	0	862	0	1,118	0	1,118	0	312	0	312	0
Total	4,456,625	2,220,000	0	6,676,625	3,083,585	467,320	0	3,550,904	3,150,076	495,535	0	3,645,611	2,836,972	380,776	0	3,266,738	0

Annual 148,554 74,000 0 222,554 102,786 15,577 0 118,263 105,003 16,518 0 121,520 94,566 12,692 0

Water Charge

	Interest 0.16	Interest 0.15	Interest 0.20
a. Annual Water Intake	420,700/3/year		
b. Cost	Present Value	Present Value	Present Value
b.1 Cost per year at financial price	102,786	105,003	94,566
b.2 Annual OM cost at financial price	15,577	16,518	12,692
b.3 Replacement cost at financial price	0	0	0
Total	118,363	121,520	107,258
c. Water Charge	0.29 Ksh	0.29 Ksh	0.25
o.1 per cubic meter	2,859 Ksh	3,038 Ksh	2,681
o.2 per ha/year	247 Ksh	253 Ksh	223

Table S.2.2-1 Farmgate Prices at Ngomano / Nyangati

	Unit	Unit Price(Kash)	
		Financial	Economic
1. Crops			
Maize	kg	9.4	9.5
Maize Green	kg	10.5	10.5
Millet	kg	21.5	21.5
Sorghum	kg	15.3	15.3
Rice	kg	22.0	16.8
Beans	kg	28.9	28.9
French Beans	kg	20.0	29.8
Cowpeas	kg	15.0	15.0
Irish Potatoes	kg	18.3	18.3
Sweet Potatoes	kg	5.0	5.0
Bulb Onions	kg	15.0	15.0
Tomatoes	kg	26.0	24.0
Okra	kg	23.4	26.1
Kale	kg	3.0	3.0
Cabbage	kg	8.8	8.8
Carrots	kg	23.0	22.4
Watermelon	kg	15.0	15.0
Banana	Bunch	200.0	200.0
Coffee	kg	23.0	17.2
Milk	kg	25.6	25.6
Avocado	kg	10.0	10.0
Mangoes	kg	15.0	15.0
2. Seed			
Maize	kg	98	92
French Beans	kg	190	177
Bulb onion	kg	4,400	4,110
Tomatoes	kg	6,400	5,978
Cabbage	kg	2,000	1,868
Carrot	kg	1,700	1,588
Kale	kg	900	841
3. Fertilizer			
Nitrogen	kg	24.1	27.4
Phosphate	kg	17.3	24.3
Potassium	kg	23.3	16.4
4. Agricultural Chemicals			
Dimethoate	lit.	585	546
Antracol	kg	600	560
Sancozeb	kg	480	448
Milraz	kg	1,285	1,200
Karate	lit.	1,395	1,303
5. Labour			
Labour	MD	95	48
Animal Labour	MAD	910	455
6. Nursery			
Banana	plant	50	50
Papaya	plant	40	40
Mango	plant	60	60
Avocado	plant	50	50
Tea	plant	50	50

Source: Farm Economic Survey (JICA) 1998
and interview survey to stockists

Table S.2.2-2 Standard Conversion Factor (SCF)

	(unit:1,000 K.Pound)							
	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	Average
(1)Imports	2,545,630	2,645,913	2,945,863	5,056,419	5,753,988	7,758,420	8,424,310	5,018,649
(2)Exports	1,244,010	1,629,467	1,742,268	3,678,247	4,282,132	4,866,950	5,910,000	3,336,153
(3)Import Duties	347,968	334,680	255,939	459,150	739,639	929,910	1,058,780	589,438
(4)Export Duties	729	70	740	222	130	0	0	270
(5)Subsidy on Exports	0	0	0	0	0	0	0	0
(6)=(1)+(2)	3,789,640	4,275,380	4,688,131	8,734,666	10,036,120	12,625,370	14,334,310	8,354,802
(7)=(1)+(2)+(3)-(4)+(5)	4,136,879	4,609,990	4,943,330	9,193,594	10,775,629	13,555,280	15,393,090	8,943,970
(8)SCF=(6)/(7)	0.916	0.927	0.948	0.950	0.931	0.931	0.931	0.934

Source:Economic Survey 1997
Statistical Abstract 1995

Table S.2.2-3 Price Structure of Maize (economic)

1. Projected 2010 world market price(\$/ton in 1990 price	94.9
2. Projected 2010 world market price(\$/ton in 1998 price	104.6
3. Quality adjustment(%)	90
4. World market equivalent(US\$/ton)	94
5. Freight and insurance(US\$/ton)	40
6. CIF Monbasa(US\$/ton)	134
7. Unloading and port handling(US\$/ton)	9
8. Value Kenya border	
- in US\$	143
- in Ksh(61.19Ksh/US\$)	8,750
9. Domestic handling, transport, margin(Ksh/ton)	831
10. Processing ratio(%)	100
11. Wholesale price(Ksh/ton)	9,581
12. Transport to/from farm(Ksh/ton)	103
13. Farmgate price(Ksh/ton)	9,478

Source:Commodity markets and the developing countries February 1998,
World Bank

Table S.2.2-4 Price Structure of Fertilizer (economic)

	Urea	TSP	Muriate of Potash
1. Projected 2010 World market price(\$/ton in 1990 price)	131.8	106.7	90.3
2. Projected 2010 World market price(\$/ton in 1998 price)	145.3	117.6	99.5
3. Freight and insurance(US\$/ton)	40	40	40
4. CIF Monbasa(US\$/ton)	185.3	157.6	139.5
5. Unloading and port handling(US\$/ton)	9	9	9
6. Value Kenya border			
- in US\$	194.3	166.6	148.5
- in Ksh(61.19Ksh/US\$)	11,889	10,194	9,086
7. Domestic handling, transport, margin(Ksh/ton)	831	831	831
8. Wholesale price(Ksh/ton)	12,720	11,025	9,917
9. Transport to/from farm(Ksh/ton)	103	103	103
10. Farmgate price(Ksh/ton)	12,617	10,922	9,814
11. Farmgate price in nutrient(Ksh/kg)	27.4	24.3	16.4

Source:Commodity markets and the developing countries, February 1998, World Bank

Table S.2.2-5 Economic Price of Vegetables

	French Beans	Okra
1. FOB Price	75.00	58.00
2. Handling charge	3.50	3.50
3. Expoter's revenue	24.00	15.00
4. Grading & packing cost	9.34	8.73
5. Transportation cost	8.41	4.67
6. Farmgate price	29.75	26.09

Source. HCDA

	Carrots	Tomatoes
1. FOB Price	48.00	56.00
2. Handling charge	3.69	3.69
3. Expoter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	4.67	4.67
6. Farmgate price	22.37	23.97

Source. HCDA

	Eggplant	Bitter Gour
1. FOB Price	42.00	65.00
2. Handling charge	3.69	3.69
3. Expoter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	4.67	4.67
6. Farmgate price	16.37	32.97

Source. HCDA

	Boby Beans	Chillies
1. FOB Price	50.00	69.00
2. Handling charge	3.69	3.69
3. Expoter's revenue	6.00	20.00
4. Grading & packing cost	8.87	8.87
5. Transportation cost	4.67	4.67
6. Farmgate price	26.77	31.77

Source. HCDA

	Volore
1. FOB Price	78.00
2. Handling charge	3.69
3. Expoter's revenue	30.00
4. Grading & packing cost	8.87
5. Transportation cost	4.67
6. Farmgate price	30.77

Source. HCDA

Table S.2.2-6 Crop Selection for Ngomano / Nyangati

	Staple Food	Demand for Exporting	Demand for Local Consumption	Suitability for Climate	Suitability for Soil	Suitability for Land Form	Profitability per Hectare	Storability	Stability of Price	Farmer's Experience	Suitability for Rainfed Farming	Necessity for Irrigation	Total
Maize dry	3	0	3	3	3	3	2	3	3	3	2	2	30
Maize green	3	0	3	3	3	3	2	2	1	3	3	2	28
Sorghum	2	0	1	3	2	3	2	3	1	2	3	1	23
Rice	2	0	2	3	3	3	2	3	1	2	0	3	24
French Beans	0	3	0	3	3	3	3	0	3	3	1	3	25
Okra	0	2	0	2	3	3	3	0	3	0	2	2	20
Chillies	0	2	1	1	2	3	2	3	1	0	2	2	19
Bitter Gourd	0	2	0	1	3	3	2	0	2	0	1	3	17
Aubergines	0	2	0	2	3	3	2	0	2	0	1	3	18
Cabbage	3	0	3	3	3	3	2	2	2	2	2	2	27
Carrots	2	0	2	2	3	3	3	2	2	1	2	2	24
Tomatoes	3	0	3	3	3	3	3	0	1	3	2	2	26
Bulb Onions	3	0	3	3	2	3	2	3	1	2	2	2	26
Sweet Potatoes	2	0	3	3	3	3	2	2	3	3	2	2	28
Kalies	3	0	3	3	3	3	2	0	1	3	2	2	25
Beans	3	0	3	3	3	3	2	3	3	3	3	1	30
Pigeon Peas	1	0	2	2	3	3	2	3	3	2	3	1	25
Green Grams	1	0	2	2	3	3	2	3	2	1	3	1	23
Cow Peas	2	0	2	2	3	3	2	3	2	1	3	1	24
Cotton	0	0	1	3	3	3	2	3	2	2	3	1	23
Papaya	1	0	2	3	3	3	2	0	3	2	3	1	23
Bananas	3	0	3	2	3	3	2	1	1	3	3	2	26
Mangoes	1	2	2	3	3	3	2	0	1	2	3	1	23

Table S.2.2-7 Cost Budget (Maize / Beans)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Maize/Beans

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds:Maize	kg	95	100	9,500	100	9,500			100	9,500
Beans	kg	32	15	480	15	480			15	480
Fertilizer:N	kg	24.1	0.0	0	2.0	48			4.0	96
P	kg	17.3	0.0	0	5.0	87			13.0	225
K	kg	23.3	0.0	0	0.0	0			2.0	47
Chemicals:	kg	480	0.0	0	0.0	0			2.0	960
Gunny bags	pieces	40	15	600	17	680			20	800
Labour Costs	MD	95	90	8,550	100	9,500			120	11,400
Irrigation	ha			0		0				190
Miscellaneous(5% of total)				1,007		1,068				1,247
Total Costs				20,137		21,363				24,945
2. Gross Income										
a. Main Product	kg	9.4	1,500	14,100	1,650	15,510			2,000	18,800
b. Beans	kg	28.9	250	7,225	325	9,393			550	15,895
3. Net Profit	Kshs			1,188		3,540				9,750

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Maize/Beans

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds:Maize	kg	92	100	9,200	100	9,200			100	9,200
Beans	kg	30	15	450	15	450			15	450
Fertilizer:N	kg	27.4	0.0	0	2.0	55			4.0	110
P	kg	24.3	0.0	0	5.0	122			13.0	316
K	kg	16.4	0.0	0	0.0	0			2.0	33
Chemicals:	kg	448	0.0	0	0.0	0			2.0	896
Gunny bags	pieces	40	15	600	17	680			20	800
Labour Costs	MD	48	90	4,320	100	4,800			120	5,760
Irrigation	ha			0		0				190
Miscellaneous(5% of total)				767		806				934
Total Costs				15,337		16,112				18,689
2. Gross Income										
a. Main Product	kg	9.5	1,500	14,250	1,650	15,675			2,000	19,000
b. Beans	kg	28.9	250	7,225	325	9,393			550	15,895
3. Net Profit	Kshs			6,138		8,956				16,206

Table S.2.2-8 Cost Budget (Green Maize)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Green Maize

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	65			55	3,575	55	3,575	55	3,575
Fertilizer:N	kg	24.1			4.0	96	2.0	48	4.0	96
P	kg	17.3			4.0	69	2.0	35	4.0	69
K	kg	23.3			4.0	93	2.0	47	4.0	93
Chemicals:	kg	480			0	0	0	0	1	480
Gunny bags	pieces	40			15	600	35	1,400	45	1,800
Labour Costs	MD	95			60	5,700	72	6,840	75	7,125
Irrigation	ha					0		0		190
Miscellaneous(5% of total)						533		629		707
Total Costs						10,667		12,573		14,136
2. Gross Income										
a. Main Product	kg	10.5			2,500	26,250	3,500	36,750	4,500	47,250
3. Net Profit	Kshs					15,583		24,177		33,114

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Green Maize

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	65			55	3,575	55	3,575	55	3,575
Fertilizer:N	kg	27.4			4.0	110	2.0	55	4.0	110
P	kg	24.3			4.0	97	2.0	49	4.0	97
K	kg	16.4			4.0	66	2.0	33	4.0	66
Chemicals:	kg	448			0	0	0	0	1	448
Gunny bags	pieces	40			15	600	35	1,400	45	1,800
Labour Costs	MD	48			60	2,880	72	3,456	75	3,600
Irrigation	ha					0		0		190
Miscellaneous(5% of total)						386		451		520
Total Costs						7,713		9,018		10,408
2. Gross Income										
a. Main Product	kg	10.5			2,500	26,250	3,500	36,750	4,500	47,250
3. Net Profit	Kshs					18,537		27,732		36,844

Table S.2.2-9 Cost Budget (Beans)

Cost and return of Crops(financial)

Site:Nyangati

Crop:Beans

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seed	kg	29	25	725	25	725	25	725	25	725
Fertilizer:N	kg	24.1	51	1,229	55	1,326	51	1,229	55	1,326
P	kg	17.3	30	519	35	606	30	519	35	606
K	kg	23.3	0	0	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000
Labour Costs	MD	95	62	5,890	65	6,175	64	6,080	70	6,650
Irrigated	ha			0		0		0		190
Miscellaneous(5% of total)				703		728		713		816
Total Costs				14,066		14,559		14,266		16,312
2. Gross Income										
a. Main Product	kg	28.9	500	14,450	650	18,785	600	17,340	850	24,565
3. Net Profit	Kshs			384		4,226		3,074		8,253

Cost and return of Crops(economic)

Site:Nyangati

Crop:Beans

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seed	kg	29	25	725	25	725	25	725	25	725
Fertilizer:N	kg	27.4	51	1,397	55	1,507	51	1,397	55	1,507
P	kg	24.3	30	729	35	851	30	729	35	851
K	kg	16.4	0	0	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	5,000	5,000	5,000	5,000	6,000	6,000
Labour Costs	MD	48	62	2,976	65	3,120	64	3,072	70	3,360
Irrigated	ha			0		0		0		190
Miscellaneous(5% of total)				570		590		575		665
Total Costs				11,397		11,792		11,498		13,297
2. Gross Income										
a. Main Product	kg	28.9	500	14,450	650	18,785	600	17,340	850	24,565
3. Net Profit	Kshs			3,053		6,993		5,842		11,268

Table S.2.2-10 Cost Budget (French Beans)

Cost and Return of Crops(financial)

Site:Nyangati
Crop:French Beans

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	190	65	12,350	65	12,350	65	12,350	65	12,350
Fertilizer:N	kg	24.1	5	121	6	145	6	145	20	482
P	kg	17.3	6	104	7	121	7	121	40	692
K	kg	23.3	0	0	0	0	0	0	0	0
Chemicals	lit.	1,285	1	1,285	1	1,285	1	1,285	2	2,570
Labour Costs	MD	95	120	11,400	123	11,685	125	11,875	250	23,750
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				1,329		1,347		1,357		2,107
Total Costs				26,589		26,932		27,132		42,141
2. Gross Income										
a. Main Product	kg	20.0	3,500	70,000	4,500	90,000	4,500	90,000	5,500	110,000
3. Net Profit	Kshs			43,411		63,068		62,868		67,859

Cost and Return of Crops(economic)

Site:Nyangati
Crop:French Beans

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	177	65	11,505	65	11,505	65	11,505	65	11,505
Fertilizer:N	kg	27.4	5	137	6	164	6	164	20	548
P	kg	24.3	6	146	7	170	7	170	40	972
K	kg	16.4	0	0	0	0	0	0	0	0
Chemicals	lit.	1,200	1	1,200	1	1,200	1	1,200	2	2,400
Labour Costs	MD	48	120	5,760	123	5,904	125	6,000	250	12,000
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				987		997		1,002		1,453
Total Costs				19,735		19,941		20,042		29,068
2. Gross Income										
a. Main Product	kg	29.8	3,500	104,300	4,500	134,100	4,500	134,100	5,500	163,900
3. Net Profit	Kshs			84,565		114,159		114,058		134,832

Table S.2.2-11 Cost Budget (Tomato)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Tomato

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:	kg	6,400	0.25	1,600	0.25	1,600	0.25	1,600	0.25	1,600
Fertilizer:N	kg	24.1	35.0	844	35.0	844	35.0	844	50.0	1,205
P		17.3	30.0	519	30.0	519	30.0	519	56.0	969
K		23.3	0	0	0	0	0	0	0	0
Manure	kg	1	10,000	10,000	12,000	12,000	12,000	12,000	15,000	15,000
Chemicals:	kg	1,285	3	3,855	3.5	4,498	5	6,425	10	12,850
Labour Costs	MD	95	150	14,250	152	14,440	153	14,535	165	15,675
Irrigation	ha			0		0		0		210
Miscellaneous(5% of total)				1,635		1,784		1,891		2,500
Total Costs				32,703		35,684		37,813		50,009
2. Gross Income										
a. Main Product:	kg	26.0	10,000	260,000	11,000	286,000	11,000	286,000	14,000	364,000
3. Net Profit	Kshs			227,297		250,316		248,187		313,991

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Tomato

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:	kg	5,978	0.25	1,495	0.25	1,495	0.25	1,495	0.25	1,495
Fertilizer:N	kg	27.4	35.0	959	35.0	959	35.0	959	50.0	1,370
P		24.3	30.0	729	30.0	729	30.0	729	56.0	1,361
K		16.4	0	0	0	0	0	0	0	0
Manure	kg	1	10,000	10,000	12,000	12,000	12,000	12,000	15,000	15,000
Chemicals:	kg	1,200	3	3,600	3.5	4,200	5	6,000	10	12,000
Labour Costs	MD	48	150	7,200	152	7,296	153	7,344	165	7,920
Irrigation	ha			0		0		0		210
Miscellaneous(5% of total)				1,262		1,404		1,501		2,071
Total Costs				25,245		28,083		30,028		41,427
2. Gross Income										
a. Main Product:	kg	24.0	10,000	240,000	11,000	264,000	11,000	264,000	14,000	336,000
3. Net Profit	Kshs			214,755		235,917		233,972		294,573

Table S.2.2-12 Cost Budget (Kale)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Kale

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	900	0.5	450	0.5	450	0.5	450	0.5	450
Fertilizer:N	kg	24.1	43	1,036	45	1,085	45	1,085	85	2,049
P	kg	17.3	20	346	20	346	20	346	40	692
K	kg	23.3	0	0	0	0	0	0	0	0
Chemicals	lit	585	0.5	293	1.0	585	0.5	293	0.8	468
Labour Costs	MD	95	120	11,400	125	11,875	125	11,875	130	12,350
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				712		755		739		853
Total Costs				14,237		15,095		14,787		17,051
2. Gross Income										
a. Main Product	kg	3.0	5,000	15,000	7,000	21,000	6,000	18,000	10,000	30,000
3. Net Profit	Kshs			763		5,905		3,213		12,949

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Kale

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	841	0.5	421	0.5	421	0.5	421	0.5	421
Fertilizer:N	kg	27.4	43	1,178	45	1,233	45	1,233	85	2,329
P	kg	24.3	20	486	20	486	20	486	40	972
K	kg	16.4	0	0	0	0	0	0	0	0
Chemicals	lit	546	0.5	273	1.0	546	0.5	273	0.8	437
Labour Costs	MD	48	120	5,760	125	6,000	125	6,000	130	6,240
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				427		457		443		557
Total Costs				8,545		9,143		8,855		11,146
2. Gross Income										
a. Main Product	kg	3.0	5,000	15,000	7,000	21,000	6,000	18,000	10,000	30,000
3. Net Profit	Kshs			6,455		11,857		9,145		18,854

