

Table I.4-4 Economic Price of Fertilizer (DAP)

Item	Value
1. World Bank Projected Price to the year 2010 for DAP (US\$/ton in 1990 price)	155.5
2. Adjusted to 1999 price (103.56%) (US\$/ton)	161.0
3. Freight and insurance (US\$/ton)	40
4. CIF Mombasa (US\$/ton)	201
5. Unloading and port handling (US\$/ton)	9
6. Value at Kenya border (US\$/ton)	210
7. Converted to Ksh (US\$1=73.40Ksh)	15,414
8. Domestic handling and transport cost (to Marigat)**	1,200
9. Wholesale price in Marigat (Ksh/ton)	16,614
10. Transport to/from farm (Ksh/ton)**	615
11. Farmgate price (Ksh/ton)	15,999
12. Farmgate price (Ksh/kg)	16

Source: World Bank Global Commodity Markets July 1999, and JICA Study team

Note: * 1300Ksh*SCF, ** 666Ksh*SCF

Table I.4-6 Standard Conversion Factor

Item	(Unit: K.£,000)						
	1993/94	1994/95	1995/96	1996/97	1997/98	Average	
(1) Imports	5,056,418	5,753,988	7,758,424	8,424,308	9,533,676	7,305,363	
(2) Exports	3,625,206	4,170,724	4,656,184	5,696,299	5,722,973	4,774,277	
(3) Import Duties	739,639	929,914	1,058,784	1,129,703	1,197,487	1,011,105	
(4) Export Duties	130	0	0	0	0	26	
(5) Subsidy on Exports	0	0	0	0	0	0	
(6)=(1)+(2)	8,681,624	9,924,712	12,414,608	14,120,607	15,256,649	12,079,640	
(7)=(1)+(2)+(3)-(4)+(5)	9,421,133	10,854,626	13,473,392	15,250,310	16,454,136	13,090,719	
(8)SCF=(6)/(7)	0.922	0.914	0.921	0.926	0.927	0.923	

Source: Statistical Abstract 1998

Table I.4-5 Economic Price of Fertilizer (SA)

Item	Value
1. World Bank Projected Price to the year 2010 for Urea (US\$/ton in 1990 price)	111.0
2. Adjusted to 1999 price (103.56%) (US\$/ton)	115.0
3. Freight and insurance (US\$/ton)	40
4. CIF Mombasa (US\$/ton)	155
5. Unloading and port handling (US\$/ton)	9
6. Value at Kenya border (US\$/ton)	164
7. Converted to Ksh (US\$1=73.40Ksh)	12,038
8. Domestic handling and transport cost (to Marigat)**	1,200
9. Wholesale price in Marigat (Ksh/ton)	13,238
10. Transport to/from farm (Ksh/ton)**	615
11. Farmgate price (Ksh/ton)	12,623
12. Farmgate price (Ksh/kg)	13
13. Adjustment of N content: SA/Urea = (21%/46%)	6

Source: World Bank Global Commodity Markets July 1999, and JICA Study team

Note: * 1300Ksh*SCF, ** 666Ksh*SCF

Table I.4-7 Cost and Return by Crop (Financial Price)

Crop : Maize (Irrigated Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
Ksh	Ksh	40%	60%	80%	90%	100%	Ksh	Ksh	Ksh	Ksh
1. Gross Income										
Main Product	kg	13	2,700	35,100	3,600	39,780	42,120	44,460	45,630	46,800
					(in the 5th year)					
Total 1				35,100		39,780	42,120	44,460	45,630	46,800
2. Production Cost										
1) Seeds	kg	91	25	2,275	25	2,275	2,275	2,275	2,275	2,275
2) Fertilizer										
DAP	kg	30	0	0	125	3,750	3,750	3,750	3,750	3,750
SA	kg	14	0	0	125	1,750	1,750	1,750	1,750	1,750
3) Insecticides	liter	650	0	0	2	1,300	1,300	1,300	1,300	1,300
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	5	280	280	280	280	280
Spraying	man-day	56	0	0	3	168	168	168	168	168
(Yield Dependent)										
Harvesting	man-day	56	30	1,680	40	1,904	2,016	2,128	2,184	2,240
Transporting	man-day	56	7	392	9	437	459	482	493	504
Threshing/Shelling	man-day	56	30	1,680	40	1,904	2,016	2,128	2,184	2,240
Total Labor				7,112		8,053	8,299	8,546	8,669	8,792
Hired Labor	%	40		2,845		3,221	3,320	3,418	3,468	3,517
Total 2 (with total labor)				12,887		20,628	20,874	21,121	21,244	21,367
Total 3 (with hired labor)				8,620		15,796	15,895	15,993	16,043	16,092
Net Return				22,213		19,152	21,246	23,339	24,386	25,433
Net Return Ratio				63		48	50	52	53	54
Net Income				26,480		23,984	26,225	28,467	29,587	30,708
Net Income Ratio				75		60	62	64	65	66

Table I.4-8 Cost and Return by Crop (Economic Price)

Crop : Maize (Irrigated Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
Ksh	Ksh	40%	60%	80%	90%	100%	Ksh	Ksh	Ksh	Ksh
1. Gross Income										
Main Product	kg	11	2,700	29,700	3,600	33,660	35,640	37,620	38,610	39,600
					(in the 5th year)					
Total 1				29,700		33,660	35,640	37,620	38,610	39,600
2. Production Cost										
1) Seeds	kg	84	25	2,100	25	2,100	2,100	2,100	2,100	2,100
2) Fertilizer										
DAP	kg	16	0	0	125	2,000	2,000	2,000	2,000	2,000
SA	kg	6	0	0	125	750	750	750	750	750
3) Insecticides	liter	600	0	0	2	1,200	1,200	1,200	1,200	1,200
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	5	140	140	140	140	140
Spraying	man-day	28	0	0	3	84	84	84	84	84
(Yield Dependent)										
Harvesting	man-day	28	30	840	40	952	1,008	1,064	1,092	1,120
Transporting	man-day	28	7	196	9	218	230	241	246	252
Threshing/Shelling	man-day	28	30	840	40	952	1,008	1,064	1,092	1,120
Total Labor				3,556		4,026	4,150	4,273	4,334	4,396
Hired Labor	%	40		1,422		1,610	1,660	1,709	1,734	1,758
Total 2 (with total labor)				8,886		13,306	13,430	13,553	13,614	13,676
Total 3 (with hired labor)				6,752		10,890	10,940	10,989	11,014	11,038
Net Return				20,814		20,354	22,210	24,067	24,996	25,924
Net Return Ratio				70		60	62	64	65	65
Net Income				22,948		22,770	24,700	26,631	27,596	28,562
Net Income Ratio				77		68	69	71	71	72