Table S.2.2-13 Cost Budget (Sweet Potatoes)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	3.5	400	1,400	400	1,400			400	1,400
Fertilizer:N	kg	24.1	0	0	13	313			50	1,205
P		17.3	0	0	15	260			60	1,038
K		23.3	0	0	0	0			0	0
Manure	kg	1	1,000	1,000	1,200	1,200			2,000	2,000
Chemicals:	kg	585	0	0	1	585			1	585
Gunny bags	piece	40	60	2,400	70	2,800			85	3,400
Labour Costs	MD	95	120	11,400	120	11,400			130	12,350
Irrigation	ha			0		0				190
Miscellaneous(5% of total)				853		945				1,167
Total Costs				17,053		18,903				23,335
2. Gross Income										
a. Main Product	kg	5.0	6,000	30,000	7,000	35,000			8,500	42,500
3. Net Profit	Kshs			12,947		18,097				19,165

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	3.5	400	1,400	400	1,400			400	1,400
Fertilizer:N	kg	27.4	0	0	13	356			50	1,370
P		24.3	0	0	15	365			60	1,458
K		16.4	0	0	0	0			0	0
Manure	kg	1	1,000	1,000	1,200	1,200			2,000	2,000
Chemicals:	kg	546	0	0	1	546			1	546
Gunny bags	piece	40	60	2,400	70	2,800			85	3,400
Labour Costs	MD	48	120	5,760	120	5,760			130	6,240
Irrigation	ha			0		0				190
Miscellaneous(5% of total)				558		654				874
Total Costs				11,118		13,081				17,478
2. Gross Income										
a. Main Product	kg	5.0	6,000	30,000	7,000	35,000			8,500	42,500
3. Net Profit	Kshs			18,884		21,919				25,022

Table S.2.2-14 Cost Budget (Millet)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	11	4.0	44	4.0	44
Fertilizer:N	kg	24.1	2.2	53	2.5	60
P	kg	17.3	5.2	90	5.5	95
K	kg	23.3	0.0	0	0.0	0
Manure	kg	1	250	250	300	300
Chemicals	kg	480	0	0	0	0
Gunny bags	piece	40	17	680	20	800
Labour Costs	MD	95	87	8,285	92	8,740
Miscellaneous(5% of total)				494		528
Total Costs				9,876		10,568
2. Gross Income						
a. Main Product	kg	21.5	750	16,125	1,000	21,500
3. Net Profit	Kshs			6,249		10,932

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	11	4.0	44	4.0	44
Fertilizer:N	kg	27.4	2.2	60	2.5	69
P	kg	24.3	5.2	126	5.5	134
K	kg	16.4	0.0	0	0.0	0
Manure	kg	1	250	250	300	300
Chemicals	kg	448	0	0	0	0
Gunny bags	piece	40	8	320	10	400
Labour Costs	MD	48	87	4,176	92	4,416
Miscellaneous(5% of total)				262		282
Total Costs				5,239		5,644
2. Gross Income						
a. Main Product	kg	21.5	750	16,125	1,000	21,500
3. Net Profit	Kshs			10,886		15,856

Table S.2.2-15 Cost Budget (Watermelon)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Watermelon

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	5,000	0.30	1,500	0.30	1,500			0.30	1,500
Fertilizer:N	kg	24.1	35.0	844	40.0	964			50.0	1,205
P		17.3	40.0	692	40.0	692			45.0	779
K		23.3	0	0	0	0			0	0
Manure	kg	1	10,000	10,000	11,000	11,000			11,000	11,000
Chemicals:	kg	1,285	5	6,425	6	7,710			8	10,280
Labour Costs	MD	95	160	15,200	165	15,675			170	16,150
Miscellaneous(5% of total)				1,824		1,976				2,153
Total Costs				36,485		39,517				43,067
2. Gross Income										
a. Main Product:	kg	15.0	7,500	112,500	8,500	127,500			10,000	150,000
3. Net Profit	Kshs			76,015		87,983				106,933

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Watermelon

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	4,670	0.30	1,401	0.30	1,401			0.30	1,401
Fertilizer:N	kg	27.4	35.0	959	40.0	1,096			50.0	1,370
P		24.3	40.0	972	40.0	972			45.0	1,094
K		16.4	0	0	0	0			0	0
Manure	kg	1	10,000	10,000	11,000	11,000			11,000	11,000
Chemicals:	kg	1,200	5	6,000	6	7,200			8	9,600
Labour Costs	MD	48	160	7,680	165	7,920			170	8,160
Miscellaneous(5% of total)				1,422		1,557				1,717
Total Costs				28,434		31,146				34,342
2. Gross Income										
a. Main Product:	kg	15.0	7,500	112,500	8,500	127,500			10,000	150,000
3. Net Profit	Kshs			84,066		96,354				115,658

Table S.2.2-16 Cost Budget (Rice)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Rice

(per ha)

	Unit	Unit Price (Kshs)	Irrigated			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	30	65.0	1,950	65.0	1,950
Fertilizer:N	kg	24.1	50.0	1,205	53.0	1,277
P	kg	17.3	40.0	692	40.0	692
K	kg	23.3	0.0	0	0.0	0
Manure	kg	1	500	500	550	550
Chemicals	kg	480	1	480	2	960
Gunny bags	piece	40	25	1,000	33	1,320
Labour Costs	MD	95	80	7,600	83	7,885
Miscellaneous(5% of total)				707		770
Total Costs				14,134		15,405
2. Gross Income						
a. Main Product	kg	22.0	2,500	55,000	3,250	71,500
b. By-product	kg	1.5	2,600	3,900	3,200	4,800
3. Net Profit	Kshs			44,766		60,895

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Rice

(per ha)

	Unit	Unit Price (Kshs)	Irrigated			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	30	65.0	1,950	65.0	1,950
Fertilizer:N	kg	27.4	50.0	1,370	53.0	1,452
P	kg	24.3	40.0	972	40.0	972
K	kg	16.4	0.0	0	0.0	0
Manure	kg	1	500	500	550	550
Chemicals	kg	448	1	448	2	896
Gunny bags	piece	40	25	1,000	33	1,320
Labour Costs	MD	48	80	3,840	83	3,984
Miscellaneous(5% of total)				531		585
Total Costs				10,611		11,710
2. Gross Income						
a. Main Product	kg	18.8	2,500	42,000	3,250	54,600
b. By-product	kg	1.5	2,600	3,900	3,200	4,800
3. Net Profit	Kshs			35,289		47,690

Table S.2.2-17 Cost Budget (Onion)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Onion

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			withput Project		with Project		withput Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	4,400	5	22,000	5	22,000	5	22,000	5	22,000
Fertilizer:N	kg	24.1	41	988	43	1,036	45	1,085	50	1,205
P	kg	17.3	45	779	50	865	50	865	55	952
K	kg	23.3	0	0	0	0	0	0	0	0
Manure	kg	1	1,000	1,000	3,000	3,000	3,000	3,000	3,000	3,000
Chemicals	kg	1,285	3	3,855	3	3,855	3	3,855	5	6,425
Labour Costs	MD	95	140	13,300	150	14,250	155	14,725	160	15,200
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				2,206		2,369		2,396		2,577
Total Costs				44,128		47,375		47,926		51,549
2. Gross Income										
a. Main Product	kg	15	6,500	97,500	7,000	105,000	8,000	120,000	8,500	127,500
3. Net Profit	Kshs			53,372		57,625		72,074		75,951

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Onion

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			withput Project		with Project		withput Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	4,110	5	20,550	5	20,550	5	20,550	5	20,550
Fertilizer:N	kg	27.4	41	1,123	43	1,178	45	1,233	50	1,370
P	kg	24.3	45	1,094	50	1,215	50	1,215	55	1,337
K	kg	16.4	0	0	0	0	0	0	0	0
Manure	kg	1	1,000	1,000	3,000	3,000	3,000	3,000	3,000	3,000
Chemicals	kg	1,200	3	3,600	3	3,600	3	3,600	5	6,000
Labour Costs	MD	48	140	6,720	150	7,200	155	7,440	160	7,680
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				1,794		1,934		1,949		2,112
Total Costs				35,881		38,677		38,987		42,238
2. Gross Income										
a. Main Product	kg	15	6,500	97,500	7,000	105,000	8,000	120,000	8,500	127,500
3. Net Profit	Kshs			61,619		66,323		81,013		85,262

Table S.2.2-18 Cost Budget (Okra)

Cost and Return of Crops(financial)

Site:Nyangati

Crop:Okra

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	280	7.0	1,960	7.0	1,960	7.0	1,960	7.0	1,960
Fertilizer:N	kg	24.1	30	723	35	844	35	844	40	964
P	kg	17.3	30	519	30	519	35	606	30	519
K	kg	23.3	0	0	0	0	0	0	0	0
Chemicals	lit.	480	1	480	1	480	1	480	1	480
Labour Costs	MD	95	200	19,000	200	19,000	210	19,950	220	20,900
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				1,194		1,200		1,255		1,316
Total Costs				23,876		24,003		25,094		26,329
2. Gross Income										
a. Main Product	kg	23.4	4,500	105,300	4,500	105,300	5,000	117,000	5,500	128,700
3. Net Profit	Kshs			81,424		81,297		91,906		102,371

Cost and Return of Crops(economic)

Site:Nyangati

Crop:Okra

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	262	7.0	1,834	7.0	1,834	7.0	1,834	7.0	1,834
Fertilizer:N	kg	27.4	30	822	35	959	35	959	40	1,096
P	kg	24.3	30	729	30	729	35	851	30	729
K	kg	18.4	0	0	0	0	0	0	0	0
Chemicals	lit.	448	1	448	1	448	1	448	1	448
Labour Costs	MD	48	200	9,600	200	9,600	210	10,080	220	10,560
Irrigation	ha			0		0		0		190
Miscellaneous(5% of total)				707		714		746		782
Total Costs				14,140		14,284		14,917		15,639
2. Gross Income										
a. Main Product	kg	28.1	4,500	117,450	4,500	117,450	5,000	130,500	5,500	143,550
3. Net Profit	Kshs			103,310		103,166		115,583		127,911

Table S.2.2-19 Cost Budget (Banana)

Cost and return of Crop(financial)

Crop/Barren/Planted	Unit	Unit Price (KSh)	without Project			with Project				
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year		
			Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)		
1. Costs	pieces	50	820	31,000	0	0	0	0	0	0
Nursery	kg	241	30	723	35	844	35	844	35	844
Fertilizer-N	kg	173	30	519	35	608	35	608	35	608
P	kg	233	0	0	0	0	0	0	0	0
K	kg	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	85	75	6,375	75	6,375	75	6,375	75	6,375
Miscellaneous(5% of total)				45,844		11,131		11,131		11,131
Total Costs				45,844		11,131		11,131		11,131
2. Gross Income	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
A. Min. Project	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
3. Net Profit	KSh			18,156		108,869		108,869		108,869

Cost and return of Crop(financial)

Crop/Barren/Planted	Unit	Unit Price (KSh)	without Project			with Project				
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year		
			Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)		
1. Costs	pieces	50	820	31,000	0	0	0	0	0	
Nursery	kg	241	30	723	35	844	35	844	35	844
Fertilizer-N	kg	173	30	519	35	608	35	608	35	608
P	kg	233	0	0	0	0	0	0	0	0
K	kg	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	85	75	6,375	75	6,375	75	6,375	75	6,375
Miscellaneous(5% of total)				45,844		11,131		11,131		11,131
Total Costs				45,844		11,131		11,131		11,131
2. Gross Income	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
A. Min. Project	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
3. Net Profit	KSh			18,156		108,869		108,869		108,869

Cost and return of Crop(financial)

Crop/Barren/Planted	Unit	Unit Price (KSh)	without Project			with Project				
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year		
			Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)		
1. Costs	pieces	50	820	31,000	0	0	0	0	0	
Nursery	kg	274	30	822	35	958	35	958	35	958
Fertilizer-N	kg	243	30	729	35	851	35	851	35	851
P	kg	154	0	0	0	0	0	0	0	0
K	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	48	75	3,600	75	3,600	75	3,600	75	3,600
Miscellaneous(5% of total)				2,008		390		390		390
Total Costs				40,158		7,798		7,798		7,798
2. Gross Income	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
A. Min. Project	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
3. Net Profit	KSh			19,841		122,201		122,201		122,201

Cost and return of Crop(financial)

Crop/Barren/Planted	Unit	Unit Price (KSh)	without Project			with Project				
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year		
			Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)	Quant- Rv	Value (KSh)		
1. Costs	pieces	50	820	31,000	0	0	0	0	0	
Nursery	kg	274	30	822	35	958	35	958	35	958
Fertilizer-N	kg	243	30	729	35	851	35	851	35	851
P	kg	154	0	0	0	0	0	0	0	0
K	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	48	75	3,600	75	3,600	75	3,600	75	3,600
Miscellaneous(5% of total)				1,881		362		362		362
Total Costs				38,814		7,238		7,238		7,238
2. Gross Income	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
A. Min. Project	kg	150	8,000	120,000	8,000	120,000	8,000	120,000	8,000	120,000
3. Net Profit	KSh			30,385		112,762		112,762		112,762

Table S.2.2-20 Cost Budget (Coffee)

Cost and return of Crop (Financial)

	Unit	Unit Price (Kshs)	Rainfed						Irrigated								
			without Project			with Project			without Project			with Project					
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year			
1. Costs	pieces	50	1,950	67,500	0	0	0	1,350	67,500	0	0	0	1,350	67,500	0	0	0
Nursery	kg	24.1	30	723	30	723	35	844	30	723	35	844	35	844	35	844	35
Fertilizer-N	kg	17.3	30	519	30	519	35	606	30	519	35	606	35	606	35	606	35
P	kg	23.3	30	699	30	699	35	816	30	699	35	816	30	699	35	816	35
K	kg	1,500	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,500	2,500	2,500	2,500	2,500
Manure	kg	1	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,500	2,500	2,500	2,500	2,500
Labour Costs	MD	95	30	2,850	30	2,850	30	2,850	30	2,850	30	2,850	35	3,325	35	3,325	35
Spraying	MD	95	20	1,900	20	1,900	20	1,900	20	1,900	20	1,900	22	2,090	22	2,090	22
Weeding	MD	95	20	1,900	20	1,900	20	1,900	20	1,900	20	1,900	22	2,090	22	2,090	22
Pruning	MD	95	20	1,900	20	1,900	20	1,900	20	1,900	20	1,900	0	0	0	0	0
Picking	2/ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation	ha	4.084	501	2,047	501	2,047	4,110	16,458	4,110	16,458	4,110	16,458	4,214	16,865	4,214	16,865	4,214
Miscellaneous (5% of total)																	
2. Total Costs																	
3. Gross Income	kg	22.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Main Product	kg	17.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Net Profit	Kshs		-81,675	-81,675	-10,622	-10,622	-82,201	-82,201	-11,488	-11,488	-11,488	-84,280	-84,280	-13,042	-13,042	-13,042	-13,042

Cost and return of Crop (economic)

	Unit	Unit Price (Kshs)	Rainfed						Irrigated								
			without Project			with Project			without Project			with Project					
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year			
1. Costs	pieces	50	1,950	67,500	0	0	0	1,350	67,500	0	0	0	1,350	67,500	0	0	0
Nursery	kg	27.4	30	822	30	822	35	959	30	822	35	959	35	959	35	959	35
Fertilizer-N	kg	24.3	30	729	30	729	35	851	30	729	35	851	30	729	35	851	35
P	kg	18.3	30	549	30	549	35	646	30	549	35	646	30	549	35	646	35
K	kg	1,500	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,500	2,500	2,500	2,500	2,500
Manure	kg	1	1,500	1,500	1,500	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,500	2,500	2,500	2,500	2,500
Labour Costs	MD	48	30	1,440	30	1,440	30	1,440	30	1,440	30	1,440	35	1,680	35	1,680	35
Spraying	MD	48	20	960	20	960	20	960	20	960	20	960	22	1,056	22	1,056	22
Weeding	MD	48	20	960	20	960	20	960	20	960	20	960	22	1,056	22	1,056	22
Pruning	MD	48	20	960	20	960	20	960	20	960	20	960	0	0	0	0	0
Picking	1/ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Irrigation	ha	3.916	501	1,962	501	1,962	3,942	15,368	3,942	15,368	3,942	15,368	4,027	15,769	4,027	15,769	4,027
Miscellaneous (5% of total)																	
2. Total Costs																	
3. Gross Income	kg	17.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Main Product	kg	17.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Net Profit	Kshs		-78,316	-78,316	-7,283	-7,283	-78,842	-78,842	-6,147	-6,147	-6,147	-80,349	-80,349	-13,523	-13,523	-13,523	-13,523

Table S.2.2-21 Estimation of the Agricultural Benefits (Ngomano / Nyangati)

(A) Rainfed Areas	Maize/ Maize		French Beans		Kale/ Cabbage		Sweet Sorghum/ Potato		Water Melon		Rice		Onion		Other Veget. Banana Coffee		Total		
	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green			
I. Without Project	9.5/28.9	0.0	28.9	29.8	3.0	5.0	21.5	15.0	0.0	15.0	26.1	10.0	17.2						
Unit price(Ksh/kg)	0	500	3,500	5,000	6,000	7,500	750	7,500	0	6,500	4,500	9,000	3,000						
Yield(kg/ha)	21,475	0	14,450	104,300	15,000	30,000	18,125	112,500	0	97,500	117,450	90,000	51,600						
Gross Income(Ksh/ha)	15,337	0	11,387	19,735	8,545	11,116	5,239	28,434	0	35,881	14,140	7,799	10,421						
Cost of Production(Ksh/ha)	6,138	0	3,053	84,565	6,455	18,884	10,886	84,008	0	81,619	103,310	82,201	41,179						
Net Return(Ksh/ha)	212.87	0.00	69.28	58.25	32.74	0.64	8.90	2.54	0.00	2.23	3.18	6.36	11.70						
Planted Area(ha)	1,305	0	212	4,757	211	12	97	213	0	137	329	523	482					8,278	
Total Net Return(1,000 Ksh)																			
II. With Project	9.5/28.9	0.0	28.9	29.8	3.0	5.0	21.5	15.0	0.0	15.0	26.1	10.0	17.2						
Unit price(Ksh/kg)	0	650	4,500	7,000	7,000	8,500	1,000	8,500	0	7,000	4,500	9,500	3,000						
Yield(kg/ha)	25,088	0	18,785	134,100	21,000	35,000	21,500	127,500	0	105,000	117,450	95,000	51,600						
Gross Income(Ksh/ha)	16,112	0	11,792	19,941	8,143	13,081	5,844	31,146	0	38,877	14,284	8,477	11,305						
Cost of Production(Ksh/ha)	8,956	0	6,993	114,159	11,857	21,919	15,856	96,354	0	66,323	103,166	86,523	40,295						
Net Return(Ksh/ha)	213.14	0.00	68.88	58.33	44.15	0.76	8.75	2.66	0.00	2.28	3.05	6.47	11.80						
Planted Area(ha)	1,909	0	482	6,431	523	17	139	258	0	151	315	560	475					11,258	
Total Net Return(1,000 Ksh)	604	0	270	1,674	312	5	42	43	0	14	14	37	8					2,980	
III. Incremental Benefits(1,000 Ksh)																			
(B) Irrigated Areas	Maize/ Maize		French Beans		Kale/ Cabbage		Sweet Sorghum/ Potato		Water Melon		Rice		Onion		Other Veget. Banana Coffee		Total		
	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green			
I. Without Project	0.0	10.5	28.9	28.8	3.0	0.0	0.0	0.0	0.0	0.0	16.8	15.0	26.1	10.0	17.2				
Unit price(Ksh/kg)	0	3,500	600	4,500	6,000	0	0	0	0	2,500	8,000	5,000	10,000	3,500					
Yield(kg/ha)	0	36,750	17,340	134,100	18,000	0	0	0	0	42,000	120,000	130,500	100,000	60,200					
Gross Income(Ksh/ha)	0	9,018	11,498	20,042	8,855	0	0	0	0	10,811	38,987	14,917	7,238	13,013					
Cost of Production(Ksh/ha)	0	27,732	5,842	114,058	9,145	0	0	0	0	35,289	81,013	115,583	92,764	47,187					
Net Return(Ksh/ha)	0.00	8.70	0.90	8.70	5.25	0.00	0.00	0.00	0.00	4.80	0.30	3.18	6.36	11.70					
Planted Area(ha)	0	241	5	992	48	0	0	0	0	169	24	368	590	552					
Total Net Return(1,000 Ksh)																			2,990
II. With Project	9.5/28.9	10.5	28.9	28.8	3.0	5.0	0.0	0.0	0.0	15.0	16.8	15.0	26.1	10.0	0.0				
Unit price(Ksh/kg)	4,500	850	5,500	10,000	8,500	0	0	10,000	0	10,000	3,250	8,500	5,500	12,500	0				
Yield(kg/ha)	34,895	47,250	24,565	163,900	30,000	42,500	0	150,000	54,600	127,500	143,550	125,000	0	0					
Gross Income(Ksh/ha)	18,889	10,406	13,297	29,068	11,146	17,478	0	34,342	11,710	42,238	15,639	11,879	0	0					
Cost of Production(Ksh/ha)	16,205	36,844	11,268	134,832	18,654	25,022	0	115,658	47,690	85,262	127,911	113,321	0	0					
Net Return(Ksh/ha)	37.70	8.40	7.70	21.80	12.96	2.90	0.00	0.38	0.00	2.40	3.40	3.40	0.00	0					
Planted Area(ha)	611	309	87	2,912	244	73	0	44	0	205	297	385	0	0					
Total Net Return(1,000 Ksh)	611	68	82	1,920	196	73	0	44	0	169	180	180	71	205					
III. Incremental Benefits(1,000 Ksh)																			
(C) Incremental Benefits(1,000 Ksh)	1,214	68	352	3,594	508	77	42	87	87	169	184	85	188	558					

Table S.2.2-22 Project Cost (Ngomano / Nyangati)

	Financial Cost(Ksh)		Economic Cost(Ksh)	
	Of Which,		Of Which,	
	Total Cost	Private Sector	Govt/Public Sect.	Total Cost
1. Construction cost				
1) Irrigation & drainage improvement	3,563,767	3,563,767	0	3,328,558
2) Marketing improvement	0	0	0	0
3) Access roads improvement	0	0	0	0
4) Village/farm roads improvement	1,824,000	0	1,824,000	1,703,616
5) Rural water supply improvement	0	0	0	0
Sub-Total	5,387,767	3,563,767	1,824,000	5,032,174
2. Community Development & Supporting Services				
1) Agricultural support services	12,950,000	0	12,950,000	12,095,300
2) Community development	7,080,000	0	7,080,000	6,612,720
3) Water management services	1,810,000	0	1,810,000	1,690,540
4) Marketing support services	374,000	0	374,000	349,316
5) Public health services	150,000	0	150,000	140,100
Sub-Total	22,364,000	0	22,364,000	20,887,976
3. Associated Cost				
1) Pre-engineering cost	227,680	100,000	127,680	212,653
2) Administration cost	1,942,622	0	1,942,622	1,814,409
3) Consulting services	2,775,176	356,376	2,418,800	2,592,014
Sub-Total	4,945,478	456,376	4,489,102	4,619,076
4. Land Acquisition	175,000	175,000	0	0
5. Physical Contingency	538,776	356,376	182,400	503,217
Total	33,411,021	4,551,519	28,859,502	31,042,444

Table S.2.2-23 Operation and Maintenance Cost (Ngomano / Nyangati)

	Financial Cost	(unit:Ksh/year) Economic Cost
Annual Operation and Maintenance Cost		
1) Irrigation & drainage facilities	71,000	66,314
2) Marketing facilities	0	0
3) Access roads	0	0
4) Village/farm roads	157,000	146,638
5) Rural water supply facilities	0	0
Total	228,000	212,952

Table S.2.2-24 Calculation of EIRR

- Ngomano Nyangati -

(Unit:1,000 Ksh)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Value by Discount Rate					
						Interest= 0.16		Interest= 0.12		Interest= 0.10	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	2,763	213	2,976	1,032	-1,944	2,976	1,032	2,976	1,032	2,976	1,032
2	6,829	213	7,042	3,095	-3,947	5,234	2,300	5,614	2,468	5,820	2,558
3	8,071	213	8,284	3,095	-5,189	5,307	1,983	5,896	2,203	6,224	2,328
4	4,129	213	4,342	4,127	-214	2,398	2,279	2,759	2,623	2,985	2,819
5	3,197	213	3,410	5,159	1,749	1,624	2,458	1,935	2,927	2,118	3,203
6	3,197	213	3,410	5,159	1,749	1,400	2,117	1,728	2,614	1,925	2,912
7	2,856	213	3,069	5,159	2,090	1,086	1,825	1,388	2,334	1,575	2,647
8	0	213	213	5,159	4,946	65	1,574	86	2,084	99	2,407
9	0	213	213	5,159	4,946	56	1,357	77	1,860	90	2,188
10	0	213	213	5,159	4,946	48	1,169	69	1,661	82	1,989
11	0	213	213	5,159	4,946	42	1,008	61	1,483	75	1,808
12	0	213	213	5,159	4,946	36	869	55	1,324	68	1,644
13	0	213	213	5,159	4,946	31	749	49	1,182	62	1,494
14	0	213	213	5,159	4,946	27	646	44	1,056	58	1,359
15	0	213	213	5,159	4,946	23	557	39	943	51	1,235
16	0	213	213	5,159	4,946	20	480	35	842	46	1,123
17	0	213	213	5,159	4,946	17	414	31	751	42	1,021
18	0	213	213	5,159	4,946	15	357	28	671	38	928
19	0	213	213	5,159	4,946	13	308	25	599	35	844
20	0	213	213	5,159	4,946	11	265	22	535	32	767
21	0	213	213	5,159	4,946	9	229	20	478	29	697
22	0	213	213	5,159	4,946	8	197	18	426	26	634
23	0	213	213	5,159	4,946	7	170	16	381	24	576
24	0	213	213	5,159	4,946	6	146	14	340	22	524
25	0	213	213	5,159	4,946	5	126	13	303	20	476
26	0	213	213	5,159	4,946	4	109	11	271	18	433
27	0	213	213	5,159	4,946	4	94	10	242	16	394
28	0	213	213	5,159	4,946	3	81	9	216	15	358
29	0	213	213	5,159	4,946	3	70	8	193	13	325
30	0	213	213	5,159	4,946	2	60	7	172	12	296
Total	31,042	6,390	37,432	145,484	108,052	20,479	25,027	23,040	34,213	24,573	41,015
						EIRR= 22.06 %					
						B/C Ratio= 16 %		1.22			
						B/C Ratio= 12 %		1.48			
						B/C Ratio= 10 %		1.67			

Table S.2.2-25 Financial Analysis for Typical Farms (Ngomano / Nyangati)

Farm size: 1.50 ha

Without Project

	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income (Ksh)	Cost of Production (Ksh)	Net Return (Ksh)
Maize/Beans	1.00	1,500	1,500	9.4	14,100	20,137	1,188
Beans/Maize	1.00	250	250	28.9	7,225		
Beans	0.33	500	165	28.9	4,769	4,642	127
French Beans	0.26	3,500	910	20.0	18,200	6,913	11,287
Tomatoes	0.13	10,000	1,300	26.0	33,800	4,251	29,549
Other Vegetables	0.11	4,500	495	23.4	11,583	2,626	8,957
Banana	0.03	9,000	270	10.0	2,700	334	2,366
Coffee	0.06	3,000	180	23.0	4,140	1,016	3,124
Total	1.91						56,598
1. Crop Income (Ksh/year)							<u>56,598</u>
2. Animal Income (Ksh/year)							<u>3,768</u>
3. Off-Farm Income (Ksh/year)							<u>17,746</u>
4. Living Expense (Ksh/year) - family size 6.6 persons/family							<u>33,268</u>
5. Disposable Income (Ksh/year)							<u>44,844</u>

With Project

I. Rainfed Area

	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income (Ksh)	Cost of Production (Ksh)	Net Return (Ksh)
Maize and Beans	0.96	2,000	1,920	9.4	18,048	20,508	12,799
Beans/Maize	0.96	550	528	28.9	15,259		
French Beans	0.25	4,500	1,125	20.0	22,500	6,733	15,767
Tomatoes	0.17	11,000	1,870	26.0	48,620	6,066	42,554
Beans	0.31	650	202	28.9	5,838	4,513	1,325
Other Vegetables	0.12	4,500	540	23.4	12,636	2,880	9,756
Banana	0.03	9,500	285	10.0	2,850	359	2,491
Coffee	0.05	3,000	150	23.0	3,450	890	2,560
Sub-Total	1.89						87,252

II. Irrigated Area

	Planted Area (ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income (Ksh)	Cost of Production (Ksh)	Net Return (Ksh)
Maize/Beans	0.31	2,000	620	9.4	5,828	7,733	3,037
Beans/Maize	0.31	550	171	28.9	4,942		
French Beans	0.18	6,000	1,080	20.0	21,600	7,585	23,839
Tomatoes	0.07	14,000	980	26.0	25,480	3,501	21,979
Beans	0.06	850	51	28.9	1,474	979	495
Other Vegetables	0.18	5,500	990	23.4	23,166	4,739	18,427
Banana	0.03	9,500	285	10.0	2,850	359	2,491
Sub-Total	0.83						70,268
1. Total Crop Income (Ksh/year)							<u>157,520</u>
2. Animal Income (Ksh/year)							<u>3,768</u>
3. Off-Farm Income (Ksh/year)							<u>17,746</u>
4. Living Expense (Ksh/year) - family size 6.6 persons/family							<u>33,268</u>
5. Disposable Income (Ksh/year)							<u>145,766</u>

Table S.2.2-26 Cost Recovery (Ngomano / Nyangati)

Case-1 Present condition	Excluding Map Preparation	Including Map Prep.
1) Number of beneficiaries	120 farm households	
2) Total project cost to be paid by the beneficiaries of which, irrigation facilities	33,411,021 Ksh	4,950,445
3) Loan per farm household	37,929 Ksh	41,254
4) Repayment Period(years)	4 48 (months)	
5) Annual interest rate(%)	16 per year	
6) Monthly interest rate(%)	1.33 (16/12)	
7) Monthly repayment(Ksh)	<u>1,075 Ksh/month</u>	<u>1,169</u>

Alternative Plans for Loan Repayment

Case-2		
1) Loan per farm household(Ksh)	37,929	41,254
2) Repayment Period(years)	6 72 (months)	
3) Annual interest rate(%)	12 per year	
4) Monthly interest rate(%)	1.00 (12/12)	
5) Monthly repayment(Ksh)	<u>742 Ksh/month</u>	<u>807</u>

Case-3		
1) Loan per farm household(Ksh)	37,929	41,254
2) Repayment Period(years)	8 96 (months)	
3) Annual interest rate(%)	10 per year	
4) Monthly interest rate(%)	0.83 (10/12)	
5) Monthly repayment(Ksh)	<u>576 Ksh/month</u>	<u>626</u>

Case-4		
1) Loan per farm household(Ksh)	37,929	41,254
2) Repayment Period(years)	10 120 (months)	
3) Annual interest rate(%)	5 per year	
4) Monthly interest rate(%)	0.42 (5/12)	
5) Monthly repayment(Ksh)	<u>402 Ksh/month</u>	<u>438</u>

Case-5		
1) Loan per farm household(Ksh)	37,929	41,254
2) Repayment Period(years)	4 48 (months)	
3) Annual interest rate(%)	30 per year	
4) Monthly interest rate(%)	2.50 (30/12)	
5) Monthly repayment(Ksh)	<u>1,366 Ksh/month</u>	<u>1,485</u>

Repayment under the Current Situation(Ngomano/Nyangati)

Case-6	
1) Loan per farm household	37,929 Ksh
2) Repayment Period(years)	4 (48 months)
3) Annual interest rate(%)	16 (% per year)
4) Monthly interest rate(%)	1.33 (16/12)
5) Monthly repayment(Ksh)	1,075 (Ksh/month)
6) Monthly repayment and disposable income(Ksh)	

	Repayment	Disposable Income
1st year	1,075	875 (farm economic survey 1998)
2nd year	1,075	6,070
3rd year	1,075	8,500
4th year	1,075	12,147

Table S.2.2.27 Estimation of Water Charge (Ngomano / Nyangati)

(Unit:Ksh)

Year	Initial Cost	O & M Cost	Replac- ement Cost	Total	Present Value by Discount Rate													
					Int.= 0.16				Int.= 0.15				Int.= 0.20					
					Initial Cost	O&M Cost	Replac- ement	Total	Initial Cost	O&M Cost	Replac- ement	Total	Initial Cost	O&M Cost	Replac- ement	Total		
1	0	71,000	0	71,000	0	71,000	0	71,000	0	71,000	0	71,000	0	71,000	0	71,000	0	71,000
2	2,413,260	71,000	0	2,484,260	1,793,445	52,765	0	1,846,210	1,824,771	53,686	0	1,878,457	1,675,875	49,306	0	1,725,181		
3	2,136,258	71,000	0	2,208,258	1,389,892	45,487	0	1,415,379	1,405,940	46,684	0	1,452,624	1,237,418	41,068	0	1,278,506		
4	0	71,000	0	71,000	0	39,213	0	39,213	0	40,594	0	40,594	0	34,240	0	34,240		
5	0	71,000	0	71,000	0	33,804	0	33,804	0	35,300	0	35,300	0	28,533	0	28,533		
6	0	71,000	0	71,000	0	29,141	0	29,141	0	30,695	0	30,695	0	23,778	0	23,778		
7	0	71,000	0	71,000	0	25,122	0	25,122	0	26,692	0	26,692	0	19,815	0	19,815		
8	0	71,000	0	71,000	0	21,657	0	21,657	0	23,210	0	23,210	0	16,512	0	16,512		
9	0	71,000	0	71,000	0	18,670	0	18,670	0	20,183	0	20,183	0	13,760	0	13,760		
10	0	71,000	0	71,000	0	16,095	0	16,095	0	17,550	0	17,550	0	11,467	0	11,467		
11	0	71,000	0	71,000	0	13,875	0	13,875	0	15,261	0	15,261	0	9,556	0	9,556		
12	0	71,000	0	71,000	0	11,961	0	11,961	0	13,270	0	13,270	0	7,963	0	7,963		
13	0	71,000	0	71,000	0	10,311	0	10,311	0	11,539	0	11,539	0	6,636	0	6,636		
14	0	71,000	0	71,000	0	8,889	0	8,889	0	10,034	0	10,034	0	5,530	0	5,530		
15	0	71,000	0	71,000	0	7,663	0	7,663	0	8,726	0	8,726	0	4,608	0	4,608		
16	0	71,000	0	71,000	0	6,606	0	6,606	0	7,587	0	7,587	0	3,840	0	3,840		
17	0	71,000	0	71,000	0	5,695	0	5,695	0	6,596	0	6,596	0	3,200	0	3,200		
18	0	71,000	0	71,000	0	4,909	0	4,909	0	5,737	0	5,737	0	2,667	0	2,667		
19	0	71,000	0	71,000	0	4,232	0	4,232	0	4,969	0	4,969	0	2,222	0	2,222		
20	0	71,000	0	71,000	0	3,648	0	3,648	0	4,338	0	4,338	0	1,852	0	1,852		
21	0	71,000	0	71,000	0	3,145	0	3,145	0	3,772	0	3,772	0	1,543	0	1,543		
22	0	71,000	0	71,000	0	2,711	0	2,711	0	3,280	0	3,280	0	1,286	0	1,286		
23	0	71,000	0	71,000	0	2,337	0	2,337	0	2,852	0	2,852	0	1,072	0	1,072		
24	0	71,000	0	71,000	0	2,015	0	2,015	0	2,480	0	2,480	0	893	0	893		
25	0	71,000	0	71,000	0	1,737	0	1,737	0	2,157	0	2,157	0	744	0	744		
26	0	71,000	0	71,000	0	1,497	0	1,497	0	1,875	0	1,875	0	620	0	620		
27	0	71,000	0	71,000	0	1,291	0	1,291	0	1,631	0	1,631	0	517	0	517		
28	0	71,000	0	71,000	0	1,113	0	1,113	0	1,418	0	1,418	0	431	0	431		
29	0	71,000	0	71,000	0	959	0	959	0	1,233	0	1,233	0	358	0	358		
30	0	71,000	0	71,000	0	827	0	827	0	1,072	0	1,072	0	299	0	299		
Total	4,551,519	2,130,000	0	6,681,519	3,163,337	448,374	0	3,811,712	3,230,711	475,445	0	3,706,157	2,913,293	385,338	0	3,278,631		

Annua 151,717 71,000 0 222,717 105,445 14,946 0 120,390 107,690 15,848 0 123,539 97,110 12,178 0 109,288

Water Charge

	Interest 0.16	Interest 0.15	Interest 0.20
a. Annual Water Intake	525,100 m ³ /year		
b. Cost	Present Value	Present Value	Present Value
b.1 Cost per year at financial price	105,445	107,690	97,110
b.2 Annual O&M cost at financial price	14,946	15,848	12,178
b.3 Replacement cost at financial price	0	0	0
Total	120,390	123,539	109,288
c. Water Charge			
c.1 per cubic meter	0.229271 Ksh	0.235267 Ksh	0.208127 Ksh
c.2 per ha/year	2,508 Ksh	2,574 Ksh	2,277 Ksh
c.3 ha/month	209 Ksh	214 Ksh	190 Ksh

Table S.2.3-1 Farmgate Prices at Nkunjumo

	Unit	Unit Price(Ksh)	
		Financial	Economic
1. Crops			
Maize	kg	10.5	9.5
Maize Green	kg	10.3	10.3
Millet	kg	20.0	20.0
Sorgum	kg	15.0	15.0
Beans	kg	31.8	31.8
French Beans	kg	23.7	29.8
Irish Potatoes	kg	14.0	14.0
kale	kg	3.2	3.2
Sweet Potatoes	kg	5.2	5.2
Bulb Onions	kg	26.7	26.7
Tomatoes	kg	20.0	20.2
Cabbage	kg	10.1	10.1
Yam	kg	20.0	20.0
Banana	Bunch	150.0	150.0
Coffee	kg	14.3	17.2
Tea	kg	8.0	17.7
Milk	kg	20.2	20.2
Avocado	kg	5.0	5.0
2. Seed			
Maize	kg	91	85
French Beans	kg	165	154
Bulb onion	kg	3,420	3,194
Tomatoes	kg	5,800	5,417
Cabbage	kg	1,200	1,121
Carrot	kg	1,280	1,196
Kale	kg	1,440	1,345
3. Fertilizer			
Nitrogen	kg	26.0	27.4
Phosphate	kg	18.0	24.3
Potassium	kg	23.4	16.4
4. Agricultural Chemicals			
Dimethoate	lit.	605	565
Antracol	kg	483	451
Sancozeb	kg	465	434
Milraz	kg	1,031	963
Karate	lit.	1,462	1,366
5. Labour			
Labour	MD	75	38
Animal Labour	MAD	1,000	500
6. Nursery			
Banana	plant	50	50
Coffee	plant	50	50
Papaya	plant	40	40
Mango	plant	60	60
Avocado	plant	50	50
Tea	plant	50	50

Source: Farm Economic Survey(JICA) 1998
and interview survey to stockists

Table S.2.3-2 Standard Conversion Factor (SCF)

	(unit:1,000 K.Pound)							
	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	Average
(1)Imports	2,545,630	2,645,913	2,945,863	5,056,419	5,753,988	7,758,420	8,424,310	5,018,649
(2)Exports	1,244,010	1,629,467	1,742,268	3,678,247	4,282,132	4,866,950	5,910,000	3,336,153
(3)Import Duties	347,968	334,680	255,939	459,150	739,639	929,910	1,058,780	589,438
(4)Export Duties	729	70	740	222	130	0	0	270
(5)Subsidy on Exports	0	0	0	0	0	0	0	0
(6)=(1)+(2)	3,789,640	4,275,380	4,688,131	8,734,666	10,036,120	12,625,370	14,334,310	8,354,802
(7)=(1)+(2)+(3)-(4)+(5)	4,136,879	4,609,990	4,943,330	9,193,594	10,775,629	13,555,280	15,393,090	8,943,970
(8)SCF=(6)/(7)	0.916	0.927	0.948	0.950	0.931	0.931	0.931	0.934

Source:Economic Survey 1997
Statistical Abstract 1995

Table S.2.3-3 Price Structure of Maize (economic)