Table I.4-9 Cost and Return by Crop (Financial Price)

Crop : Maize (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	13	800	10,400	1,800 (in the 5th year)	15,600	18,200	20,800	22,100	23,400
Total 1				10,400		15,600	18,200	20,800	22,100	23,400
2. Production Cost										
1) Seeds	kg	91	25	2,275	25	2,275	2,275	2,275	2,275	2,275
2) Fertilizer										
DAP	kg	30	0	0	50	1,500	1,500	1,500	1,500	1,500
SA	kg	14	0	0	50	700	700	700	700	700
3) Insecticides	liter	650	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	0	0	0	0	0	0
Spraying	man-day	56	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	56	20	1,120	45	1,680	1,960	2,240	2,380	2,520
Transporting	man-day	56	7	392	16	594	694	795	846	896
Threshing/Shelling	man-day	56	20	1,120	45	1,680	1,960	2,240	2,380	2,520
Total Labor				5,992		7,314	7,974	8,635	8,966	9,296
Hired Labor	%	10		599		731	797	864	897	930
Total 2 (with total labor)				11,767		15,289	15,949	16,610	16,941	17,271
Total 3 (with hired labor)				6,374		8,706	8,772	8,839	8,872	8,905
Net Return				-1,367		311	2,251	4,190	5,159	6,129
Net Return Ratio				-13		2	12	20	23	26
Net Income				4,026		6,894	9,428	11,961	13,228	14,495
Net Income Ratio				39		44	52	58	60	62

Table I.4-10 Cost and Return by Crop (Economic Price)

Crop : Maize (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	11	800	8,800	1,800 (in the 5th year)	13,200	15,400	17,600	18,700	19,800
Total 1				8,800		13,200	15,400	17,600	18,700	19,800
2. Production Cost										
1) Seeds	kg	84	25	2,100	25	2,100	2,100	2,100	2,100	2,100
2) Fertilizer										
DAP	kg	16	0	0	50	800	800	800	800	800
SA	kg	6	0	0	50	300	300	300	300	300
3) Insecticides	liter	600	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	0	0	0	0	0	0
Spraying	man-day	28	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	28	20	560	45	840	980	1,120	1,190	1,260
Transporting	man-day	28	7	196	16	297	347	398	423	448
Threshing/Shelling	man-day	28	20	560	45	840	980	1,120	1,190	1,260
Total Labor				2,996		3,657	3,987	4,318	4,483	4,648
Hired Labor	%	10		300		366	399	432	448	465
Total 2 (with total labor)				8,326		10,087	10,417	10,748	10,913	11,078
Total 3 (with hired labor)				5,630		6,796	6,829	6,862	6,878	6,895
Net Return				474		3,113	4,983	6,852	7,787	8,722
Net Return Ratio				5		24	32	39	42	44
Net Income				3,170		6,404	8,571	10,738	11,822	12,905
Net Income Ratio				36		49	56	61	63	65

Table I.4-11 Cost and Return by Crop (Financial Price)

Crop : Sorghum (Rainfed Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
		Ksh		Ksh	40% Ksh	60% Ksh	80% Ksh	90% Ksh	100% Ksh	
1. Gross Income										
Main Product	kg	38	400	15,200	1,800	36,480	47,120	57,760	63,080	68,400
					(in the 5th year)					
Total 1				15,200		36,480	47,120	57,760	63,080	68,400
2. Production Cost										
1) Seeds	kg	35	10	350	10	350	350	350	350	350
2) Fertilizer										
DAP	kg	30	0	0	50	1,500	1,500	1,500	1,500	1,500
SA	kg	14	0	0	50	700	700	700	700	700
3) Insecticides	liter	650	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	25	1,400	25	1,400	1,400	1,400	1,400	1,400
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	0	0	0	0	0	0
Spraying	man-day	56	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	56	25	1,400	113	3,371	4,357	5,342	5,835	6,328
Transporting	man-day	56	5	280	23	683	885	1,086	1,187	1,288
Threshing/Shelling	man-day	56	25	1,400	113	3,371	4,357	5,342	5,835	6,328
Total Labor				6,160		10,505	12,679	14,850	15,937	17,024
Hired Labor	%	10		616		1,051	1,268	1,485	1,594	1,702
Total 2 (with total labor)				10,010		16,555	18,729	20,900	21,987	23,074
Total 3 (with hired labor)				4,466		7,101	7,318	7,535	7,644	7,752
Net Return				5,190		19,925	28,391	36,860	41,093	45,326
Net Return Ratio				34		55	60	64	65	66
Net Income				10,734		29,379	39,802	50,225	55,436	60,648
Net Income Ratio				71		81	84	87	88	89

Table I.4-12 Cost and Return by Crop (Economic Price)

Crop : Sorghum (Rainfed Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
		Ksh		Ksh	40% Ksh	60% Ksh	80% Ksh	90% Ksh	100% Ksh	
1. Gross Income										
Main Product	kg	35	400	14,000	1,800	33,600	43,400	53,200	58,100	63,000
					(in the 5th year)					
Total 1				14,000		33,600	43,400	53,200	58,100	63,000
2. Production Cost										
1) Seeds	kg	32	10	320	10	320	320	320	320	320
2) Fertilizer										
DAP	kg	16	0	0	50	800	800	800	800	800
SA	kg	6	0	0	50	300	300	300	300	300
3) Insecticides	liter	600	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	25	700	25	700	700	700	700	700
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	0	0	0	0	0	0
Spraying	man-day	28	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	28	25	700	113	1,686	2,178	2,671	2,918	3,164
Transporting	man-day	28	5	140	23	342	442	543	594	644
Threshing/Shelling	man-day	28	25	700	113	1,686	2,178	2,671	2,918	3,164
Total Labor				3,080		5,254	6,338	7,425	7,970	8,512
Hired Labor	%	10		308		525	634	743	797	851
Total 2 (with total labor)				6,630		9,904	10,988	12,075	12,620	13,162
Total 3 (with hired labor)				3,858		5,175	5,284	5,393	5,447	5,501
Net Return				7,370		23,696	32,412	41,125	45,480	49,838
Net Return Ratio				53		71	75	77	78	79
Net Income				10,142		28,425	38,116	47,807	52,653	57,499
Net Income Ratio				72		85	88	90	91	91

Table I.4-13 Cost and Return by Crop (Financial Price)

Crop : Millet (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income										
Main Product	kg	33	400	13,200	700 (in the 5th year)	17,160	19,140	21,120	22,110	23,100
Total 1				13,200		17,160	19,140	21,120	22,110	23,100
2. Production Cost										
1) Seeds	kg	30	5	150	5	150	150	150	150	150
2) Fertilizer										
DAP	kg	30	0	0	50	1,500	1,500	1,500	1,500	1,500
SA	kg	14	0	0	50	700	700	700	700	700
3) Insecticides	liter	650	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	0	0	0	0	0	0
Spraying	man-day	56	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	56	25	1,400	44	1,826	2,038	2,251	2,358	2,464
Transporting	man-day	56	5	280	9	370	414	459	482	504
Threshing/Shelling	man-day	56	25	1,400	44	1,826	2,038	2,251	2,358	2,464
Total Labor				6,440		7,382	7,850	8,321	8,558	8,792
Hired Labor	%	10		644		738	765	832	856	879
Total 2 (with total labor)				10,090		13,232	13,700	14,171	14,408	14,642
Total 3 (with hired labor)				4,294		6,588	6,635	6,682	6,706	6,729
Net Return				3,110		3,928	5,440	6,949	7,702	8,458
Net Return Ratio				24		23	28	33	35	37
Net Income				8,906		10,572	12,505	14,438	15,404	16,371
Net Income Ratio				67		62	65	68	70	71

Table I.4-14 Cost and Return by Crop (Economic Price)

Crop : Millet (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income										
Main Product	kg	30	400	12,000	700 (in the 5th year)	15,600	17,400	19,200	20,100	21,000
Total 1				12,000		15,600	17,400	19,200	20,100	21,000
2. Production Cost										
1) Seeds	kg	28	5	140	5	140	140	140	140	140
2) Fertilizer										
DAP	kg	16	0	0	50	800	800	800	800	800
SA	kg	6	0	0	50	300	300	300	300	300
3) Insecticides	liter	600	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	0	0	0	0	0	0
Spraying	man-day	28	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	28	25	700	44	913	1,019	1,126	1,179	1,232
Transporting	man-day	28	5	140	9	185	207	230	241	252
Threshing/Shelling	man-day	28	25	700	44	913	1,019	1,126	1,179	1,232
Total Labor				3,220		3,691	3,925	4,162	4,279	4,396
Hired Labor	%	10		322		369	393	416	428	440
Total 2 (with total labor)				6,590		8,161	8,395	8,632	8,749	8,866
Total 3 (with hired labor)				3,692		4,839	4,863	4,886	4,898	4,910
Net Return				5,410		7,439	9,005	10,568	11,351	12,134
Net Return Ratio				45		48	52	55	56	58
Net Income				8,308		10,761	12,537	14,314	15,202	16,090
Net Income Ratio				69		69	72	75	76	77

Table I.4-15 Cost and Return by Crop (Financial Price)

Crop : Beans (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	45	600	27,000	1,300 (in the 5th year)	39,600	45,900	52,200	55,350	58,500
Total 1				27,000		39,600	45,900	52,200	55,350	58,500
2. Production Cost										
1) Seeds	kg	55	50	2,750	50	2,750	2,750	2,750	2,750	2,750
2) Fertilizer										
DAP	kg	30	0	0	100	3,000	3,000	3,000	3,000	3,000
SA	kg	14	0	0	100	1,400	1,400	1,400	1,400	1,400
3) Insecticides	liter	650	0	0	2	1,300	1,300	1,300	1,300	1,300
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	25	1,400	25	1,400	1,400	1,400	1,400	1,400
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	4	224	224	224	224	224
Spraying	man-day	56	0	0	3	168	168	168	168	168
(Yield Dependent)										
Harvesting	man-day	56	15	840	33	1,243	1,445	1,646	1,747	1,848
Transporting	man-day	56	5	280	11	414	482	549	582	616
Threshing/Shelling	man-day	56	20	1,120	43	1,635	1,893	2,150	2,279	2,408
Total Labor				5,320		6,764	7,292	7,817	8,080	8,344
Hired Labor	%	20		1,064		1,353	1,458	1,563	1,616	1,689
Total 2 (with total labor)				11,570		18,714	19,242	19,767	20,030	20,294
Total 3 (with hired labor)				7,314		13,303	13,408	13,513	13,566	13,619
Net Return				15,430		20,886	26,658	32,433	35,320	38,206
Net Return Ratio				57		53	58	62	64	65
Net Income				19,686		26,297	32,492	38,687	41,784	44,881
Net Income Ratio				73		66	71	74	75	77

Table I.4-16 Cost and Return by Crop (Economic Price)

Crop : Beans (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	42	600	25,200	1,300 (in the 5th year)	36,960	42,840	48,720	51,660	54,600
Total 1				25,200		36,960	42,840	48,720	51,660	54,600
2. Production Cost										
1) Seeds	kg	51	50	2,550	50	2,550	2,550	2,550	2,550	2,550
2) Fertilizer										
DAP	kg	16	0	0	100	1,600	1,600	1,600	1,600	1,600
SA	kg	6	0	0	100	600	600	600	600	600
3) Insecticides	liter	600	0	0	2	1,200	1,200	1,200	1,200	1,200
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	25	700	25	700	700	700	700	700
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	4	112	112	112	112	112
Spraying	man-day	28	0	0	3	84	84	84	84	84
(Yield Dependent)										
Harvesting	man-day	28	15	420	33	622	722	823	874	924
Transporting	man-day	28	5	140	11	207	241	274	291	308
Threshing/Shelling	man-day	28	20	560	43	818	946	1,075	1,140	1,204
Total Labor				2,660		3,383	3,645	3,908	4,041	4,172
Hired Labor	%	20		532		677	729	782	808	834
Total 2 (with total labor)				8,440		12,563	12,825	13,088	13,221	13,352
Total 3 (with hired labor)				6,312		9,857	9,909	9,962	9,988	10,014
Net Return				16,780		24,397	30,015	35,632	38,439	41,248
Net Return Ratio				67		66	70	73	74	76
Net Income				18,888		27,103	32,931	38,758	41,672	44,586
Net Income Ratio				75		73	77	80	81	82