1. Projected 2010 world market price(\$/ton in 1990 price	94.9
2. Projected 2010 world market price(\$/ton in 1998 price	104.6
3. Quality adjustment(%)	90
4. World market equivalent(US\$/ton)	94
5. Freight and insurance(US\$/ton)	40
6. CIF Monbasa(US\$/ton)	134
7. Unloading and port handling(US\$/ton)	9
8. Value Kenya border	
- in US\$	143
- in Ksh(61.19Ksh/US\$)	8,750
9. Domestic handling, transport, margin(Ksh/ton)	831
10. Processing ratio(%)	100
11. Wholesale price(Ksh/ton)	9,581
12. Transport to/from farm(Ksh/ton)	103
13. Farmgate price(Ksh/ton)	9,478

Source:Commodity markets and the developing countries February 1998,
World Bank

Table S.2.3-4 Price Structure of Fertilizer (economic)

	Muriate of Potash		
	Urea	TSP	
1. Projected 2010 World market price(\$/ton in 1990 price)	131.8	106.7	90.3
2. Projected 2010 World market price(\$/ton in 1998 price)	145.3	117.6	99.5
3. Freight and insurance(US\$/ton)	40	40	40
4. CIF Monbasa(US\$/ton)	185.3	157.6	139.5
5. Unloading and port handling(US\$/ton)	9	9	9
6. Value Kenya border			
- in US\$	194.3	166.6	148.5
- in Ksh(61.19Ksh/US\$)	11,889	10,194	9,086
7. Domestic handling, transport, margin(Ksh/ton)	831	831	831
8. Wholesale price(Ksh/ton)	12,720	11,025	9,917
9. Transport to/from farm(Ksh/ton)	103	103	103
10. Farmgate price(Ksh/ton)	12,617	10,922	9,814
11. Farmgate price in nutrient(Ksh/kg)	27.4	24.3	16.4

Source:Commodity markets and the developing countries, February 1998, World Bank

Table S.2.3-5 Price Structure of Coffee and Tea (economic)

	Coffee	Tea
1. Projected 2010 World market price(\$/ton in 1990 price)	1,812	1,405
2. Projected 2010 World market price(\$/ton in 1998 price)	1,997	1,549
3. Adjustment for quality(%)	95	90
4. Weighted average export price FOB price(US\$/ton)	1,897	1,471
5. Port charges/handling(US\$/ton)	9	9
6. Value at Kenya border(per ton)		
- in US\$	1,888	1,462
- in Ksh(61.19Ksh/US\$)	115,526	89,457
7. Domestic handling, transport, margin(Ksh/ton)	766	766
8. Ex-coffee factory price(Ksh/ton)	114,760	88,691
9. Yielding recovery(%)	15	20
10. Input price at coffee factory(Ksh/ton)	17,214	17,738
11. Transport to/from farm(Ksh/ton)	20	20
12. Farmgate price(Ksh/ton)	17,194	17,718

Source. Commodity markets and the developing countries, February 1998, World Bank

Table S.2.3-6 Economic Price of Vegetables

	French Beans	Okra
1. FOB Price	75.00	58.00
2. Handling charge	3.50	3.50
3. Exporter's revenue	24.00	15.00
4. Grading & packing cost	9.34	8.73
5. Transportation cost	8.41	8.41
6. Farmgate price	29.75	22.36

Source. HCDA

	Carrots	Tomatoes
1. FOB Price	48.00	56.00
2. Handling charge	3.69	3.69
3. Exporter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	8.41	8.41
6. Farmgate price	18.63	20.23

Source. HCDA

	Eggplant	Bitter Gourd
1. FOB Price	42.00	65.00
2. Handling charge	3.69	3.69
3. Exporter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	8.41	8.41
6. Farmgate price	12.63	29.23

Source. HCDA

Table S.2.3-7 Crop Selection for Nkunjumo

	Staple Food	Demand for Exporting	Demand for Local Consumption	Suitability for Climate	Suitability for Soil	Suitability for Land Form	Profitability per Hectare	Storability	Stability of Price	Farmer's Experience	Suitability for Rainfed Farming	Necessity for Irrigation	Total
Maize dry	3	0	3	3	3	1	2	2	3	3	3	1	27
French Beans	0	3	0	2	3	2	3	0	3	2	3	2	23
Snow Peas	0	3	0	3	2	2	3	0	2	1	2	3	21
Cabbage	3	0	3	3	3	2	2	2	3	3	3	2	28
Carrots	2	0	3	3	2	2	3	2	2	2	3	2	26
Tomatoes	3	0	3	2	3	2	3	0	1	3	3	2	25
Bulb Onions	3	0	3	2	2	2	2	2	1	2	3	2	24
Potatoes	3	0	3	2	3	3	3	3	3	3	3	2	31
Sweet Potatoes	3	0	3	2	3	3	2	1	3	3	3	2	28
Kales	3	0	3	3	3	2	2	0	1	3	3	2	25
Beans	3	0	3	3	3	2	2	3	3	3	3	2	30
Coffee	0	3	1	3	3	3	2	3	2	3	3	1	27
Tea	0	3	3	2	3	3	2	1	2	2	3	1	25
Papaya	1	0	2	2	2	3	2	0	3	2	3	1	21
Bananas	3	0	3	2	2	3	2	1	1	1	3	1	24
Macadamia Nut	0	3	0	2	3	3	3	3	3	2	3	1	26

Table S.2.3-8 Cost Budget (Maize / Beans)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Maize/Beans

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:Maize	kg	91	100	9,100	100	9,100			100	9,100
Beans	kg	30	15	450	15	450			15	450
Fertilizer:N	kg	26.0	3.4	88	4.0	104			4.0	104
P	kg	18.0	3.4	61	4.0	72			6.0	108
K	kg	23.4	3.4	80	4.0	94			5.0	117
Chemicals:	kg	465	0	0	1	465			1	465
Gunny bags	pieces	40	18	720	20	800			23	920
Labour Costs	MD	75	133	9,975	135	10,125			140	10,500
Irrigation	ha			0		0				260
Miscellaneous(5% of total)				1,078		1,116				1,159
Total Costs				21,552		22,326				23,183
2. Gross Income										
a. Main Product	kg	10.5	1,750	18,375	2,000	21,000			2,250	23,625
b. Beans	kg	31.8	300	9,540	400	12,720			600	19,080
3. Net Profit	Kshs			6,363		11,394				19,522

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Maize/Beans

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:Maize	kg	85	100	8,500	100	8,500			100	8,500
Beans	kg	30	15	450	15	450			15	450
Fertilizer:N	kg	27.4	3.4	93	4.0	110			4.0	110
P	kg	24.3	3.4	83	4.0	97			6.0	146
K	kg	16.4	3.4	56	4.0	66			5.0	82
Chemicals:	kg	434	0	0	1	434			1	434
Gunny bags	pieces	40	18	720	20	800			23	920
Labour Costs	MD	38	133	5,054	135	5,130			140	5,320
Irrigation	ha			0		0				260
Miscellaneous(5% of total)				787		820				854
Total Costs				15,743		16,407				17,075
2. Gross Income										
a. Main Product	kg	9.5	1,750	16,625	2,000	19,000			2,250	21,375
b. Beans	kg	31.8	300	9,540	400	12,720			600	19,080
3. Net Profit	Kshs			10,422		15,313				23,380

Table S.2.3-9 Cost Budget (Beans)

Cost and return of Crops(financial)

Site:Nkunjumo

Crop:Beans

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seed	kg	32	25	800	25	800	25	800	25	800
Fertilizer:N	kg	26.0	51	1,326	51	1,326	51	1,326	55	1,430
P	kg	18.0	30	540	30	540	30	540	35	630
K	kg	23.4	0	0	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Labour Costs	MD	75	64	4,800	70	5,250	70	5,250	73	5,475
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				656		680		680		702
Total Costs				13,122		13,596		13,596		14,037
2. Gross Income										
a. Main Product	kg	31.8	600	19,080	650	20,670	700	22,260	750	23,850
3. Net Profit	Kshs			5,958		7,074		8,664		9,813

Cost and return of Crops(economic)

Site:Nkunjumo

Crop:Beans

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seed	kg	32	25	800	25	800	25	800	25	800
Fertilizer:N	kg	27.4	51	1,397	51	1,397	51	1,397	55	1,507
P	kg	24.3	30	729	30	729	30	729	35	851
K	kg	18.4	0	0	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Labour Costs	MD	38	64	2,432	70	2,660	70	2,660	73	2,774
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				545		557		557		575
Total Costs				10,904		11,144		11,144		11,507
2. Gross Income										
a. Main Product	kg	31.8	600	19,080	650	20,670	700	22,260	750	23,850
3. Net Profit	Kshs			8,176		9,526		11,116		12,343

Table S.2.3-10 Cost Budget (Kale)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Kale

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	1,440	0.5	720	0.5	720	0.5	720	0.5	720
Fertilizer:N	kg	26.0	20	520	20	520	43	1,118	80	2,080
P	kg	18.0	20	360	30	540	20	360	94	1,692
K	kg	23.4	0	0	0	0	0	0	0	0
Chemicals	lit.	465	1	233	1	372	1	233	1	372
Labour Costs	MD	75	120	9,000	120	9,000	120	9,000	122	9,150
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				570		587		602		751
Total Costs				11,403		11,739		12,032		15,025
2. Gross Income										
a. Main Product	kg	3.2	6,000	19,200	8,000	25,600	8,000	25,600	12,000	38,400
3. Net Profit	Kshs			7,797		13,861		13,568		23,375

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Kale

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	1,345	0.5	673	0.5	673	0.5	673	0.5	673
Fertilizer:N	kg	27.4	20	548	20	548	43	1,178	80	2,192
P	kg	24.3	20	486	30	729	20	486	94	2,284
K	kg	16.4	0	0	0	0	0	0	0	0
Chemicals	lit.	434	1	217	1	347	1	217	1	347
Labour Costs	MD	38	120	4,560	120	4,560	120	4,560	122	4,636
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				341		361		374		547
Total Costs				6,825		7,218		7,488		10,939
2. Gross Income										
a. Main Product	kg	3.2	6,000	19,200	8,000	25,600	8,000	25,600	12,000	38,400
3. Net Profit	Kshs			12,375		18,382		18,112		27,461

Table S.2.3-11 Cost Budget (Irish Potatoes)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Irish Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	20.0	2,000	40,000	2,000	40,000	2,000	40,000	2,000	40,000
Fertilizer:N	kg	26.0	30	780	30	780	54	1,404	56	1,456
P		18.0	40	720	40	720	70	1,260	72	1,296
K		23.4	0	0	0	0	0	0	0	0
Manure	kg	1	8,000	8,000	8,000	8,000	10,000	10,000	15,000	15,000
Chemicals:	kg	1,031	3	3,093	3	3,093	5	5,155	10	10,310
Gunny bags	piece	40	125	5,000	125	5,000	125	5,000	150	6,000
Labour Costs	MD	75	220	16,500	250	18,750	240	18,000	270	20,250
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				3,900		4,018		4,254		4,977
Total Costs				77,993		80,381		85,073		99,549
2. Gross Income										
a. Main Product	kg	14.0	7,500	105,000	8,000	112,000	8,500	119,000	10,000	140,000
3. Net Profit	Kshs			27,007		31,639		33,927		40,451

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Irish Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	20.0	2,000	40,000	2,000	40,000	2,000	40,000	2,000	40,000
Fertilizer:N	kg	27.4	30	822	30	822	50	1,370	56	1,534
P		24.3	40	972	40	972	70	1,701	72	1,750
K		16.4	0	0	0	0	0	0	0	0
Manure	kg	1	8,000	8,000	8,000	8,000	10,000	10,000	15,000	15,000
Chemicals:	kg	863	3	2,889	3	2,889	5	4,815	10	9,630
Gunny bags	piece	40	75	3,000	80	3,200	85	3,400	100	4,000
Labour Costs	MD	38	220	8,360	250	9,500	240	9,120	270	10,260
Irrigation	ha			0		0		0		280
Miscellaneous(5% of total)				3,371		3,441		3,706		4,339
Total Costs				67,414		68,824		74,112		86,773
2. Gross Income										
a. Main Product	kg	14.0	7,500	105,000	8,000	112,000	8,500	119,000	10,000	140,000
3. Net Profit	Kshs			37,586		43,176		44,888		53,227

Table S.2.3-12 Cost Budget (Cabbage)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Cabbage

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	1,200	0.5	600	0.5	600	0.5	600	0.5	600
Fertilizer:N	kg	28.0	60	1,560	60	1,560	60	1,560	86	2,236
P	kg	18.0	60	1,080	60	1,080	60	1,080	94	1,692
K	kg	23.4	0	0	0	0	0	0	0	0
Chemicals	lit.	1,031	1	516	1.5	1,547	1.5	1,547	1	825
Labour Costs	MD	75	120	9,000	125	9,375	125	9,375	135	10,125
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				871		745		745		828
Total Costs				13,427		14,907		14,907		16,566
2. Gross Income										
a. Main Product	kg	10.1	10,000	101,000	15,000	151,500	14,000	141,400	16,000	161,600
3. Net Profit	Kshs			87,573		136,593		126,493		145,034

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Cabbage

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	1,121	0.5	561	0.5	561	0.5	561	0.5	561
Fertilizer:N	kg	27.4	80	1,644	60	1,644	60	1,644	86	2,358
P	kg	24.3	60	1,458	60	1,458	60	1,458	94	2,284
K	kg	18.4	0	0	0	0	0	0	0	0
Chemicals	lit.	963	1	482	1.5	1,445	1.5	1,445	1	770
Labour Costs	MD	38	120	4,560	125	4,750	125	4,750	135	5,130
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				458		519		519		598
Total Costs				9,182		10,378		10,378		11,959
2. Gross Income										
a. Main Product	kg	10.1	10,000	101,000	15,000	151,500	14,000	141,400	16,000	161,600
3. Net Profit	Kshs			91,838		141,124		131,024		149,641

Table S.2.3-13 Cost Budget (French Beans)

Cost and Return of Crops(financial)

Site:Nkunjumo
Crop:French Beans

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	165	65	10,725	65	10,725	65	10,725	65	10,725
Fertilizer:N	kg	26.0	16	416	16	416	16	416	18	468
P	kg	18.0	20	360	20	360	20	360	25	450
K	kg	23.4	0	0	0	0	0	0	0	0
Chemicals	lit.	1031	2	2,062	2	2,062	2	2,062	2	2,062
Labour Costs	MD	75	150	11,250	153	11,475	155	11,625	160	12,000
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				1,306		1,318		1,326		1,353
Total Costs				26,119		26,356		26,514		27,058
2. Gross Income										
a. Main Product	kg	23.7	3,000	71,100	3,500	82,950	3,500	82,950	4,000	94,800
3. Net Profit	Kshs			44,981		56,594		56,436		67,742

Cost and Return of Crops(economic)

Site:Nkunjumo
Crop:French Beans

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	154	65	10,010	65	10,010	65	10,010	65	10,010
Fertilizer:N	kg	27.4	16	438	16	438	16	438	18	493
P	kg	24.3	20	486	20	486	20	486	25	608
K	kg	16.4	0	0	0	0	0	0	0	0
Chemicals	lit.	963	2	1,926	2	1,926	2	1,926	2	1,926
Labour Costs	MD	38	150	5,700	153	5,814	155	5,890	160	6,080
Irrigation	ha			0		0		0		260
Miscellaneous(5% of total)				977		983		987		1,006
Total Costs				19,537		19,657		19,737		20,123
2. Gross Income										
a. Main Product	kg	29.8	3,000	89,400	3,500	104,300	3,500	104,300	4,000	119,200
3. Net Profit	Kshs			69,863		84,643		84,563		99,077

Table S.2.3-14 Cost Budget (Sweet Potatoes)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	3.5	400	1,400	400	1,400			400	1,400
Fertilizer:N	kg	26.0	10	260	10	260			30	780
P		18.0	0	0	0	0			30	540
K		23.4	0	0	0	0			0	0
Manure	kg	1	1,000	1,000	1,000	1,000			2,000	2,000
Chemicals:	kg	605	0	0	1	605			1	605
Gunny bags	piece	40	70	2,800	70	2,800			85	3,400
Labour Costs	MD	75	100	7,500	105	7,875			120	9,000
Irrigation	ha									260
Miscellaneous(5% of total)				682		734				947
Total Costs				13,642		14,674				18,932
2. Gross Income										
a. Main Product	kg	5.2	7,000	36,400	7,000	36,400			8,500	44,200
3. Net Profit	Kshs			22,758		21,726				25,268

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	3.5	400	1,400	400	1,400			400	1,400
Fertilizer:N	kg	27.4	10	274	10	274			30	822
P		24.3	0	0	0	0			30	729
K		18.4	0	0	0	0			0	0
Manure	kg	1	1,000	1,000	1,000	1,000			2,000	2,000
Chemicals:	kg	565	0	0	1	565			1	565
Gunny bags	piece	40	70	2,800	70	2,800			85	3,400
Labour Costs	MD	38	100	3,800	105	3,990			120	4,560
Irrigation	ha			0		0				260
Miscellaneous(5% of total)				488		528				723
Total Costs				9,762		10,557				14,459
2. Gross Income										
a. Main Product	kg	5.2	7,000	36,400	7,000	36,400			8,500	44,200
3. Net Profit	Kshs			26,638		25,843				29,741

Table S.2.3-15 Cost Budget (Tomato)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Tomato

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:	kg	5,800	0.25	1,450	0.25	1,450	0.25	1,450	0.25	1,450
Fertilizer:N	kg	26.0	20.0	520	22.0	572	30.0	780	32.0	832
P		18.0	20.0	360	22.0	396	22.0	396	25.0	450
K		23.4	0	0	0	0	0	0	0	0
Manure	kg	1	8,000	8,000	9,000	9,000	10,000	10,000	15,000	15,000
Chemicals:	kg	1,031	3	3,093	3	3,093	3	3,093	7	7,217
Labour Costs	MD	75	150	11,250	153	11,475	153	11,475	160	12,000
Miscellaneous(5% of total)				1,299		1,368		1,431		1,945
Total Costs				25,972		27,354		28,625		38,894
2. Gross Income										
a. Main Product:	kg	20.0	7,500	150,000	7,500	150,000	8,500	170,000	10,000	200,000
3. Net Profit	Kshs			124,028		122,646		141,375		161,106

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Tomato

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds:	kg	5,417	0.25	1,354	0.25	1,354	0.25	1,354	0.25	1,354
Fertilizer:N	kg	27.4	20.0	548	22.0	603	30.0	822	32.0	877
P		24.3	20.0	486	22.0	535	22.0	535	25.0	608
K		16.4	0	0	0	0	0	0	0	0
Manure	kg	1	8,000	8,000	9,000	9,000	10,000	10,000	15,000	15,000
Chemicals:	kg	963	3	2,889	3	2,889	3	2,889	7	6,741
Labour Costs	MD	38	150	5,700	153	5,814	153	5,814	160	6,080
Miscellaneous(5% of total)				999		1,063		1,127		1,614
Total Costs				19,978		21,258		22,541		32,273
2. Gross Income										
a. Main Product:	kg	20.2	7,500	151,500	7,500	151,500	8,500	171,700	10,000	202,000
3. Net Profit	Kshs			131,524		130,242		149,159		169,727

Table S.2.3-16 Cost Budget (Millet)

Cost and Return of Crops (financial)

Site:Nkunjumo

Crop:Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	10	4.0	40	4.0	40
Fertilizer:N	kg	28.0	1.8	47	2.0	52
P	kg	18.0	3.8	69	4.0	72
K	kg	23.4	0.0	0	0.0	0
Manure	kg	1	250	250	300	300
Chemicals	kg	465	0	0	0	0
Gunny bags	piece	40	8	320	8	320
Labour Costs	MD	75	83	6,225	85	6,375
Miscellaneous (5% of total)				368		377
Total Costs				7,318		7,538
2. Gross Income						
a. Main Product	kg	20	800	16,000	800	16,000
3. Net Profit	Kshs			8,684		8,464

Cost and Return of Crops (economic)

Site:Nkunjumo

Crop:Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	10	4.0	40	4.0	40
Fertilizer:N	kg	27.4	1.8	49	2.0	55
P	kg	24.3	3.8	92	4.0	97
K	kg	16.4	0.0	0	0.0	0
Manure	kg	1	250	250	300	300
Chemicals	kg	434	0	0	0	0
Gunny bags	piece	40	8	320	8	320
Labour Costs	MD	38	83	3,154	85	3,230
Miscellaneous (5% of total)				206		213
Total Costs				4,111		4,255
2. Gross Income						
a. Main Product	kg	20	800	16,000	800	16,000
3. Net Profit	Kshs			11,889		11,745

Table S.2.3-17 Cost Budget (Onion)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Onion

	Unit	Unit Price (Kshs)	Rainfed				Irrigated				
			without Project		with Project		without Project		with Project		
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	
1. Costs											
Seeds	kg	3,420	5	17,100	5	17,100	5	17,100	5	17,100	
Fertilizer:N	kg	26.0	40	1,040	40	1,040	50	1,300	80	2,080	
P	kg	18.0	40	720	40	720	50	900	55	990	
K	kg	23.4	0	0	0	0	0	0	0	0	
Manure	kg	1	1,000	1,000	1,500	1,500	1,000	1,000	3,000	3,000	
Chemicals	kg	1,031	3	3,093	3	3,093	4	4,124	6	6,186	
Labour Costs	MD	75	140	10,500	150	11,250	155	11,625	160	12,000	
Irrigation	ha			0		0		0		190	
Miscellaneous(5% of total)				1,761		1,826		1,897		2,187	
Total Costs				35,214		36,529		37,946		43,733	
2. Gross Income											
a. Main Product	kg	26.7	6,500	173,550	6,500	173,550	7,000	186,900	7,500	200,250	
3. Net Profit	Kshs			138,336		137,021		148,954		156,517	

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Onion

	Unit	Unit Price (Kshs)	Rainfed				Irrigated				
			without Project		with Project		without Project		with Project		
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	
1. Costs											
Seeds	kg	3,194	5	15,970	5	15,970	5	15,970	5	15,970	
Fertilizer:N	kg	27.4	40	1,096	40	1,096	50	1,370	80	2,192	
P	kg	24.3	40	972	40	972	50	1,215	55	1,337	
K	kg	16.4	0	0	0	0	0	0	0	0	
Manure	kg	1	1,000	1,000	1,500	1,500	1,000	1,000	3,000	3,000	
Chemicals	kg	963	3	2,889	3	2,889	4	3,852	6	5,778	
Labour Costs	MD	38	140	5,320	150	5,700	155	5,890	160	6,080	
Irrigation	ha			0		0		0		190	
Miscellaneous(5% of total)				1,434		1,480		1,542		1,818	
Total Costs				28,661		29,607		30,839		36,365	
2. Gross Income											
a. Main Product	kg	26.7	6,500	173,550	6,500	173,550	7,000	186,900	7,500	200,250	
3. Net Profit	Kshs			144,869		143,943		156,061		163,885	

Table S.2.3-18 Cost Budget (Green Maize)

Cost and Return of Crops(financial)

Site:Nkunjumo

Crop:Green Maize

(per ha)

	Unit	Unit Price (Kshs)	Irrigated			
			without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	63	60	3,780	60	3,780
Fertilizer:N	kg	26.0	3.4	88	4.0	104
P	kg	18.0	3.4	61	4.0	72
K	kg	23.4	3.4	80	4.0	94
Chemicals:	kg	465	0	0	1	465
Gunny bags	pieces	40	30	1,200	40	1,600
Labour Costs	MD	75	75	5,625	80	6,000
Irrigation	ha					260
Miscellaneous(5% of total)				570		651
Total Costs				11,404		13,026
2. Gross Income						
a. Main Product	kg	10.3	3,000	30,900	4,000	41,200
3. Net Profit	Kshs			19,496		28,174

Cost and Return of Crops(economic)

Site:Nkunjumo

Crop:Green Maize

(per ha)

	Unit	Unit Price (Kshs)	Irrigated			
			without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	63	60	3,780	60	3,780
Fertilizer:N	kg	27.4	3.4	93	4.0	110
P	kg	24.3	3.4	83	4.0	97
K	kg	16.4	3.4	56	4.0	66
Chemicals:	kg	434	0	0	1	434
Gunny bags	pieces	40	30	1,200	40	1,600
Labour Costs	MD	38	75	2,850	80	3,040
Irrigation	ha					260
Miscellaneous(5% of total)				424		494
Total Costs				8,486		9,880
2. Gross Income						
a. Main Product	kg	10.3	3,000	30,900	4,000	41,200
3. Net Profit	Kshs			22,414		31,320

Table S.2.3-19 Cost Budget (Banana)

Cost and return of Crop(s) Financial

Site/Nun/umo Crop/Banana (m/ha)	Unit	Price (K/ha)	without Project			with Project		
			1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)	1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)
1. Costs	pieces	50	820	31,000	0	0	0	
Nursery	kg	26.0	51	1,326	80	1,480	40	1,040
Fertilizer N	kg	18.0	30	540	35	630	35	630
P	kg	23.4	0	0	0	0	0	0
K	kg	23.4	0	0	0	0	0	0
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	35	78	2,730	78	2,730	80	2,800
Irrigation	ha							
Miscellaneous (5% of total)			2,153	75,351	314	11,094	529	18,623
Total Costs			42,791	1,027,141	118,811	43,917	10,589	10,776
2. Gross Income			45,000	1,000,000	3,500,000	3,000,000	4,000,000	4,000,000
A. Main Product	kg	7.5	0	0	0	0	0	0
B. Net Profit	K/ha		2,209	42,228	9,483	49,111	15,024	15,024

Cost and return of Crop(s) Economic

Site/Nun/umo Crop/Banana (m/ha)	Unit	Price (K/ha)	without Project			with Project		
			1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)	1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)
1. Costs	pieces	50	820	31,000	0	0	0	
Nursery	kg	26.0	51	1,326	80	1,480	40	1,040
Fertilizer N	kg	18.0	30	540	35	630	35	630
P	kg	23.4	0	0	0	0	0	0
K	kg	23.4	0	0	0	0	0	0
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	35	78	2,730	78	2,730	80	2,800
Irrigation	ha							
Miscellaneous (5% of total)			2,153	75,351	314	11,094	529	18,623
Total Costs			42,791	1,027,141	118,811	43,917	10,589	10,776
2. Gross Income			45,000	1,000,000	3,500,000	3,000,000	4,000,000	4,000,000
A. Main Product	kg	7.5	0	0	0	0	0	0
B. Net Profit	K/ha		2,209	42,228	9,483	49,111	15,024	15,024

Cost and return of Crop(s) Financial

Site/Nun/umo Crop/Banana (m/ha)	Unit	Price (K/ha)	without Project			with Project		
			1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)	1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)
1. Costs	pieces	50	820	31,000	0	0	0	
Nursery	kg	26.0	51	1,326	80	1,480	40	1,040
Fertilizer N	kg	18.0	30	540	35	630	35	630
P	kg	23.4	0	0	0	0	0	0
K	kg	23.4	0	0	0	0	0	0
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	35	78	2,730	78	2,730	80	2,800
Irrigation	ha							
Miscellaneous (5% of total)			2,153	75,351	314	11,094	529	18,623
Total Costs			42,791	1,027,141	118,811	43,917	10,589	10,776
2. Gross Income			45,000	1,000,000	3,500,000	3,000,000	4,000,000	4,000,000
A. Main Product	kg	7.5	0	0	0	0	0	0
B. Net Profit	K/ha		2,209	42,228	9,483	49,111	15,024	15,024

Cost and return of Crop(s) Economic

Site/Nun/umo Crop/Banana (m/ha)	Unit	Price (K/ha)	without Project			with Project		
			1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)	1st Year Quant- ity	2nd Year Value (K/ha)	3rd Year Value (K/ha)
1. Costs	pieces	50	820	31,000	0	0	0	
Nursery	kg	26.0	51	1,326	80	1,480	40	1,040
Fertilizer N	kg	18.0	30	540	35	630	35	630
P	kg	23.4	0	0	0	0	0	0
K	kg	23.4	0	0	0	0	0	0
Manure	kg	1	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs	MD	35	78	2,730	78	2,730	80	2,800
Irrigation	ha							
Miscellaneous (5% of total)			2,153	75,351	314	11,094	529	18,623
Total Costs			42,791	1,027,141	118,811	43,917	10,589	10,776
2. Gross Income			45,000	1,000,000	3,500,000	3,000,000	4,000,000	4,000,000
A. Main Product	kg	7.5	0	0	0	0	0	0
B. Net Profit	K/ha		2,209	42,228	9,483	49,111	15,024	15,024

Table S.2.3-20 Cost Budget (Coffee)

Cost and return of Crops(financial)

Crop/Coefficient(s)	without Project						with Project					
	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Unit	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value
(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)
1. Costs												
Nursery	pieces	50	87,500	0	0	0	1,350	87,500	0	0	0	0
Fertiliser-N	kg	25.0	1,820	70	1,820	70	1,820	70	1,820	70	1,820	70
Fertiliser-P	kg	18.0	340	35	850	40	720	30	540	30	540	30
K	kg	23.4	30	792	35	818	30	702	30	702	30	702
Manure	kg	1	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs												
Spraying	MD	75	30	2,250	30	2,250	35	2,825	35	2,825	35	2,825
Weeding	MD	75	20	1,500	20	1,500	22	1,650	22	1,650	22	1,650
Pruning	MD	75	20	1,500	20	1,500	22	1,650	22	1,650	22	1,650
Planting	2/1/4	0	0	0	0	0	0	0	0	0	0	0
Irrigation	ha											
Miscellaneous(5% of total)			4,045		465		978		4151		578	
Total Costs			80,855		8,972		19,388		89,918		11,595	
2. Gross Income			0		0		0		0		0	
A. Min. Product	kg	14.3	0	0	0	4,590	84,350	0	0	0	4,590	84,350
B. Net Profit	Kgha		-80,855		-8,972		-19,388		-89,918		-11,595	

Crop/Coefficient(s)	without Project						with Project					
	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Unit	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value
(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)
1. Costs												
Nursery	pieces	50	87,500	0	0	0	1,350	87,500	0	0	0	0
Fertiliser-N	kg	25.0	1,820	70	1,820	70	1,820	70	1,820	70	1,820	70
Fertiliser-P	kg	18.0	340	35	850	40	720	30	540	30	540	30
K	kg	23.4	30	792	35	818	30	702	30	702	30	702
Manure	kg	1	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs												
Spraying	MD	75	30	2,250	30	2,250	35	2,825	35	2,825	35	2,825
Weeding	MD	75	20	1,500	20	1,500	22	1,650	22	1,650	22	1,650
Pruning	MD	75	20	1,500	20	1,500	22	1,650	22	1,650	22	1,650
Planting	2/1/4	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous(5% of total)			4,045		465		978		4,151		578	
Total Costs			80,855		8,972		19,388		89,918		11,595	
2. Gross Income			0		0		0		0		0	
A. Min. Product	kg	14.3	0	0	0	4,590	84,350	0	0	0	4,590	84,350
B. Net Profit	Kgha		-80,855		-8,972		-19,388		-89,918		-11,595	

Cost and return of Crops(economic)

Crop/Coefficient(s)	without Project						with Project					
	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Unit	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value
(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)
1. Costs												
Nursery	pieces	50	87,500	0	0	0	1,350	87,500	0	0	0	0
Fertiliser-N	kg	25.4	1,818	70	1,818	70	1,818	70	1,818	70	1,818	70
Fertiliser-P	kg	24.3	30	729	35	811	40	912	30	720	30	720
K	kg	18.4	30	482	35	514	30	482	30	482	30	482
Manure	kg	1	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs												
Spraying	MD	38	30	1,140	30	1,140	35	1,275	35	1,275	35	1,275
Weeding	MD	38	20	760	20	760	22	836	22	836	22	836
Pruning	MD	38	20	760	20	760	22	836	22	836	22	836
Planting	1/1/4	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous(5% of total)			3,910		384		812		3,981		428	
Total Costs			79,398		7,285		12,238		79,922		8,596	
2. Gross Income			0		0		0		0		0	
A. Min. Product	kg	17.2	0	0	0	4,590	77,400	0	0	0	4,590	77,400
B. Net Profit	Kgha		-79,398		-7,285		-12,238		-79,922		-8,596	

Cost and return of Crops(economic)

Crop/Coefficient(s)	without Project						with Project					
	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Unit	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value	Quant	Value
(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)	Ry	(Kgha)
1. Costs												
Nursery	pieces	50	87,500	0	0	0	1,350	87,500	0	0	0	0
Fertiliser-N	kg	25.4	1,818	70	1,818	70	1,818	70	1,818	70	1,818	70
Fertiliser-P	kg	24.3	30	729	35	811	40	912	30	720	30	720
K	kg	18.4	30	482	35	514	30	482	30	482	30	482
Manure	kg	1	1,000	1,000	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Labour Costs												
Spraying	MD	38	30	1,140	30	1,140	35	1,275	35	1,275	35	1,275
Weeding	MD	38	20	760	20	760	22	836	22	836	22	836
Pruning	MD	38	20	760	20	760	22	836	22	836	22	836
Planting	1/1/4	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous(5% of total)			3,910		384		812		3,981		428	
Total Costs			79,398		7,285		12,238		79,922		8,596	
2. Gross Income			0		0		0		0		0	
A. Min. Product	kg	17.2	0	0	0	4,590	77,400	0	0	0	4,590	77,400
B. Net Profit	Kgha		-79,398		-7,285		-12,238		-79,922		-8,596	

Table S.2.3-21 Estimation of the Agricultural Benefits (Nkunjumo)

	Maize/ Maize		Kale		Potato		Cabbage		French Beans		Sweet Potato		Millet		Onion		Napier		Coffee		Banana		Total	
	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green	Beans	Green		
(A) Rainfed Areas																								
I. Without Project																								
Unit price(Ksh/kg)	9.5/31.8	0.0	31.8	3.2	14.0	10.1	28.8	5.2	20.2	20.0	26.7	17.2	7.5											
Yield(kg/ha)	0	800	6,000	7,500	10,000	3,000	7,000	7,500	800	7,500	800	6,500	12,000	4,500	8,500									
Gross Income(Ksh/ha)	26,165	0	18,080	18,200	105,000	101,000	89,400	36,400	151,500	16,000	173,550	0	77,400	83,750										
Cost of Production(Ksh/ha)	15,743	0	10,904	6,825	67,414	9,182	19,537	9,762	19,978	4,111	28,981		12,238	7,771										
Net Return(Ksh/ha)	10,422	0	8,176	12,375	37,586	91,818	69,863	26,638	131,524	11,889	144,569		65,164	76,000										
Planted Area(he)	92.02	0.00	33.35	3.08	7.09	3.48	2.18	0.25	1.89	1.45	0.18	0.00	89.51	9.17										
Total Net Return(1,000 Ksh)	846	0	273	38	286	321	152	7	249	17	28	0	4,530	513										
II. With Project																								
Unit price(Ksh/kg)	9.5/31.8	0.0	31.8	3.2	14.0	10.1	28.8	5.2	20.2	20.0	26.7	17.2	7.5											
Yield(kg/ha)	0	650	8,000	8,000	15,000	3,500	7,000	7,500	800	7,500	800	6,500	12,000	4,500	8,500									
Gross Income(Ksh/ha)	31,720	0	20,870	25,600	112,000	151,500	104,300	36,400	151,500	16,000	173,550	0	77,400	83,750										
Cost of Production(Ksh/ha)	16,407	0	11,144	7,218	68,824	10,378	19,657	10,557	21,258	4,255	29,807		13,308	7,931										
Net Return(Ksh/ha)	15,313	0	9,726	18,382	43,176	141,124	84,643	25,843	130,242	11,745	143,743		64,094	75,819										
Planted Area(he)	28.92	0.00	32.08	3.21	7.21	2.40	0.32	1.92	1.80	0.18	0.00	47.11	6.41											
Total Net Return(1,000 Ksh)	443	0	305	59	311	453	203	8	250	19	23	0	3,019	358										
III. Incremental Benefits(1,000 Ksh)	-204	0	35	21	45	132	51	2	1	2	-3	0	-1,510	-158										
(B) Irrigated Areas																								
I. Without Project																								
Unit price(Ksh/kg)	0.0	10.3	31.8	3.2	14.0	10.1	28.8	5.2	20.2	20.0	26.7	17.2	7.5											
Yield(kg/ha)	0	3,000	700	8,000	8,500	14,000	3,500	0	8,500	0	7,000	13,000	0	0										
Gross Income(Ksh/ha)	0	30,900	22,260	25,600	119,000	141,400	104,300	0	171,700	0	188,900	0	0	0										
Cost of Production(Ksh/ha)	0	8,486	11,144	7,488	74,112	10,378	19,737	0	22,541	0	30,838	0	0	0										
Net Return(Ksh/ha)	0	22,414	11,116	18,112	44,988	131,024	84,563	0	149,159	0	158,061	0	0	0										
Planted Area(he)	0.00	0.55	0.00	1.45	1.64	0.55	1.45	0.00	0.91	0.00	0.73	1.87	0.00	0.00										
Total Net Return(1,000 Ksh)	0	12	0	28	74	72	123	0	136	0	114	0	0	0										
II. With Project																								
Unit price(Ksh/kg)	9.5/31.8	10.3	31.8	3.2	14.0	10.1	28.8	5.2	20.2	20.0	26.7	17.2	7.5											
Yield(kg/ha)	4,000	750	12,000	10,000	16,000	4,000	4,000	8,500	10,000	0	7,500	15,000	5,500	10,000										
Gross Income(Ksh/ha)	40,455	4,200	23,850	38,400	140,000	161,600	119,200	44,200	202,000	0	200,250	0	94,600	75,000										
Cost of Production(Ksh/ha)	17,075	6,880	11,507	10,939	86,773	11,959	20,123	14,459	32,273	0	36,365	0	20,357	11,491										
Net Return(Ksh/ha)	23,380	31,320	12,343	27,461	53,227	149,641	99,077	29,741	169,727	0	163,885	0	74,243	63,509										
Planted Area(he)	28.80	2.80	5.60	9.00	6.80	3.90	1.40	2.80	1.80	0.00	0.80	1.80	22.40	2.80										
Total Net Return(1,000 Ksh)	997	88	69	90	362	584	139	83	272	0	131	0	1,663	178										
III. Incremental Benefits(1,000 Ksh)	887	75	69	53	288	512	16	83	136	0	17	0	1,663	178										
(C) Incremental Benefits(1,000 Ksh)																								
	493	75	102	75	333	644	67	85	137	2	14	0	153	22										

Table S.2.3-22 Project Cost (Nkunjumo)

	Financial Cost(Ksh)		Economic Cost(Ksh)	
	Total Cost	Of Which, Private Sector	Total Cost	Total Cost
1. Construction cost				
1) Irrigation & drainage improvement	5,455,106	5,455,106	5,095,069	
2) Marketing improvement	286,600,000	0	0	
3) Access roads improvement	0	0	0	
4) Village/farm roads improvement	1,425,000	0	1,330,950	
5) Rural water supply improvement	0	0	0	
Sub-Total	293,480,106	5,455,106	6,426,019	
2. Community Development & Supporting Services				
1) Agricultural support services	10,640,000	0	9,937,760	
2) Community development	7,086,000	0	6,618,324	
3) Water management services	1,960,000	0	1,830,640	
4) Marketing support services	21,280,000	0	354,920	
5) Public health services	0	0	0	
Sub-Total	40,966,000	0	18,741,644	
3. Associated Cost				
1) Pre-engineering cost	8,697,750	0	0	
2) Administration cost	10,484,226	0	1,668,569	
3) Consulting services	11,292,610	545,510	2,383,671	
Sub-Total	30,474,586	545,510	4,052,239	
4. Physical Contingency	15,018,010	545,510	509,506	
Total	379,938,702	6,546,126	29,729,409	

Note: Construction cost and associated cost for the marketing improvement are excluded.