Table I4-17 Cost and Return by Crop (Financial Price)

Crop : Beans (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	45	400	18,000	900 (in the 5th year)	27,000	31,500	36,000	38,250	40,500
Total 1				18,000		27,000	31,500	36,000	38,250	40,500
2. Production Cost										
1) Seeds	kg	55	50	2,750	50	2,750	2,750	2,750	2,750	2,750
2) Fertilizer										
DAP	kg	30	0	0	50	1,500	1,500	1,500	1,500	1,500
SA	kg	14	0	0	50	700	700	700	700	700
3) Insecticides	liter	650	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	25	1,400	25	1,400	1,400	1,400	1,400	1,400
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	0	0	0	0	0	0
Spraying	man-day	56	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	56	15	840	34	1,266	1,478	1,691	1,798	1,904
Transporting	man-day	56	5	280	11	414	482	549	582	616
Threshing/Shelling	man-day	56	20	1,120	45	1,680	1,960	2,240	2,360	2,520
Total Labor				5,320		6,440	7,000	7,560	7,840	8,120
Hired Labor	%	10		532		644	700	756	784	812
Total 2 (with total labor)				11,570		14,890	15,450	16,010	16,290	16,570
Total 3 (with hired labor)				6,782		9,094	9,150	9,206	9,234	9,262
Net Return				6,430		12,110	16,050	19,990	21,960	23,930
Net Return Ratio				36		45	51	56	57	59
Net Income				11,218		17,906	22,350	26,794	29,016	31,238
Net Income Ratio				62		66	71	74	76	77

Table I4-18 Cost and Return by Crop (Economic Price)

Crop : Beans (Rainfed Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	42	400	16,800	900 (in the 5th year)	25,200	29,400	33,600	35,700	37,800
Total 1				16,800		25,200	29,400	33,600	35,700	37,800
2. Production Cost										
1) Seeds	kg	51	50	2,550	50	2,550	2,550	2,550	2,550	2,550
2) Fertilizer										
DAP	kg	16	0	0	50	800	800	800	800	800
SA	kg	6	0	0	50	300	300	300	300	300
3) Insecticides	liter	600	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	25	700	25	700	700	700	700	700
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	0	0	0	0	0	0
Spraying	man-day	28	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	28	15	420	34	633	739	846	899	952
Transporting	man-day	28	5	140	11	207	241	274	291	308
Threshing/Shelling	man-day	28	20	560	45	840	980	1,120	1,190	1,260
Total Labor				2,660		3,220	3,500	3,780	3,920	4,060
Hired Labor	%	10		266		322	350	378	392	406
Total 2 (with total labor)				8,440		10,100	10,380	10,660	10,800	10,940
Total 3 (with hired labor)				6,046		7,202	7,230	7,258	7,272	7,286
Net Return				8,360		15,100	19,020	22,940	24,900	26,860
Net Return Ratio				50		60	65	68	70	71
Net Income				10,754		17,998	22,170	26,342	28,428	30,514
Net Income Ratio				64		71	75	78	80	81

Table 1.4-19 Cost and Return by Crop (Financial Price)

Crop : Groundnuts (Rainfed Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
Ksh	Ksh	40%	60%	80%	90%	100%	Ksh	Ksh	Ksh	Ksh
1. Gross Income										
Main Product	kg	50	500	25,000	700	29,000	31,000	33,000	34,000	35,000
					(in the 5th year)					
Total 1				25,000		29,000	31,000	33,000	34,000	35,000
2. Production Cost										
1) Seeds	kg	60	50	3,000	50	3,000	3,000	3,000	3,000	3,000
2) Fertilizer										
DAP	kg	30	0	0	100	3,000	3,000	3,000	3,000	3,000
SA	kg	14	0	0	100	1,400	1,400	1,400	1,400	1,400
3) Insecticides	liter	650	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,400	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	25	1,400	25	1,400	1,400	1,400	1,400	1,400
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	0	0	0	0	0	0
Spraying	man-day	56	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	56	30	1,680	42	1,949	2,083	2,218	2,285	2,352
Transporting	man-day	56	7	392	10	459	493	526	543	560
Threshing/Shelling	man-day	56	15	840	21	974	1,042	1,109	1,142	1,176
Total Labor				5,992		6,462	6,698	6,933	7,050	7,168
Hired Labor	%	10		599		646	670	693	705	717
Total 2 (with total labor)				12,492		17,362	17,598	17,833	17,950	18,068
Total 3 (with hired labor)				7,099		11,546	11,570	11,593	11,605	11,617
Net Return				12,508		11,638	13,402	15,167	16,050	16,932
Net Return Ratio				50		40	43	46	47	48
Net Income				17,901		17,454	19,430	21,407	22,395	23,383
Net Income Ratio				72		60	63	65	66	67

Table 1.4-20 Cost and Return by Crop (Economic Price)

Crop : Groundnuts (Rainfed Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						1st year	2nd year	3rd year	4th year	5th year
Ksh	Ksh	40%	60%	80%	90%	100%	Ksh	Ksh	Ksh	Ksh
1. Gross Income										
Main Product	kg	14	500	7,000	700	8,120	8,680	9,240	9,520	9,800
					(in the 5th year)					
Total 1				7,000		8,120	8,680	9,240	9,520	9,800
2. Production Cost										
1) Seeds	kg	55	50	2,750	50	2,750	2,750	2,750	2,750	2,750
2) Fertilizer										
DAP	kg	16	0	0	100	1,600	1,600	1,600	1,600	1,600
SA	kg	6	0	0	100	600	600	600	600	600
3) Insecticides	liter	600	0	0	0	0	0	0	0	0
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	0	0	0	0	0	0	0	0
Ridging by Tractor	rent	1,290	0	0	0	0	0	0	0	0
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	25	700	25	700	700	700	700	700
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	0	0	0	0	0	0
Spraying	man-day	28	0	0	0	0	0	0	0	0
(Yield Dependent)										
Harvesting	man-day	28	30	840	42	974	1,042	1,109	1,142	1,176
Transporting	man-day	28	7	196	10	230	246	263	272	280
Threshing/Shelling	man-day	28	15	420	21	487	521	554	571	588
Total Labor				2,996		3,231	3,349	3,466	3,525	3,584
Hired Labor	%	10		300		323	335	347	353	358
Total 2 (with total labor)				8,976		11,411	11,529	11,646	11,705	11,784
Total 3 (with hired labor)				6,280		8,503	8,515	8,527	8,533	8,538
Net Return				-1,976		-3,291	-2,849	-2,406	-2,185	-1,964
Net Return Ratio				-28		-41	-33	-26	-23	-20
Net Income				720		-383	165	713	967	1,262
Net Income Ratio				10		-5	2	8	10	13

Table 14-21 Cost and Return by Crop (Financial Price)

Crop : Onion (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity (in the 5th year)	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	14	4,700	65,800	10,000	95,480	110,320	125,160	132,580	140,000
Total 1				65,800		95,480	110,320	125,160	132,580	140,000
2. Production Cost										
1) Seeds	kg	2,350	4	9,400	4	9,400	9,400	9,400	9,400	9,400
2) Fertilizer										
DAP	kg	30	0	0	200	6,000	6,000	6,000	6,000	6,000
SA	kg	14	0	0	100	1,400	1,400	1,400	1,400	1,400
3) Insecticides	liter	650	0	0	10	6,500	6,500	6,500	6,500	6,500
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
Ridging by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	7	392	392	392	392	392
Spraying	man-day	56	0	0	9	504	504	504	504	504
(Yield Dependent)										
Harvesting	man-day	56	30	1,680	64	2,442	2,822	3,203	3,394	3,584
Transporting	man-day	56	7	392	15	571	661	750	795	840
Threshing/Shelling	man-day	56	30	1,680	64	2,442	2,822	3,203	3,394	3,584
Total Labor				7,112		9,711	10,561	11,412	11,839	12,264
Hired Labor	%	40		2,845		3,884	4,224	4,565	4,736	4,906
Total 2 (with total labor)				22,812		39,311	40,161	41,012	41,439	41,864
Total 3 (with hired labor)				18,545		33,484	33,824	34,165	34,336	34,506
Net Return				42,988		56,169	70,159	84,148	91,141	98,136
Net Return Ratio				65		59	64	67	69	70
Net Income				47,255		61,996	76,496	90,995	98,244	105,494
Net Income Ratio				72		65	69	73	74	75

Table 14-22 Cost and Return by Crop (Economic Price)

Crop : Onion (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity (in the 5th year)	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	13	4,700	61,100	10,000	88,660	102,440	116,220	123,110	130,000
Total 1				61,100		88,660	102,440	116,220	123,110	130,000
2. Production Cost										
1) Seeds	kg	2,169	4	8,676	4	8,676	8,676	8,676	8,676	8,676
2) Fertilizer										
DAP	kg	16	0	0	200	3,200	3,200	3,200	3,200	3,200
SA	kg	6	0	0	100	600	600	600	600	600
3) Insecticides	liter	600	0	0	10	6,000	6,000	6,000	6,000	6,000
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
Ridging by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	7	196	196	196	196	196
Spraying	man-day	28	0	0	9	252	252	252	252	252
(Yield Dependent)										
Harvesting	man-day	28	30	840	64	1,221	1,411	1,602	1,697	1,792
Transporting	man-day	28	7	196	15	286	330	375	398	420
Threshing/Shelling	man-day	28	30	840	64	1,221	1,411	1,602	1,697	1,792
Total Labor				3,556		4,856	5,280	5,707	5,920	6,132
Hired Labor	%	40		1,422		1,942	2,112	2,283	2,368	2,453
Total 2 (with total labor)				18,042		29,142	29,566	29,993	30,206	30,418
Total 3 (with hired labor)				15,908		26,228	26,398	26,569	26,654	26,739
Net Return				43,058		59,518	72,874	86,227	92,904	99,582
Net Return Ratio				70		67	71	74	75	77
Net Income				45,192		62,432	76,042	89,651	96,456	103,251
Net Income Ratio				74		70	74	77	78	79

Table I.4-23 Cost and Return by Crop (Financial Price)

Crop : Watermelon (Irrigated Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						40%	60%	80%	90%	100%
			Ksh	Ksh	Ksh					
1. Gross Income										
Main Product	kg	15	7,400	111,000	10,000	126,600	134,400	142,200	146,100	150,000
					(in the 5th year)					
Total 1				111,000		126,600	134,400	142,200	146,100	150,000
2. Production Cost										
1) Seeds	kg	500	2	1,000	2	1,000	1,000	1,000	1,000	1,000
2) Fertilizer										
DAP	kg	30	0	0	200	6,000	6,000	6,000	6,000	6,000
SA	kg	14	0	0	100	1,400	1,400	1,400	1,400	1,400
3) Insecticides	liter	650	0	0	4	2,600	2,600	2,600	2,600	2,600
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
Ridging by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	7	392	392	392	392	392
Spraying	man-day	56	0	0	5	280	280	280	280	280
(Yield Dependent)										
Harvesting	man-day	56	30	1,680	41	1,926	2,050	2,173	2,234	2,296
Transporting	man-day	56	7	392	9	437	459	482	493	504
Threshing/Shelling	man-day	56	30	1,680	41	1,926	2,050	2,173	2,234	2,296
Total Labor				7,112		8,321	8,591	8,860	8,993	9,128
Hired Labor	%	40		2,845		3,328	3,436	3,544	3,597	3,651
Total 2 (with total labor)				14,412		25,621	25,891	26,180	26,293	26,428
Total 3 (with hired labor)				10,145		20,628	20,736	20,844	20,897	20,951
Net Return				96,588		100,979	108,509	116,040	119,807	123,572
Net Return Ratio				87		80	81	82	82	82
Net Income				100,855		105,972	113,664	121,356	125,203	129,049
Net Income Ratio				91		84	85	85	86	86