Table S.2.3-23 Operation and Maintenance Cost (Nkunjumo)

	Financial Cost	Economic Cost
Annual Operation and Maintenance Cost		
1) Irrigation & drainage facilities	109,000	101,806
2) Marketing facilities	0	0
3) Access roads	0	0
4) Village/farm roads	62,000	57,908
5) Rural water supply facilities	0	0
Total	171,000	159,714

Table S.2.3-24 Calculation of EIRR

- Nkunjumo -

(Unit:1,000 Ksh)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Value by Discount Rate					
						Interest= 0.16		Interest= 0.10		Interest= 0.12	
						Cost	Benefit	Cost	Benefit	Cost	Benefit
1	238	160	398	1,102	704	398	1,102	398	1,102	398	1,102
2	13,735	160	13,895	1,322	-12,573	10,326	982	11,483	1,092	11,077	1,054
3	13,140	160	13,300	1,322	-11,978	8,521	847	9,993	993	9,467	941
4	713	160	873	1,762	889	482	973	597	1,204	555	1,120
5	624	160	784	2,203	1,419	373	1,049	487	1,368	445	1,250
6	624	160	784	2,203	1,419	322	904	443	1,244	397	1,116
7	654	160	814	2,203	1,389	288	779	418	1,130	368	997
8	0	160	160	2,203	2,043	49	672	75	1,028	65	890
9	0	160	160	2,203	2,043	42	579	68	934	58	794
10	0	160	160	2,203	2,043	36	499	62	849	52	709
11	0	160	160	2,203	2,043	31	431	56	772	46	633
12	0	160	160	2,203	2,043	27	371	51	702	41	565
13	0	160	160	2,203	2,043	23	320	46	638	37	505
14	0	160	160	2,203	2,043	20	276	42	580	33	451
15	0	160	160	2,203	2,043	17	238	38	527	29	402
16	0	160	160	2,203	2,043	15	205	35	479	26	359
17	0	160	160	2,203	2,043	13	177	32	436	23	321
18	0	160	160	2,203	2,043	11	152	29	396	21	286
19	0	160	160	2,203	2,043	10	131	26	360	19	256
20	0	160	160	2,203	2,043	8	113	24	327	17	228
21	0	160	160	2,203	2,043	7	98	22	298	15	204
22	0	160	160	2,203	2,043	6	84	20	271	13	182
23	0	160	160	2,203	2,043	5	73	18	246	12	163
24	0	160	160	2,203	2,043	5	63	16	224	11	145
25	0	160	160	2,203	2,043	4	54	15	203	9	130
26	0	160	160	2,203	2,043	3	46	13	185	8	116
27	0	160	160	2,203	2,043	3	40	12	168	8	103
28	0	160	160	2,203	2,043	3	35	11	153	7	92
29	0	160	160	2,203	2,043	2	30	10	138	6	82
30	0	160	160	2,203	2,043	2	26	9	126	5	74
Total	29,729	4,800	34,529	62,786	28,257	21,053	11,348	24,547	18,175	23,266	15,270

EIRR= 5.92 %

B/C Ratio= 16 % 0.54
 B/C Ratio= 10 % 0.74
 B/C Ratio= 12 % 0.66

Table S.2.3-25 Financial Analysis for Typical Farms (Nkunjumo)

1. Small Farm size: 1.10 ha

Without Project

	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production (Ksh)	Net Return (Ksh)
Maize/Beans	0.45	1,750	788	10.5	8,274		
Beans/Maize	0.45	300	135	31.8	4,293	9,685	2,882
Beans	0.24	600	144	31.8	4,579	3,149	1,430
Cabbage	0.03	10,000	300	10.1	3,030	403	2,627
Potatoes	0.05	7,500	375	14.0	5,250	3,900	1,350
Other Vegetables	0.07	3,000	210	23.7	4,977	1,828	3,149
Coffee	0.51	4,500	2,295	14.3	32,819	9,990	22,829
Banana	0.06	8,500	510	7.5	3,825	625	3,200
Total	1.41						37,467
1. Crop Income(Ksh/year)							37,467
2. Animal Income(Ksh/year)							3,890
3. Off-Farm Income(Ksh/year)							15,315
4. Living Expense(Ksh/year)-family size 7.4persons/family							42,020
5. Disposable Income(Ksh/year)							14,652

With Project

i. Rainfed Area

	Planted Area(ha)	Yield (kg/ha)	Production (kg/ha)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production (Ksh)	Net Return (Ksh)
Maize/Beans	0.30	2,000	600	10.5	6,300		
Beans/Maize	0.30	400	120	31.8	3,816	6,698	3,418
Beans	0.34	650	221	31.8	7,028	4,623	2,405
Potatoes	0.08	8,000	640	14.0	8,960	6,429	2,531
Cabbage	0.03	15,000	450	10.1	4,545	447	4,098
Other Vegetables	0.10	3,500	350	23.7	8,295	2,636	5,659
Coffee	0.50	4,500	2,250	14.3	32,175	10,520	21,655
Banana	0.07	8,500	595	7.5	4,463	751	3,712
Sub-Total	1.42						43,478

ii. Irrigated Area

Maize/Beans	0.21	2,250	473	10.5	4,967		
Beans/Maize	0.21	600	126	31.8	4,007	4,888	4,105
Beans	0.04	750	30	31.8	954	561	393
Potatoes	0.05	10,000	500	14.0	7,000	4,977	2,023
Other Vegetables	0.13	4,000	520	23.7	12,324	3,518	8,806
Coffee	0.16	5,500	880	14.3	12,584	4,672	7,912
Banana	0.02	10,000	200	7.5	1,500	295	1,215
Sub-Total	0.61						24,454
1. Total Crop Income(Ksh/year)							67,932
2. Animal Income(Ksh/year)							3,890
3. Off-Farm Income(Ksh/year)							15,315
4. Living Expense(Ksh/year)-family size 7.4persons/family							42,020
5. Disposable Income(Ksh/year)							45,117

Table S.2.3-26 Cost Recovery (Nkunjumo)

Case-1 Present condition	Excluding Map Preparation	Including Map Prep.
1) Number of beneficiaries	140 farm households	
2) Total project cost to be paid by the beneficiaries of which, irrigation facilities	379,938,702 Ksh 6,546,126 Ksh	7,309,839
3) Loan per farm household	46,758 Ksh	52,213
4) Repayment Period(years)	4 48 (months)	
5) Annual interest rate(%)	16 per year	
6) Monthly interest ratre(%)	1.33 (16/12)	
7) Monthly repayment(Ksh)	1,325 Ksh/month	1,480

Alternative Plans for Loan Repayment

Case-2		
1) Loan per farm household(Ksh)	46,758	52,213
2) Repayment Period(years)	6 72 (months)	
3) Annual interest rate(%)	12 per year	
4) Monthly interest ratre(%)	1.00 (12/12)	
5) Monthly repayment(Ksh)	914 Ksh/month	1,021
Case-3		
1) Loan per farm household(Ksh)	46,758	52,213
2) Repayment Period(years)	8 96 (months)	
3) Annual interest rate(%)	10 per year	
4) Monthly interest ratre(%)	0.83 (10/12)	
5) Monthly repayment(Ksh)	710 Ksh/month	792
Case-4		
1) Loan per farm household(Ksh)	46,758	52,213
2) Repayment Period(years)	10 120 (months)	
3) Annual interest rate(%)	5 per year	
4) Monthly interest ratre(%)	0.42 (5/12)	
5) Monthly repayment(Ksh)	496 Ksh/month	554
Case-5		
1) Loan per farm household(Ksh)	46,758	52,213
2) Repayment Period(years)	4 48 (months)	
3) Annual interest rate(%)	30 per year	
4) Monthly interest ratre(%)	2.50 (30/12)	
5) Monthly repayment(Ksh)	1,684 Ksh/month	1,880

Repayment under the Current Situation(Nkunjumo)

Case-6	
1) Loan per farm household	46,758 Ksh
2) Repayment Period(years)	4 (48 months)
3) Annual interest rate(%)	16 (% per year)
4) Monthly interest ratre(%)	1.33 (16/12)
5) Monthly repayment(Ksh)	1,325 (Ksh/month)
6) Monthly repayment and disposable income(Ksh)	

	Repayment	Disposable Income
1st year	1,325	350 (farm economic survey 1998)
2nd year	1,325	1,880
3rd year	1,325	2,600
4th year	1,325	3,760

Table S.2.3-27 Estimation of Water Charge (Nkunjumo)

(Unit:Ksh)

Year	Present Value by Discount Rate																	
	Initial Cost	O & M Cost	Reple- ment Cost	Total	Int= 0.16				Int= 0.15				Int= 0.20					
					Initial Cost	O&M Cost	Repleo- ment	Total	Initial Cost	O&M Cost	Repleo- ment	Total	Initial Cost	O&M Cost	Repleo- ment	Total		
1	0	109,000	0	109,000	0	109,000	0	109,000	0	109,000	0	109,000	0	109,000	0	109,000	0	109,000
2	3,273,063	109,000	0	3,382,063	2,432,418	81,005	0	2,513,424	2,474,906	82,420	0	2,557,326	2,272,960	75,894	0	2,348,855	0	2,348,855
3	3,273,063	109,000	0	3,382,063	2,096,913	69,832	0	2,166,745	2,152,082	71,689	0	2,223,761	1,894,134	63,079	0	1,957,212	0	1,957,212
4	0	109,000	0	109,000	0	60,200	0	60,200	0	62,321	0	62,321	0	52,568	0	52,568	0	52,568
5	0	109,000	0	109,000	0	51,896	0	51,896	0	54,192	0	54,192	0	43,805	0	43,805	0	43,805
6	0	109,000	0	109,000	0	44,738	0	44,738	0	47,124	0	47,124	0	36,504	0	36,504	0	36,504
7	0	109,000	0	109,000	0	38,567	0	38,567	0	40,977	0	40,977	0	30,420	0	30,420	0	30,420
8	0	109,000	0	109,000	0	33,248	0	33,248	0	35,632	0	35,632	0	25,350	0	25,350	0	25,350
9	0	109,000	0	109,000	0	28,982	0	28,982	0	30,985	0	30,985	0	21,125	0	21,125	0	21,125
10	0	109,000	0	109,000	0	24,709	0	24,709	0	26,943	0	26,943	0	17,604	0	17,604	0	17,604
11	0	109,000	0	109,000	0	21,300	0	21,300	0	23,429	0	23,429	0	14,670	0	14,670	0	14,670
12	0	109,000	0	109,000	0	18,362	0	18,362	0	20,373	0	20,373	0	12,225	0	12,225	0	12,225
13	0	109,000	0	109,000	0	15,830	0	15,830	0	17,716	0	17,716	0	10,188	0	10,188	0	10,188
14	0	109,000	0	109,000	0	13,646	0	13,646	0	15,405	0	15,405	0	8,490	0	8,490	0	8,490
15	0	109,000	0	109,000	0	11,764	0	11,764	0	13,395	0	13,395	0	7,075	0	7,075	0	7,075
16	0	109,000	0	109,000	0	10,141	0	10,141	0	11,648	0	11,648	0	5,896	0	5,896	0	5,896
17	0	109,000	0	109,000	0	8,743	0	8,743	0	10,129	0	10,129	0	4,913	0	4,913	0	4,913
18	0	109,000	0	109,000	0	7,537	0	7,537	0	8,806	0	8,806	0	4,094	0	4,094	0	4,094
19	0	109,000	0	109,000	0	6,497	0	6,497	0	7,659	0	7,659	0	3,412	0	3,412	0	3,412
20	0	109,000	0	109,000	0	5,801	0	5,801	0	6,660	0	6,660	0	2,843	0	2,843	0	2,843
21	0	109,000	0	109,000	0	4,828	0	4,828	0	5,791	0	5,791	0	2,369	0	2,369	0	2,369
22	0	109,000	0	109,000	0	4,182	0	4,182	0	5,036	0	5,036	0	1,974	0	1,974	0	1,974
23	0	109,000	0	109,000	0	3,588	0	3,588	0	4,379	0	4,379	0	1,645	0	1,645	0	1,645
24	0	109,000	0	109,000	0	3,093	0	3,093	0	3,808	0	3,808	0	1,371	0	1,371	0	1,371
25	0	109,000	0	109,000	0	2,667	0	2,667	0	3,311	0	3,311	0	1,143	0	1,143	0	1,143
26	0	109,000	0	109,000	0	2,299	0	2,299	0	2,879	0	2,879	0	952	0	952	0	952
27	0	109,000	0	109,000	0	1,982	0	1,982	0	2,504	0	2,504	0	793	0	793	0	793
28	0	109,000	0	109,000	0	1,708	0	1,708	0	2,177	0	2,177	0	661	0	661	0	661
29	0	109,000	0	109,000	0	1,473	0	1,473	0	1,893	0	1,893	0	551	0	551	0	551
30	0	109,000	0	109,000	0	1,270	0	1,270	0	1,646	0	1,646	0	459	0	459	0	459
Total	6,546,128	3,270,000	0	9,816,128	4,529,332	688,349	0	5,217,881	4,626,998	729,909	0	5,356,907	4,167,094	560,871	0	4,727,965	0	4,727,965

Annual 218,204 109,000 0 327,204 150,978 22,945 0 173,923 154,233 24,330 0 178,564 138,903 18,696 0 157,599

Water Charge

	Interest 0.16	Interest 0.15	Interest 0.20
a. Annual Water Intake	589,100 m ³ /year		
b. Cost	Present Value	Present Value	Present Value
b.1 Cost per year at financial price	150,978	154,233	138,903
b.2 Annual O&M cost at financial price	22,945	24,330	18,696
b.3 Replacement cost at financial price	0	0	0
Total	173,923	178,564	157,599
c. Water Charge			
c.1 per cubic meter	0.295235 Ksh	0.303112 Ksh	0.267525 Ksh
c.2 per ha/year	3,106 Ksh	3,189 Ksh	2,814 Ksh
c.3 ha/month	259 Ksh	266 Ksh	235 Ksh

Table S.2.4-1 Farmgate Prices at Ruungu / Karocho

	Unit	Unit Price(Ksh)	
		Financial	Economic
1. Crops			
Maize	kg	15.0	9.5
Millet	kg	10.0	10.0
Sorgum	kg	6.9	6.9
Beans	kg	27.1	27.1
French Beans	kg	24.0	29.8
Cowpeas	kg	16.5	16.5
Pigeon Peas	kg	23.5	23.5
Irish Potatoes	kg	20.0	20.0
Cotton	kg	10.0	10.0
Sweet Potatoes	kg	5.0	5.0
Bulb Onions	kg	25.0	25.0
Tomatoes	kg	25.0	20.2
Okra	kg	23.0	22.4
Banana	Bunch	150.0	150.0
Green grams	kg	21.5	21.5
Milk	kg	17.7	17.7
Macadamia nut	kg	30.0	30.0
Avocado	kg	10.0	10.0
Mangoes	kg	15.0	15.0
2. Seed			
Maize	kg	85	80
French Beans	kg	500	467
Okra	kg	300	280
Tomatoes	kg	6,400	5,978
Kale	kg	1,000	934
3. Fertilizer			
Nitrogen	kg	28.0	27.4
Phosphate	kg	20.0	24.3
Potassium	kg	24.0	16.4
4. Agricultural Chemicals			
Dimethoate	lit.	800	747
Sancozeb	kg	950	887
Karate	lit.	1,300	1,214
5. Labour			
Labour	MD	60	30
Animal Labour	MAD	1,500	750
6. Nursery			
Banana	plant	50	50
Papaya	plant	40	40
Passion fruit	plant	50	50
Macadamia nut	plant	60	60
Cashew nut	plant	60	60

Source: Farm Economic Survey (JICA) 1998
and interview survey to stockists

Table S.2.4-2 Standard Conversion Factor (SCF)

	(unit:1,000 K.Pound)							
	1989/90	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	Average
(1)Imports	2,545,630	2,645,913	2,945,863	5,056,419	5,753,988	7,758,420	8,424,310	5,018,649
(2)Exports	1,244,010	1,629,467	1,742,268	3,678,247	4,282,132	4,866,950	5,910,000	3,336,153
(3)Import Duties	347,968	334,680	255,939	459,150	739,639	929,910	1,058,780	589,438
(4)Export Duties	729	70	740	222	130	0	0	270
(5)Subsidy on Exports	0	0	0	0	0	0	0	0
(6)=(1)+(2)	3,789,640	4,275,380	4,688,131	8,734,666	10,036,120	12,625,370	14,334,310	8,354,802
(7)=(1)+(2)+(3)-(4)+(5)	4,136,879	4,609,990	4,943,330	9,193,594	10,775,629	13,555,280	15,393,090	8,943,970
(8)SCF=(6)/(7)	0.916	0.927	0.948	0.950	0.931	0.931	0.931	0.934

Source:Economic Survey 1997

Statistical Abstract 1995

Table S.2.4-3 Price Structure of Maize (economic)

1. Projected 2010 world market price(\$/ton in 1990 price)	94.9
2. Projected 2010 world market price(\$/ton in 1998 price)	104.6
3. Quality adjustment(%)	90
4. World market equivalent(US\$/ton)	94
5. Freight and insurance(US\$/ton)	40
6. CIF Monbasa(US\$/ton)	134
7. Unloading and port handling(US\$/ton)	9
8. Value Kenya border	
- in US\$	143
- in Ksh(61.19Ksh/US\$)	8,750
9. Domestic handling, transport, margin(Ksh/ton)	831
10. Processing ratio(%)	100
11. Wholesale price(Ksh/ton)	9,581
12. Transport to/from farm(Ksh/ton)	103
13. Farmgate price(Ksh/ton)	9,478

Source:Commodity markets and the developing countries February 1998,
World Bank

Table S.2.4-4 Price Structure of Fertilizer (economic)

	Urea	TSP	Muriate of Potash
1. Projected 2010 World market price(\$/ton in 1990 price)	131.8	106.7	90.3
2. Projected 2010 World market price(\$/ton in 1998 price)	145.3	117.6	99.5
3. Freight and insurance(US\$/ton)	40	40	40
4. CIF Monbasa(US\$/ton)	185.3	157.6	139.5
5. Unloading and port handling(US\$/ton)	9	9	9
6. Value Kenya border			
- in US\$	194.3	166.6	148.5
- in Ksh(61.19Ksh/US\$)	11,889	10,194	9,086
7. Domestic handling, transport, margin(Ksh/ton)	831	831	831
8. Wholesale price(Ksh/ton)	12,720	11,025	9,917
9. Transport to/from farm(Ksh/ton)	103	103	103
10. Farmgate price(Ksh/ton)	12,617	10,922	9,814
11. Farmgate price in nutrient(Ksh/kg)	27.4	24.3	16.4

Source:Commodity markets and the developing countries, February 1998, World Bank

Table S.2.4-5 Economic Price of Vegetables

	French Beans	Okra
1. FOB Price	75.00	58.00
2. Handling charge	3.50	3.50
3. Expoter's revenue	24.00	15.00
4. Grading & packing cost	9.34	8.73
5. Transportation cost	8.41	8.41
6. Farmgate price	29.75	22.36

Source. HCDA

	Carrots	Tomatoes
1. FOB Price	48.00	56.00
2. Handling charge	3.69	3.69
3. Expoter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	8.41	8.41
6. Farmgate price	18.63	20.23

Source. HCDA

	Eggplant	Bitter Gourd
1. FOB Price	42.00	65.00
2. Handling charge	3.69	3.69
3. Expoter's revenue	14.00	19.00
4. Grading & packing cost	3.27	4.67
5. Transportation cost	8.41	8.41
6. Farmgate price	12.63	29.23