Table I.4-24 Cost and Return by Crop (Economic Price)

Crop : Watermelon (Irrigated Farm)										
Item	Unit	Unit Price	Without Project		With Project					
			Quantity	Value	Quantity	Value (Yield Increase)				
						40%	60%	80%	90%	100%
			Ksh	Ksh	Ksh					
1. Gross Income										
Main Product	kg	14	7,400	103,600	10,000	118,160	125,440	132,720	136,360	140,000
					(in the 5th year)					
Total 1				103,600		118,160	125,440	132,720	136,360	140,000
2. Production Cost										
1) Seeds	kg	462	2	924	2	924	924	924	924	924
2) Fertilizer										
DAP	kg	16	0	0	200	3,200	3,200	3,200	3,200	3,200
SA	kg	6	0	0	100	600	600	600	600	600
3) Insecticides	liter	600	0	0	4	2,400	2,400	2,400	2,400	2,400
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
Ridging by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	7	196	196	196	196	196
Spraying	man-day	28	0	0	5	140	140	140	140	140
(Yield Dependent)										
Harvesting	man-day	28	30	840	41	963	1,025	1,086	1,117	1,148
Transporting	man-day	28	7	196	9	218	230	241	246	252
Threshing/Shelling	man-day	28	30	840	41	963	1,025	1,086	1,117	1,148
Total Labor				3,556		4,160	4,296	4,429	4,496	4,564
Hired Labor	%	40		1,422		1,664	1,718	1,772	1,798	1,826
Total 2 (with total labor)				10,290		17,094	17,230	17,363	17,430	17,498
Total 3 (with hired labor)				8,156		14,598	14,652	14,706	14,732	14,760
Net Return				93,310		101,066	108,210	115,357	118,930	122,502
Net Return Ratio				90		86	86	87	87	88
Net Income				95,444		103,562	110,788	118,014	121,628	125,240
Net Income Ratio				92		88	88	89	89	89

Table I.4-25 Cost and Return by Crop (Financial Price)

Crop : Kale (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	23	3,400	78,200	5,000 (in the 5th year)	92,920	100,280	107,640	111,320	115,000
Total 1				78,200		92,920	100,280	107,640	111,320	115,000
2. Production Cost										
1) Seeds	kg	23	2	46	2	46	46	46	46	46
2) Fertilizer										
DAP	kg	30	0	0	200	6,000	6,000	6,000	6,000	6,000
SA	kg	14	0	0	100	1,400	1,400	1,400	1,400	1,400
3) Insecticides	liter	650	0	0	2	1,300	1,300	1,300	1,300	1,300
4) Land Preparation										
Prowing by Tractor	rent	3,500	1	3,500	1	3,500	3,500	3,500	3,500	3,500
Harrowing by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
Ridging by Tractor	rent	1,400	1	1,400	1	1,400	1,400	1,400	1,400	1,400
5) Labor										
(Non Yield Dependent)										
Planting	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Weeding	man-day	56	30	1,680	30	1,680	1,680	1,680	1,680	1,680
Watering	man-day	56	0	0	10	560	560	560	560	560
Spraying	man-day	56	0	0	3	168	168	168	168	168
(Yield Dependent)										
Harvesting	man-day	56	30	1,680	44	1,994	2,150	2,307	2,386	2,464
Transporting	man-day	56	7	392	10	459	493	526	543	560
Threshing/Shelling	man-day	56	30	1,680	44	1,994	2,150	2,307	2,386	2,464
Total Labor				7,112		8,535	8,881	9,228	9,403	9,576
Hired Labor	%	40		2,845		3,414	3,552	3,691	3,761	3,830
Total 2 (with total labor)				13,458		23,581	23,927	24,274	24,449	24,622
Total 3 (with hired labor)				9,191		18,460	18,598	18,737	18,807	18,876
Net Return				64,742		69,339	76,353	83,366	86,871	90,378
Net Return Ratio				83		75	76	77	78	79
Net Income				69,009		74,460	81,682	88,903	92,513	96,124
Net Income Ratio				88		80	81	83	83	84

Table I.4-26 Cost and Return by Crop (Economic Price)

Crop : Kale (Irrigated Farm)										
Item	Unit	Unit Price Ksh	Without Project		With Project					
			Quantity	Value Ksh	Quantity	Value (Yield Increase)				
						1st year 40% Ksh	2nd year 60% Ksh	3rd year 80% Ksh	4th year 90% Ksh	5th year 100% Ksh
1. Gross Income Main Product	kg	21	3,400	71,400	5,000 (in the 5th year)	84,840	91,560	98,280	101,640	105,000
Total 1				71,400		84,840	91,560	98,280	101,640	105,000
2. Production Cost										
1) Seeds	kg	21	2	42	2	42	42	42	42	42
2) Fertilizer										
DAP	kg	16	0	0	200	3,200	3,200	3,200	3,200	3,200
SA	kg	6	0	0	100	600	600	600	600	600
3) Insecticides	liter	600	0	0	2	1,200	1,200	1,200	1,200	1,200
4) Land Preparation										
Prowing by Tractor	rent	3,230	1	3,230	1	3,230	3,230	3,230	3,230	3,230
Harrowing by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
Ridging by Tractor	rent	1,290	1	1,290	1	1,290	1,290	1,290	1,290	1,290
5) Labor										
(Non Yield Dependent)										
Planting	man-day	28	30	840	30	840	840	840	840	840
Weeding	man-day	28	30	840	30	840	840	840	840	840
Watering	man-day	28	0	0	10	280	280	280	280	280
Spraying	man-day	28	0	0	3	84	84	84	84	84
(Yield Dependent)										
Harvesting	man-day	28	30	840	44	997	1,075	1,154	1,193	1,232
Transporting	man-day	28	7	196	10	230	246	263	272	280
Threshing/Shelling	man-day	28	30	840	44	997	1,075	1,154	1,193	1,232
Total Labor				3,556		4,268	4,440	4,615	4,702	4,788
Hired Labor	%	40		1,422		1,707	1,776	1,846	1,881	1,915
Total 2 (with total labor)				9,408		15,120	15,292	15,467	15,554	15,640
Total 3 (with hired labor)				7,274		12,559	12,628	12,698	12,733	12,767
Net Return				61,992		69,720	76,268	82,813	86,086	89,360
Net Return Ratio				87		82	83	84	85	85
Net Income				64,126		72,281	78,932	85,582	88,907	92,233
Net Income Ratio				90		85	86	87	87	88