Source. HCDA

Table S.2.4-6 Crop Selection for Ruungu Karocho

	Staple Food	Demand		Suitability for Climate	Suitability for Soil	Suitability for Land Form	Profitability per Hectare	Storability	Stability of Price	Farmer's Experience	Suitability for Rainfed Farming	Necessity for Irrigation	Total
		Exporting	Local Consumption										
Maize	3	0	3	3	2	3	2	3	3	3	2	3	30
Millet	3	0	2	3	3	3	2	3	1	3	3	2	27
Sorghum	2	0	1	3	3	3	2	3	3	3	3	3	27
French Beans	0	3	0	2	2	3	3	0	3	0	1	3	20
Okra	0	2	0	3	2	3	3	0	3	0	2	2	20
Chillies	0	2	1	3	3	3	2	3	1	0	2	2	22
Bitter Gourd	0	2	0	3	2	3	2	0	2	0	1	3	18
Aubergines	0	2	0	3	2	3	2	0	2	0	1	3	18
Carrots	1	0	2	2	2	3	3	2	2	1	1	3	22
Tomatoes	3	0	3	3	2	3	3	0	1	1	1	3	23
Bulb Onions	3	0	3	3	2	3	2	3	1	1	1	3	25
Sweet Potatoes	2	0	3	2	2	3	2	2	3	2	1	3	25
Kales	3	0	3	2	2	3	2	0	1	2	1	3	22
Beans	3	0	3	2	2	3	2	3	3	2	2	2	27
Pigeon Peas	2	0	2	3	3	3	2	3	3	3	3	1	28
Green Grams	2	0	2	3	3	3	2	3	2	3	3	1	27
Cow Peas	3	0	2	3	3	3	2	3	2	2	3	2	29
Cotton	0	0	1	3	3	3	2	3	2	3	3	1	24
Tobacco	0	3	3	3	3	3	3	3	3	1	1	2	25
Papaya	1	0	2	3	2	3	2	0	3	3	2	1	22
Bananas	2	0	3	3	1	3	2	1	1	2	2	2	22
Mangoes	1	2	2	3	2	3	2	0	1	2	3	1	22
Macadamia Nut	0	3	0	1	2	3	3	3	3	1	1	3	23
Cashew Nut	0	2	0	3	3	3	3	3	3	2	3	1	26

Table S.2.4-7 Cost Budget (Maize)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Maize

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	85	100	8,500	100	8,500	100	8,500	100	8,500
Fertilizer:N	kg	28.0	0.0	0	0.0	0	2.2	62	4.0	112
P	kg	20.0	0.0	0	0.0	0	4.9	98	5.0	100
K	kg	24.0	0.0	0	0.0	0	0.0	0	4.0	96
Chemicals:	kg	800	0	0	0	0	0	0	1.6	1,280
Gunny bags	pieces	40	10	400	13	520	20	800	25	1,000
Labour Costs	MD	60	80	4,800	82	4,920	100	6,000	110	6,600
Irrigation	ha	210	0	0	0	0	0	0	0	210
Miscellaneous(5% of total)				721		734		814		942
Total Costs				14,421		14,674		16,273		18,840
2. Gross Income										
a. Main Product	kg	15.0	1,000	15,000	1,250	18,750	2,000	30,000	2,500	37,500
3. Net Profit	Kshs			579		4,076		13,727		18,660

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Maize

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs										
Seeds	kg	80	100	8,000	100	8,000	100	8,000	100	8,000
Fertilizer:N	kg	27.4	0.0	0	0.0	0	2.2	60	4.0	110
P	kg	24.3	0.0	0	0.0	0	4.9	119	5.0	122
K	kg	16.4	0.0	0	0.0	0	0.0	0	4.0	66
Chemicals:	kg	747	0	0	0	0	0	0	1.6	1,195
Gunny bags	pieces	40	10	400	13	520	20	800	25	1,000
Labour Costs	MD	30	75	2,250	80	2,400	85	2,550	110	3,300
Irrigation	ha	210	0	0	0	0	0	0	0	210
Miscellaneous(5% of total)				561		575		607		737
Total Costs				11,211		11,495		12,136		14,739
2. Gross Income										
a. Main Product	kg	9.5	1,000	9,500	1,250	11,875	2,000	19,000	2,500	23,750
3. Net Profit	Kshs			-1,711		380		6,864		9,011

Table S.2.4-8 Cost Budget (Pulses)

Cost and return of Crops(financial)

Site:Ruungu

Crop:Pulses

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seed	kg	27	25	675	25	675	25	675	25	675
Fertilizer:N	kg	28.0	0	0	0	0	0	0	25	700
P	kg	20.0	0	0	0	0	0	0	30	600
K	kg	24.0	0	0	0	0	0	0	0	0
Manure	kg	1	0	0	1,000	1,000	1,000	1,000	2,000	2,000
Labour Costs	MD	60	60	3,600	62	0	65	3,900	70	4,200
Irrigation	ha	210		0		0		0		210
Miscellaneous(5% of total)				225		88		293		441
Total Costs				4,500		1,763		5,868		8,826
2. Gross Income										
a. Main Product	kg	21.5	300	6,450	450	9,675	600	12,900	800	17,200
3. Net Profit	Kshs			1,950		7,912		7,032		8,374

Cost and return of Crops(economic)

Site:Ruungu

Crop:Pulses

(unit:per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with Project		without Project		with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seed	kg	27	25	675	25	675	25	675	25	675
Fertilizer:N	kg	27.4	0	0	0	0	0	0	25	685
P	kg	24.3	0	0	0	0	0	0	30	729
K	kg	16.4	0	0	0	0	0	0	0	0
Manure	kg	1	0	0	1,000	1,000	1,000	1,000	2,000	2,000
Labour Costs	MD	30	60	1,800	62	1,860	65	1,950	70	2,100
Irrigation	ha	210		0		0		0		210
Miscellaneous(5% of total)				130		186		191		337
Total Costs				2,605		3,721		3,816		6,736
2. Gross Income										
a. Main Product	kg	21.5	300	6,450	450	9,675	600	12,900	800	17,200
3. Net Profit	Kshs			3,845		5,954		9,084		10,464

Table S.2.4-9 Cost Budget (Millet)

Cost and Return of Crops (financial)

Site: Ruwengu

Crop: Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with project		without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	10	4.0	40	4.0	40			4.0	40
Fertilizer: N	kg	28.0	0.0	0	0.0	0			2.0	56
P	kg	20.0	0.0	0	0.0	0			4.5	90
K	kg	24.0	0.0	0	0.0	0			0.0	0
Manure	kg	1	200	200	250	250			250	250
Chemicals	kg	800	0	0	0	0			0	0
Gunny bags	piece	40	4	160	5	200			8	320
Labour Costs	ND	80	50	3,900	50	3,900			70	4,200
Irrigation	ha	210		0		0				210
Miscellaneous (5% of total)				179		184				272
Total Costs				3,579		3,674				5,438
2. Gross Income										
a. Main Product	kg	10.0	400	4,000	450	4,500			750	7,500
3. Net Profit	Kshs			421		826				2,062

Cost and Return of Crops (economic)

Site: Ruwengu

Crop: Millet

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated			
			without Project		with project		without Project		with project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs										
Seeds	kg	10	4.0	40	4.0	40			4.0	40
Fertilizer: N	kg	27.4	0.0	0	0.0	0			2.0	55
P	kg	24.3	0.0	0	0.0	0			4.5	109
K	kg	16.4	0.0	0	0.0	0			0.0	0
Manure	kg	1	200	200	250	250			250	250
Chemicals	kg	747	0	0	0	0			0	0
Gunny bags	piece	40	4	160	5	200			8	320
Labour Costs	ND	30	50	1,500	50	1,500			70	2,100
Irrigation	ha	210		0		0				210
Miscellaneous (5% of total)				100		105				162
Total Costs				2,000		2,095				3,248
2. Gross Income										
a. Main Product	kg	10.0	400	4,000	450	4,500			750	7,500
3. Net Profit	Kshs			2,000		2,405				4,254

Table S.2.4-10 Cost Budget (Sorghum)

Cost and Return of Crops (financial)

Site: Ruungu
Crop: Sorghum

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated				
			without Project		with project		without Project		with project		
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	
1. Costs											
Seeds	kg	10	4.0	40	4.0	40					
Fertilizer:N	kg	28.0	0.0	0	0.0	0					
P	kg	20.0	0.0	0	0.0	0					
K	kg	24.0	0.0	0	0.0	0					
Manure	kg	1	100	100	150	150					
Chemicals	kg	800	0	0	0	0					
Gunny bags	piece	40	6	240	7	280					
Labour Costs	MD	60	70	4,200	75	4,500					
Irrigation	ha	210	0	0	0	0					
Miscellaneous (5% of total)				241		282					
Total Costs				4,821		5,232					
2. Gross Income											
a. Main Product	kg	6.9	750	5,175	850	5,865					
3. Net Profit	Kshs			354		633					

Cost and Return of Crops (economic)

Site: Ruungu
Crop: Sorghum

(per ha)

	Unit	Unit Price (Kshs)	Rainfed				Irrigated				
			without Project		with project		without Project		with project		
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	
1. Costs											
Seeds	kg	10	4.0	40	4.0	40					
Fertilizer:N	kg	27.4	0.0	0	0.0	0					
P	kg	24.3	0.0	0	0.0	0					
K	kg	16.4	0.0	0	0.0	0					
Manure	kg	1	100	100	150	150					
Chemicals	kg	747	0	0	0	0					
Gunny bags	piece	40	6	240	7	280					
Labour Costs	MD	30	70	2,100	75	2,250					
Irrigation	ha	210	0	0	0	0					
Miscellaneous (5% of total)				131		143					
Total Costs				2,611		2,863					
2. Gross Income											
a. Main Product	kg	6.9	750	5,175	850	5,865					
3. Net Profit	Kshs			2,564		3,002					

Table S.2.4-11 Cost Budget (Cotton)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Cotton

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	20	22.5	450		
Fertilizer:N	kg	28.0	30	840		
P	kg	20.0	30	600		
K	kg	24.0	0	0		
Chemicals	lit.	800	0.5	400		
Labour Costs	MD	60	100	6,000		
Miscellaneous(5% of total)				436		
Total Costs				8,726		
2. Gross Income						
a. Main Product	kg	10.0	1,000	10,000		
3. Net Profit	Kshs			1,274		

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Cotton

(per ha)

	Unit	Unit Price (Kshs)	Rainfed			
			without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	20	22.5	450		
Fertilizer:N	kg	27.4	30	822		
P	kg	24.3	30	729		
K	kg	16.4	0	0		
Chemicals	lit.	747	0.5	374		
Labour Costs	MD	30	100	3,000		
Miscellaneous(5% of total)				283		
Total Costs				5,657		
2. Gross Income						
a. Main Product	kg	10.0	1,000	10,000		
3. Net Profit	Kshs			4,343		

Table S.2.4-12 Cost Budget (Sweet Potatoes)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed		Irrigated	
			without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	3.5			400	1,400
Fertilizer:N	kg	28.0			50	1,400
P		20.0			50	1,000
K		24.0			0	0
Manure	kg	1			2,000	2,000
Chemicals:	kg	800			1	800
Gunny bags	piece	40			9	360
Labour Costs	MD	60			120	7,200
Irrigation	ha					210
Miscellaneous (5% of total)						756
Total Costs						15,126
2. Gross Income						
a. Main Product	kg	5.0			8,500	42,500
3. Net Profit	Kshs					27,374

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Sweet Potatoes

	Unit	Unit Price (Kshs)	Rainfed		Irrigated	
			without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	3.5			400	1,400
Fertilizer:N	kg	27.4			50	1,370
P		24.3			50	1,215
K		16.4			0	0
Manure	kg	1			2,000	2,000
Chemicals:	kg	747			1	747
Gunny bags	piece	40			85	3,400
Labour Costs	MD	30			120	3,600
Irrigation	ha					210
Miscellaneous (5% of total)						734
Total Costs						14,676
2. Gross Income						
a. Main Product	kg	5.0			8,500	42,500
3. Net Profit	Kshs					27,824

Table S.2.4-13 Cost Budget (Onion)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Onion

	Unit	Unit Price (Kshs)	Irrigated			
			withput Project		with Project	
			Quant- ity	Value (Kshs)	Quant- ity	Value (Kshs)
1. Costs						
Seeds	kg	4,400			5	22,000
Fertilizer:N	kg	28			41	1,148
P	kg	20			46	920
K	kg	24			0	0
Manure	kg	1			3,000	3,000
Chemicals	kg	1,300			5	6,500
Labour Costs	MD	60			155	9,300
Irrigation	ha					210
Miscellaneous(5% of total)						2,267
Total Costs						45,345
2. Gross Income						
a. Main Product	kg	25			7,000	175,000
3. Net Profit	Kshs					129,655

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Onion

	Unit	Unit Price (Kshs)	Irrigated			
			withput Project		with Project	
			Quant- ity	Value (Kshs)	Quant- ity	Value (Kshs)
1. Costs						
Seeds	kg	4,149			5	20,745
Fertilizer:N	kg	27.4			50	1,370
P	kg	24.3			50	1,215
K	kg	16.4			0	0
Manure	kg	1			5,000	5,000
Chemicals	kg	1,214			5	6,070
Labour Costs	MD	30			160	4,800
Irrigation	ha					210
Miscellaneous(5% of total)						2,074
Total Costs						41,484
2. Gross Income						
a. Main Product	kg	25			7,000	175,000
3. Net Profit	Kshs					133,516

Table S.2.4-14 Cost Budget (Tomato)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Tomato

	Unit	Unit Price (Kshs)	without Project		Irrigated with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds:	kg	6,400			0.25	1,600
Fertilizer:N	kg	28.0			30.0	840
P		20.0			30.0	600
K		24.0			0	0
Manure	kg	1			15,000	15,000
Chemicals:	kg	1,300			7	9,100
Labour Costs	MD	60			160	9,600
Irrigation	ha					210
Miscellaneous (5% of total)						1,945
Total Costs						38,895
2. Gross Income						
a. Main Product:	kg	25.0			12,000	300,000
3. Net Profit	Kshs					261,105

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Tomato

	Unit	Unit Price (Kshs)	without Project		Irrigated with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds:	kg	5,978			0.25	1,495
Fertilizer:N	kg	27.4			30.0	822
P		24.3			30.0	729
K		16.4			0	0
Manure	kg	1			15,000	15,000
Chemicals:	kg	1,214			7	8,498
Labour Costs	MD	30			160	4,800
Irrigation	ha					210
Miscellaneous (5% of total)						1,661
Total Costs						33,214
2. Gross Income						
a. Main Product:	kg	20.2			12,000	242,400
3. Net Profit	Kshs					209,186

Table S.2.4-15 Cost Budget (Tobacco)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Tobacco(irrigated)

(per ha)

	Unit	Unit Price (Kshs)	without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	100			2.5	250
Fertilizer:N	kg	28.0			30	840
P	kg	20.0			90	1,800
K	kg	24.0			100	2,400
Chemicals	lit.	800			2.7	2,160
Labour Costs	MD	60			250	15,000
Irrigation	ha					210
Miscellaneous(5% of total)						1,193
Total Costs						23,853
2. Gross Income						
a. Main Product	kg	50.0			750	37,500
3. Net Profit	Kshs					13,647

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Tobacco(irrigated)

(per ha)

	Unit	Unit Price (Kshs)	without Project		with Project	
			Quantity	Value (Kshs)	Quantity	Value (Kshs)
1. Costs						
Seeds	kg	93.4			2.5	234
Fertilizer:N	kg	27.4			30	822
P	kg	24.3			90	2,187
K	kg	16.4			100	1,640
Chemicals	lit.	747			2.7	2,017
Labour Costs	MD	30			250	7,500
Irrigation	ha					210
Miscellaneous(5% of total)						769
Total Costs						15,378
2. Gross Income						
a. Main Product	kg	50.0			750	37,500
3. Net Profit	Kshs					22,122

Table S.2.4-16 Cost Budget (Okra)

Cost and Return of Crops(financial)

Site:Ruungu

Crop:Okra

(per ha)

	Unit	Unit Price (Kshs)	without Project		Irrigated with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	300			7.0	2,100
Fertilizer:N	kg	28.0			20	560
P	kg	20.0			20	400
K	kg	24.0			0	0
Chemicals	lit.	800			1	800
Labour Costs	MD	60			200	12,000
Irrigation	ha					210
Miscellaneous(5% of total)						846
Total Costs						16,916
2. Gross Income						
a. Main Product	kg	23.0			4,000	92,000
3. Net Profit	Kshs					75,084

Cost and Return of Crops(economic)

Site:Ruungu

Crop:Okra

(per ha)

	Unit	Unit Price (Kshs)	without Project		Irrigated with Project	
			Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)
1. Costs						
Seeds	kg	280			7.0	1,960
Fertilizer:N	kg	27.4			20	548
P	kg	24.3			20	486
K	kg	16.4			0	0
Chemicals	lit.	747			1	747
Labour Costs	MD	30			200	6,000
Irrigation	ha					210
Miscellaneous(5% of total)						524
Total Costs						10,475
2. Gross Income						
a. Main Product	kg	22.4			4,000	89,600
3. Net Profit	Kshs					79,125

Table S.2.4-17 Cost Budget (Banana)

Cost and return of Crops(financial)

Site:Ruungu
Crop:Banana (unit:per ha)

	Unit	Price (Kshs)	Irrigated					
			without Project			with Project		
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	
1. Costs								
Nursery	pieces	50						
FertilizerN	kg	28.0	60	1,680	65	1,820	70	1,960
P	kg	20.0	35	700	40	800	40	800
K	kg	24.0	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	7,000	7,000	10,000	10,000
Labour Costs	MD	60	76	4,560	80	4,800	80	4,800
Irrigation	ha			210	770		210	770
Miscellaneous(5% of total)				639		770		935
Total Costs				12,789		15,400		18,705
2. Gross Income								
a. Main Product	kg	7.5	6,500	48,750	7,000	52,500	7,500	56,250
3. Net Profit	Kshs			35,961		37,100		37,545

Cost and return of Crops(economic)

Site:Ruungu
Crop:Banana (unit:per ha)

	Unit	Price (Kshs)	Irrigated					
			without Project			with Project		
			1st Year	2nd Year	3rd Year	1st Year	2nd Year	3rd Year
Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	Quant-ity	Value (Kshs)	
1. Costs								
Nursery	pieces	50						
FertilizerN	kg	27.4	60	1,644	65	1,781	70	1,918
P	kg	24.3	35	851	40	972	40	972
K	kg	16.4	0	0	0	0	0	0
Manure	kg	1	5,000	5,000	7,000	7,000	10,000	10,000
Labour Costs	MD	30	76	2,280	80	2,400	80	2,400
Irrigation	ha			210	528		210	528
Miscellaneous(5% of total)				10,510		13,014		16,316
Total Costs				18,500		22,623		27,562
2. Gross Income								
a. Main Product	kg	7.5	6,500	48,750	7,000	52,500	7,500	56,250
3. Net Profit	Kshs			30,250		29,877		28,688

Table S.2.4-18 Cost Budget (Manogoes)

Site/Resource	Condition/Description	Cost and Return of Cropland/without Project													
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th				
Unit	Unit Price (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)
1. Costs															
Nutrient	\$/lb	50	220	11,500	0	0	0	0	0	0	0	0	0	0	0
Fertilizer	\$/lb	20	0	0	0	0	0	0	0	0	0	0	0	0	0
P	\$/lb	24	0	0	0	0	0	0	0	0	0	0	0	0	0
K	\$/lb	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Manure	\$/lb	800	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	\$/lb	90	50	3,000	50	3,000	50	3,000	50	3,000	50	3,000	70	4,200	4,900
Labour Costs	\$/hr	15.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous (\$ of total)															
Total Costs															
2. Gross Income															
3. Net Profit															

Cost and Return of Cropland/with Project

Site/Resource	Condition/Description	Cost and Return of Cropland/with Project													
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th				
Unit	Unit Price (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)
1. Costs															
Nutrient	\$/lb	50	220	11,500	0	0	0	0	0	0	0	0	0	0	0
Fertilizer	\$/lb	20	0	0	0	0	0	0	0	0	0	0	0	0	0
P	\$/lb	24	0	0	0	0	0	0	0	0	0	0	0	0	0
K	\$/lb	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Manure	\$/lb	800	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	\$/lb	90	50	3,000	50	3,000	50	3,000	50	3,000	50	3,000	70	4,200	4,900
Labour Costs	\$/hr	15.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous (\$ of total)															
Total Costs															
2. Gross Income															
3. Net Profit															

Site/Resource	Condition/Description	Cost and Return of Cropland/without Project													
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th				
Unit	Unit Price (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)
1. Costs															
Nutrient	\$/lb	50	220	11,500	0	0	0	0	0	0	0	0	0	0	0
Fertilizer	\$/lb	20	0	0	0	0	0	0	0	0	0	0	0	0	0
P	\$/lb	24	0	0	0	0	0	0	0	0	0	0	0	0	0
K	\$/lb	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Manure	\$/lb	800	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	\$/lb	90	50	3,000	50	3,000	50	3,000	50	3,000	50	3,000	70	4,200	4,900
Labour Costs	\$/hr	15.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous (\$ of total)															
Total Costs															
2. Gross Income															
3. Net Profit															