Table I.4-27 Benefit for Agricultural Project (Financial Price)

Crop	Without Project		With Project										
	Area	Net Profit	1st Year		2nd Year		3rd Year		4th Year		5th Year		
	ha	Ksh/ha	Ksh	ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	Net Profit
Maize	0.78	22,213	17,326	0.75	19,152	14,364	15,935	23,339	17,504	24,386	18,290	25,433	19,075
Beans	0.15	15,430	2,315	0.15	20,886	3,133	3,999	32,433	4,865	35,320	5,298	38,206	5,731
Watermelon	0.03	96,588	2,898	0.05	100,979	5,049	108,509	116,040	5,802	119,807	5,990	123,572	6,179
Kale	0.02	64,742	1,295	0.05	69,339	3,467	76,353	83,366	4,168	86,871	4,344	90,378	4,519
Total	0.98	23,834	23,834	1.00	26,013	26,013	29,177	32,339	32,339	33,922	33,922	35,504	35,504

Benefit	1ha	240 ha
1st Year	2,179	522,960
2nd Year	5,343	1,282,320
3rd Year	8,505	2,041,200
4th Year	10,088	2,421,120
5th Year	11,670	2,800,800

Crop	Without Project		With Project										
	Area	Net Profit	1st Year		2nd Year		3rd Year		4th Year		5th Year		
	ha	Ksh/ha	Ksh	ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	Net Profit	Ksh/ha	
Maize	0.79	-1,367	-1,080	0.60	311	187	1,351	4,190	2,514	5,159	3,095	6,129	3,677
Sorghum	0.02	5,190	104	0.10	19,925	1,993	2,839	36,860	3,686	41,093	4,109	45,236	4,524
Millet	0.16	3,110	498	0.20	3,928	786	1,088	6,949	1,390	7,702	1,540	8,458	1,692
Beans	0.02	6,430	129	0.10	12,110	1,211	1,605	19,990	1,999	21,960	2,196	23,930	2,393
Total	0.99	-349	-349	1.00	4,177	4,177	6,883	9,589	9,589	10,940	10,940	12,286	12,286

Benefit	1ha	4ha
1st Year	4,526	18,104
2nd Year	7,232	28,928
3rd Year	9,938	39,752
4th Year	11,289	45,156
5th Year	12,635	50,540

Table I.4-28 Benefit for Agricultural Project (Economic Price)

Crop	Without Project			With Project														
	Area	Net Profit		1st Year		2nd Year		3rd Year		4th Year		5th Year						
	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh			
Maize	0.78	20,814	16,235	0.75	20,354	15,266	0.75	22,210	16,658	0.75	24,067	18,050	0.75	24,996	18,747	0.75	25,924	19,443
Beans	0.15	16,760	2,514	0.15	24,397	3,660	0.15	30,015	4,502	0.15	35,632	5,345	0.15	38,439	5,766	0.15	41,248	6,187
Watermelon	0.03	93,310	2,799	0.05	101,066	5,053	0.05	108,210	5,411	0.05	115,357	5,768	0.05	118,930	5,947	0.05	122,502	6,125
Kale	0.02	61,992	1,240	0.05	69,720	3,486	0.05	76,268	3,813	0.05	82,813	4,141	0.05	86,086	4,304	0.05	89,360	4,468
Total	0.98		22,788	1.00		27,465			30,384			33,304			34,764			36,223

Benefit	1ha	240 ha
1st Year	4,677	1,122,480
2nd Year	7,596	1,823,040
3rd Year	10,516	2,523,840
4th Year	11,976	2,874,240
5th Year	13,435	3,224,400

Crop	Without Project			With Project														
	Area	Net Profit		1st Year		2nd Year		3rd Year		4th Year		5th Year						
	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh	ha	Ksh/ha	Ksh			
Maize	0.79	474	374	0.60	3,113	1,868	0.60	4,983	2,990	0.60	6,852	4,111	0.60	7,787	4,672	0.60	8,722	5,233
Sorghum	0.02	7,370	147	0.10	23,696	2,370	0.10	32,412	3,241	0.10	41,125	4,113	0.10	45,480	4,548	0.10	49,838	4,984
Millet	0.16	5,410	866	0.20	7,439	1,488	0.20	9,005	1,801	0.20	10,568	2,114	0.20	11,351	2,270	0.20	12,134	2,427
Beans	0.02	8,360	167	0.10	15,100	1,510	0.10	19,020	1,902	0.10	22,940	2,294	0.10	24,900	2,490	0.10	26,860	2,686
Total	0.99		1,554	1.00		7,236			9,934			12,632			13,980			15,330

Benefit	1ha	4ha
1st Year	5,682	22,728
2nd Year	8,380	33,520
3rd Year	11,078	44,312
4th Year	12,426	49,704
5th Year	13,776	55,104

Table I.4-29 Benefit for Livestock Improvement

	Without Project	With Project	
Aniaml	Local Goat	Crossbred	
Breeding cycle	1.6 times/year, 1.5 heads/time	2 times/year, 1.5 heads/time	(20%UP)
Mortality Rate	20%	16%	(20%Down)
Birth rate	2.4 heads/female/year	3.0 heads/female/year	
Weight at birth	1.8kg	2.16kg	(20%UP)
Growth period	15 months	12 months	(20%UP)
Wholesale price (Financial)	900 Ksh/head	1,170 Ksh/head	(30%UP)
Wholesale price (Economic)	831 Ksh/head	1,081 Ksh/head	
No. of sale	1.9 heads/year	3.0 heads/year	
Gross income (Financial)	1,710 Ksh/year/female	3,510Ksh/year/female	
Gross income (Economic)	1,579 Ksh/year/female	3,243Ksh/year/female	