Cost and Return of Cropland/with Project

Site/Resource	Condition/Description	Cost and Return of Cropland/with Project													
		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th				
Unit	Unit Price (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)	Quant.	Value (\$/lb)
1. Costs															
Nutrient	\$/lb	50	220	11,500	0	0	0	0	0	0	0	0	0	0	0
Fertilizer	\$/lb	20	0	0	0	0	0	0	0	0	0	0	0	0	0
P	\$/lb	24	0	0	0	0	0	0	0	0	0	0	0	0	0
K	\$/lb	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Manure	\$/lb	800	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	\$/lb	90	50	3,000	50	3,000	50	3,000	50	3,000	50	3,000	70	4,200	4,900
Labour Costs	\$/hr	15.0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous (\$ of total)															
Total Costs															
2. Gross Income															
3. Net Profit															

Table S.2.4-19 Estimation of the Agricultural Benefits (Ruungu / Karocho)

	Green					Sweet Asian					Total	
	Maize	Gram	Millet	Sorghum	Cotton	Potato	Veget	Onion	Tomato	Tobacco		Banana
(A) Rainfed Areas												
I. Without Project	9.5	21.5	10.0	6.9	10.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
Unit price(Ksh/kg)	1,000	300	400	750	1,000	0	0	0	0	0	0	3,500
Yield(kg/ha)	9,500	6,450	4,000	5,175	10,000	0	0	0	0	0	0	52,500
Gross Income(Ksh/ha)	11,211	2,605	2,000	2,811	5,657	0	0	0	0	0	0	2,526
Cost of Production(Ksh/ha)	-1,711	3,845	2,000	2,564	4,343	0	0	0	0	0	0	49,974
Net Return(Ksh/ha)	228.44	85.36	140.41	17.15	5.72	0.00	0.00	0.00	0.00	0.00	0.00	7.86
Planted Area(ha)	-391	328.2	280.8	43.973	24.84	0	0	0	0	0	0	392.8
Total Net Return(1,000 Ksh)												679.78
II. With Project	9.5	21.5	10.0	6.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
Unit price(Ksh/kg)	1,250	450	450	850	0	0	0	0	0	0	0	3,500
Yield(kg/ha)	11,875	9,675	4,500	5,865	0	0	0	0	0	0	0	52,500
Gross Income(Ksh/ha)	11,495	3,721	2,095	2,863	0	0	0	0	0	0	0	2,526
Cost of Production(Ksh/ha)	380	5,954	2,405	3,902	0	0	0	0	0	0	0	49,974
Net Return(Ksh/ha)	220	94	140	20	0	0.00	0.00	0.00	0.00	0.00	0.00	8.00
Planted Area(ha)	84	560	337	60	0	0	0	0	0	0	0	400
Total Net Return(1,000 Ksh)	474	231	58	16	-25	0	0	0	0	0	0	7
III. Incremental Benefit(1,000 Ksh)												1,440.780
(B) Irrigated Areas												
I. Without Project	0.0	21.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unit price(Ksh/kg)	0	600	0	0	0	0	0	0	0	0	0	0
Yield(kg/ha)	0	12,900	0	0	0	0	0	0	0	0	0	0
Gross Income(Ksh/ha)	0	3,816	0	0	0	0	0	0	0	0	0	0
Cost of Production(Ksh/ha)	0	9,084	0	0	0	0	0	0	0	0	0	0
Net Return(Ksh/ha)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Planted Area(ha)	0	0	0	0	0	0	0	0	0	0	0	0
Total Net Return(1,000 Ksh)												0
II. With Project	9.5	21.5	10.0	0.0	0.0	5.0	22.4	25.0	20.2	50.0	7.5	0
Unit price(Ksh/kg)	2,500	800	750	0	8,500	4,000	7,000	12,000	750	7,500	0	0
Yield(kg/ha)	23,750	17,200	7,500	0	42,500	89,600	175,000	242,400	37,500	56,250	0	0
Gross Income(Ksh/ha)	14,739	6,738	3,248	0	14,676	10,475	41,484	33,214	15,378	16,318	0	0
Cost of Production(Ksh/ha)	9,011	10,464	4,254	0	27,824	79,125	133,516	209,186	22,122	39,934	0	0
Net Return(Ksh/ha)	5,710	18,50	6,00	0.00	11,90	10,80	6,40	1,70	8,40	3,40	0.00	0.00
Planted Area(ha)	515	194	26	0	331	855	855	356	186	136	0	0
Total Net Return(1,000 Ksh)	515	194	26	0	331	855	855	356	186	136	0	0
III. Incremental Benefit(1,000 Ksh)	515	194	26	0	331	855	855	356	186	136	0	0
(C) Incremental Benefit(1,000 Ksh)	989	425	81	16	-25	331	855	855	356	186	136	7
												4,211

Table S.2.4-20 Project Cost (Ruungu / Karocho)

	Financial Cost(Ksh)		Economic Cost(Ksh)	
	Total Cost	Of Which, Private Sector	Total Cost	Total Cost
1. Construction cost				
1) Irrigation & drainage improvement	4,520,200	4,520,200	4,221,867	4,221,867
2) Marketing improvement	1,500,000	1,500,000	1,401,000	1,401,000
3) Access roads improvement	19,660,000	0	18,362,440	18,362,440
4) Village/farm roads improvement	1,710,000	0	1,597,140	1,597,140
5) Rural water supply improvement	0	0	0	0
Sub-Total	27,390,200	6,020,200	25,582,447	25,582,447
2. Community Development & Supporting Services				
1) Agricultural support services	14,050,000	0	13,122,700	13,122,700
2) Community development	7,120,000	0	6,650,080	6,650,080
3) Water management services	1,810,000	0	1,690,540	1,690,540
4) Marketing support services	284,000	0	265,256	265,256
5) Public health services	150,000	0	140,100	140,100
Sub-Total	23,414,000	0	21,868,676	21,868,676
3. Associated Cost				
1) Pre-engineering cost	1,600,900	105,000	1,495,241	1,495,241
2) Administration cost	3,239,880	0	3,026,048	3,026,048
3) Consulting services	4,628,400	150,000	4,322,926	4,322,926
Sub-Total	9,469,180	255,000	8,844,214	8,844,214
4. Physical Contingency	2,287,000	150,000	2,136,058	2,136,058
Total	62,560,380	6,425,200	58,431,395	58,431,395

Note: Construction cost and associated cost for the marketing improvement are excluded.

Table S.2.4-21 Operation and Maintenance Cost (Ruungu / Karocho)

	Financial Cost	Economic Cost
Annual Operation and Maintenance Cost		
1) Irrigation & drainage facilities	62,300	58,188
2) Marketing facilities	30,000	28,020
3) Access roads	994,000	928,396
4) Village/farm roads	75,000	70,050
5) Rural water supply facilities	0	0
Total	1,161,300	1,084,654

Table S.2.4-22 Calculation of EIRR
- Ruungu / Karocho -

(Unit: 1,000 Ksh)

Year	Capital Cost	O & M Cost	Total	Benefit	Return	Present Value by Discount Rate						
						Interest= 0.16		Interest= 0.10		Interest= 0.12		
						Cost	Benefit	Cost	Benefit	Cost	Benefit	
1	4,908	1,084	5,992	1,303	-4,689	5,992	1,303	5,992	1,303	5,992	1,303	
2	20,509	1,084	21,593	2,172	-19,422	16,047	1,614	17,846	1,795	17,214	1,731	
3	18,639	1,084	19,723	3,040	-16,683	12,636	1,948	14,819	2,284	14,039	2,164	
4	4,382	1,084	5,466	3,909	-1,558	3,019	2,159	3,734	2,670	3,474	2,484	
5	3,447	1,084	4,531	4,343	-188	2,157	2,068	2,814	2,697	2,571	2,464	
6	3,447	1,084	4,531	4,343	-188	1,860	1,783	2,558	2,452	2,296	2,200	
7	3,097	1,084	4,181	4,343	162	1,479	1,537	2,145	2,229	1,891	1,965	
8	0	1,084	1,084	4,343	3,259	331	1,325	506	2,026	438	1,754	
9	0	1,084	1,084	4,343	3,259	285	1,142	460	1,842	391	1,566	
10	0	1,084	1,084	4,343	3,259	246	984	418	1,674	349	1,398	
11	0	1,084	1,084	4,343	3,259	212	849	380	1,522	312	1,249	
12	0	1,084	1,084	4,343	3,259	183	732	345	1,384	278	1,115	
13	0	1,084	1,084	4,343	3,259	157	631	314	1,258	248	995	
14	0	1,084	1,084	4,343	3,259	136	544	285	1,144	222	889	
15	0	1,084	1,084	4,343	3,259	117	469	260	1,040	198	793	
16	0	1,084	1,084	4,343	3,259	101	404	236	945	177	708	
17	0	1,084	1,084	4,343	3,259	87	348	214	859	158	633	
18	0	1,084	1,084	4,343	3,259	75	300	195	781	141	565	
19	0	1,084	1,084	4,343	3,259	65	259	177	710	126	504	
20	0	1,084	1,084	4,343	3,259	56	223	161	646	112	450	
21	0	1,084	1,084	4,343	3,259	48	192	146	587	100	402	
22	0	1,084	1,084	4,343	3,259	41	166	133	534	90	359	
23	0	1,084	1,084	4,343	3,259	36	143	121	485	80	320	
24	0	1,084	1,084	4,343	3,259	31	123	110	441	71	286	
25	0	1,084	1,084	4,343	3,259	27	106	100	401	64	255	
26	0	1,084	1,084	4,343	3,259	23	92	91	364	57	228	
27	0	1,084	1,084	4,343	3,259	20	79	83	331	51	204	
28	0	1,084	1,084	4,343	3,259	17	68	75	301	45	182	
29	0	1,084	1,084	4,343	3,259	15	59	68	274	41	162	
30	0	1,084	1,084	4,343	3,259	13	51	62	249	36	145	
Total	58,431	32,520	90,951	123,341	32,390	45,509	21,698	54,848	35,226	51,262	29,474	
EIRR=										3.63 %		
B/C Ratio=										16 %		0.48
B/C Ratio=										10 %		0.64
B/C Ratio=										12 %		0.57

Table S.2.4-23 Financial Analysis for Typical Farms (Ruungu / Karocho)

Farm size: 2.80 ha

Without Project

1st Rain Season	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return		
						(Ksh)	(Ksh)	
Maize	1.60	1,000	1,600	15.0	24,000	23,074	926	
Pulses	0.72	300	216	21.5	4,644	3,240	1,404	
Millet	0.98	400	392	10.0	3,920	3,507	413	
Cotton	0.04	1,000	40	10.0	400	349	51	
Mango	0.05	3,500	175	15.0	2,625	253	2,372	
Total	3.39						5,166	
1. Crop Income(Ksh/year)								<u>5166</u>
2. Animal Income(Ksh/year)								<u>1,823</u>
3. Off-Farm Income(Ksh/year)								<u>13,371</u>
4. Living Expense(Ksh/year)-family size 7.9 persons/family								<u>23,240</u>
5. Disposable Income(Ksh/year)								<u>-2,881</u>

With Project

I. Rainfed

	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return	
						(Ksh)	(Ksh)
Maize	1.83	1,250	2,288	15.0	34,320	26,853	7,467
Pulses	0.79	450	356	21.5	7,654	1,393	6,261
Millet	1.16	450	522	10.0	5,220	4,262	958
Sorghum	0.17	850	145	6.9	1,001	889	112
Mango	0.06	3,500	210	15.0	3,150	304	2,846
Sub-Total	4.00						17,644

II. Irrigated

	Planted Area(ha)	Yield (kg/ha)	Production (kg)	Unit Price (Ksh/kg)	Gross Income(Ksh)	Cost of Production Net Return		
						(Ksh)	(Ksh)	
Maize	0.33	2,500	825	15.0	12,375	6,217	6,158	
Pulses	0.08	800	64	21.5	1,376	706	670	
Sweet Potatoes	0.07	8,500	595	5.0	2,975	1,059	1,916	
Tobacco	0.05	750	38	50.0	1,900	1,193	707	
Asian Vegetables	0.20	4,000	800	23.0	18,400	3,383	15,017	
Sub-Total	0.73						24,468	
1. Total Crop income(Ksh/year)								<u>42112</u>
2. Animal Income(Ksh/year)								<u>1,823</u>
3. Off-Farm Income(Ksh/year)								<u>13,371</u>
4. Living Expense(Ksh/year)-family size 7.9 persons/family								<u>23,240</u>
5. Disposable Income(Ksh/year)								<u>34,065</u>

Table S.2.4-24 Cost Recovery (Ruungu / Narocho)

	<u>Excluding Map Preparation</u>	<u>Including Map Prep.</u>
Case-1 Present condition		
1) Number of beneficiaries	170 farm households	
2) Total project cost to be paid by the beneficiaries of which, irrigation facilities	62,560,380 Ksh 6,425,200 Ksh	6,925,200
3) Loan per farm household	37,795 Ksh	40,736
4) Repayment Period(years)	4 48 (months)	
5) Annual interest rate(%)	16 per year	
6) Monthly interest ratre(%)	1.33 (16/12)	
7) Monthly repayment(Ksh)	<u>1,071 Ksh/month</u>	<u>1,154</u>

Alternative Plans for Loan Repayment

Case-2		
1) Loan per farm household(Ksh)	37,795	40,736
2) Repayment Period(years)	6 72 (months)	
3) Annual interest rate(%)	12 per year	
4) Monthly interest ratre(%)	1.00 (12/12)	
5) Monthly repayment(Ksh)	<u>739 Ksh/month</u>	<u>796</u>

Case-3		
1) Loan per farm household(Ksh)	37,795	40,736
2) Repayment Period(years)	8 96 (months)	
3) Annual interest rate(%)	10 per year	
4) Monthly interest ratre(%)	0.83 (10/12)	
5) Monthly repayment(Ksh)	<u>574 Ksh/month</u>	<u>618</u>

Case-4		
1) Loan per farm household(Ksh)	37,795	40,736
2) Repayment Period(years)	10 120 (months)	
3) Annual interest rate(%)	5 per year	
4) Monthly interest ratre(%)	0.42 (5/12)	
5) Monthly repayment(Ksh)	<u>401 Ksh/month</u>	<u>432</u>

Case-5		
1) Loan per farm household(Ksh)	37,795	40,736
2) Repayment Period(years)	4 48 (months)	
3) Annual interest rate(%)	30 per year	
4) Monthly interest ratre(%)	2.50 (30/12)	
5) Monthly repayment(Ksh)	<u>1,361 Ksh/month</u>	<u>1,467</u>

Repayment under the Current Situation(Ruungu/Karocho)

Case-6	
1) Loan per farm household	37,795 Ksh
2) Repayment Period(years)	4 (48 months)
3) Annual interest rate(%)	16 (% per year)
4) Monthly interest ratre(%)	1.33 (16/12)
5) Monthly repayment(Ksh)	1,071 (Ksh/month)
6) Monthly repayment and disposable income(Ksh)	

	Disposable	
	Repayment	Income
1st year	1,071	100 (farm economic survey 1998)
2nd year	1,071	1,420
3rd year	1,071	1,990
4th year	1,071	2,839

Table S.2.4-25 Estimation of Water Charge (Ruungu / Karocho)

(Unit:Ksh)

Year	Initial Cost	O & M Cost	Replac- ment Cost	Total	Present Value by Discount Rate											
					Int.= 0.16				Int.= 0.15				Int.= 0.20			
					Initial Cost	O&M Cost	Replac- ment	Total	Initial Cost	O&M Cost	Replac- ment	Total	Initial Cost	O&M Cost	Replac- ment	Total
1	2260,100	62,300	0	2,322,400	2,260,100	62,300	0	2,322,400	2,260,100	62,300	0	2,322,400	2,260,100	62,300	0	2,322,400
2	3265,100	62,300	0	3,327,400	2,426,591	46,299	0	2,472,890	2,469,885	47,108	0	2,515,992	2,267,431	43,264	0	2,310,694
3	900,000	62,300	0	962,300	576,592	39,913	0	616,505	591,765	40,963	0	632,728	520,833	38,053	0	556,887
4	0	62,300	0	62,300	0	34,408	0	34,408	0	35,620	0	35,620	0	30,044	0	30,044
5	0	62,300	0	62,300	0	29,662	0	29,662	0	30,974	0	30,974	0	25,037	0	25,037
6	0	62,300	0	62,300	0	25,571	0	25,571	0	26,934	0	26,934	0	20,864	0	20,864
7	0	62,300	0	62,300	0	22,044	0	22,044	0	23,421	0	23,421	0	17,387	0	17,387
8	0	62,300	0	62,300	0	18,003	0	18,003	0	20,368	0	20,368	0	14,489	0	14,489
9	0	62,300	0	62,300	0	16,382	0	16,382	0	17,710	0	17,710	0	12,074	0	12,074
10	0	62,300	0	62,300	0	14,122	0	14,122	0	15,400	0	15,400	0	10,062	0	10,062
11	0	62,300	0	62,300	0	12,174	0	12,174	0	13,391	0	13,391	0	8,355	0	8,355
12	0	62,300	0	62,300	0	10,495	0	10,495	0	11,644	0	11,644	0	6,987	0	6,987
13	0	62,300	0	62,300	0	9,048	0	9,048	0	10,125	0	10,125	0	5,823	0	5,823
14	0	62,300	0	62,300	0	7,800	0	7,800	0	8,805	0	8,805	0	4,852	0	4,852
15	0	62,300	0	62,300	0	6,724	0	6,724	0	7,656	0	7,656	0	4,044	0	4,044
16	0	62,300	0	62,300	0	5,796	0	5,796	0	6,658	0	6,658	0	3,370	0	3,370
17	0	62,300	0	62,300	0	4,997	0	4,997	0	5,789	0	5,789	0	2,808	0	2,808
18	0	62,300	0	62,300	0	4,306	0	4,306	0	5,034	0	5,034	0	2,340	0	2,340
19	0	62,300	0	62,300	0	3,714	0	3,714	0	4,378	0	4,378	0	1,950	0	1,950
20	0	62,300	0	62,300	0	3,201	0	3,201	0	3,807	0	3,807	0	1,625	0	1,625
21	0	62,300	0	62,300	0	2,760	0	2,760	0	3,310	0	3,310	0	1,354	0	1,354
22	0	62,300	0	62,300	0	2,379	0	2,379	0	2,878	0	2,878	0	1,128	0	1,128
23	0	62,300	0	62,300	0	2,051	0	2,051	0	2,503	0	2,503	0	940	0	940
24	0	62,300	0	62,300	0	1,768	0	1,768	0	2,176	0	2,176	0	784	0	784
25	0	62,300	0	62,300	0	1,524	0	1,524	0	1,893	0	1,893	0	653	0	653
26	0	62,300	0	62,300	0	1,314	0	1,314	0	1,646	0	1,646	0	544	0	544
27	0	62,300	0	62,300	0	1,133	0	1,133	0	1,431	0	1,431	0	454	0	454
28	0	62,300	0	62,300	0	976	0	976	0	1,244	0	1,244	0	378	0	378
29	0	62,300	0	62,300	0	842	0	842	0	1,082	0	1,082	0	315	0	315
30	0	62,300	0	62,300	0	726	0	726	0	941	0	941	0	262	0	262
Total	6,425,200	1,869,000	0	8,294,200	5,263,193	393,433	0	5,656,626	5,320,749	417,187	0	5,737,936	5,048,364	320,571	0	5,368,935

Annual 214,173 62,300 0 276,473 175,440 13,114 0 188,554 177,358 13,906 0 191,265 168,279 10,686 0 178,964

Water Charge

Interest
0.16

Interest
0.15

Interest
0.20

a. Annual Water Intake

889,700 m³/year

b. Cost

Present Value

Present Value

Present Value

- b.1 Cost per year at financial price
- b.2 Annual OM cost at financial price
- b.3 Replacement cost at financial price
- Total

175,440
13,114
0
188,554

177,358
13,906
0
191,265

168,279
10,686
0
178,964

c. Water Charge

- c.1 per cubic meter
- c.2 per ha/year
- c.3 ha/month

0.21193 Ksh
2,773 Ksh
231 Ksh

0.214978 Ksh
2,813 Ksh
234 Ksh

0.201152 Ksh
2,632 Ksh
219 Ksh