(Benefit)

Year	Financial Price		Economic Price	
	per female	Total (100 heads)	per female	Total (100 heads)
	(ksh)	(Ksh)	(ksh)	(Ksh)
1st Year (0%)	0	0	0	0
2nd Year (50%)	900	90,000	832	83,200
3rd Year (100%)	1,800	180,000	1,664	166,400

Table L4-30 Benefit for Improved Jiko + Bee-keeping

	Without Project	With Project	
Unit Yield (Crude) (kg/hive)	17.5 (Log Hive)	25.0 (KTBH)	43% UP
Unit Yield (Refined) (kg/hive)	8.75	12.5	
Unit Price (Refined)(Ksh/kg)	160	240 **	50% UP
Gross Profit (Ksh/hive)	1,400	3,000	
Total Profit (20 hive)	28,000	60,000	
Benefit (Financial) (Ksh)		32,000 (1)	
Benefit (Economic) (Ksh)		29,536 (1)*SCF	

Note: ** Expected by better equipment and better packaging

Table I.4-31 Benefit for Improved Jiko + Fish Processing

	Without Project	With Project	
Firewood Consumption(Kg/1kg fish)	1.5	0.75	50% Down
Price of Firewood (Ksh/kg)	2.5	2.5	
Annual Fish Processing (kg/jiko)	300	300	
Cost of Firewood (Ksh)	1,125	563	
Total Profit (20 sets of Jiko)	22,500	11,250	
Benefit (Financial) (Ksh)		11,250 (1)	
Benefit (Economic) (Ksh)		10,384 (1)*SCF	

Table 1.5-1 Project Cost for Evaluation (Financial Price)

Project	Project Cost (Ksh)			Adjusted Cost for Evaluation (Ksh)			O&M	Replacement Cost	Remark	
	F/C	L/C		F/C	L/C					Total
		Skilled	Unskilled		Skilled	Unskilled				
Improved Jiko + Small-scale Industry	2,701,014	1,291,830	23,389	4,161,400	0	226,958	145,167	23,389	395,514	Jiko: 5 years Bee hive + equipments 5 years Total O&M=15,300 Ksh
Communal Resource Management PIM	568,138	1,788,908	1,896,247	1,352,032	5,984,747	5,107,410	3,518,726	1,641,024	16,251,907	Concerted to the cost for 600 acres Exclude study & purchasing tour Exclude study tour
Livestock Improvement	445,946	134,728	54,245	2,772	637,691	204,622	1,637	2,888	349,480	Equipment: 5 years Pump: 20 years
Total	1,014,084	1,923,636	1,950,492	6,243,016	6,189,369	5,247,743	3,520,363	1,643,912	16,601,387	
Food Security Livestock Improvement	445,946	134,728	54,245	2,772	637,691	204,622	1,637	2,888	349,480	Equipment: 5 years Pump: 20 years
Rainfed Agriculture	60,933	171,112	545,453	248,155	1,025,653	349,099	167,157	249,393	1,198,780	Equipment: 5 years Pump: 20 years
Total	506,879	305,840	599,698	250,927	1,663,344	553,721	307,490	434,786	252,281	1,548,260

* Ksh = 1,114

Table 1.5-2 Project Cost for Evaluation (Economic Price)

Project	Project Cost (Ksh)			Adjusted Cost for Evaluation (Ksh)			O&M	Replacement Cost	Remark	
	F/C	L/C		F/C	L/C					Total
		Skilled	Unskilled		Skilled	Unskilled				
Improved Jiko + Small-scale Industry					0	209,482	133,989	11,695	355,166	Jiko: 5 years Bee hive + equipments 5 years
Communal Resource Management PIM					5,984,747	4,714,139	3,247,784	820,512	14,767,182	Land leveling : 5 years Exclude study & purchasing tour
Livestock Improvement					204,622	129,527	1,511	1,444	337,104	Equipment: 5 years Pump: 20 years
Total					6,189,369	4,843,666	3,249,795	821,956	15,104,286	
Food Security Livestock Improvement					204,622	129,527	1,511	1,444	337,104	Equipment: 5 years Pump: 20 years
Rainfed Agriculture					349,099	154,288	399,780	124,697	1,077,862	Equipment: 5 years Pump: 20 years
Total					553,721	283,813	401,291	126,141	1,364,966	0.5% of cost

Table I.6-1 FIRR for Improved Jiko + Small-scale Industry in Salabani

Year	Investment	Cost (Ksh)		Benefit (Ksh)		Difference (Ksh)		Net Present Value (Ksh)						
		O&M	Total Cost	(Ksh)	(Ksh)	(i = 5.0 %)		(i = 5.0 %)		(i = 10.0 %)		(i = 10.0 %)		
						Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference
1	395,514	10,300	405,814	43,250	-32,564	386,490	41,190	-345,300	386,382	41,179	-345,203	368,922	39,318	-329,604
2		10,300	10,300	43,250	32,950	9,342	39,229	29,887	9,337	39,207	29,870	8,512	35,744	27,232
3		10,300	10,300	43,250	32,950	8,898	37,361	28,463	8,890	37,330	28,440	7,739	32,494	24,755
4		10,300	10,300	43,250	32,950	8,474	35,582	27,108	8,464	35,542	27,078	7,035	29,540	22,505
5		10,300	10,300	43,250	32,950	8,070	33,888	25,818	8,059	33,840	25,781	6,395	26,855	20,460
6	53,000	10,300	63,300	43,250	-20,050	47,235	32,274	-14,961	47,156	32,220	-14,936	35,731	24,413	-11,318
7		10,300	10,300	43,250	32,950	7,320	30,737	23,417	7,306	30,677	23,371	5,286	22,194	16,908
8		10,300	10,300	43,250	32,950	6,971	29,273	22,302	6,956	29,208	22,252	4,805	20,176	15,371
9		10,300	10,300	43,250	32,950	6,639	27,879	21,240	6,623	27,809	21,186	4,368	18,342	13,974
10		10,300	10,300	43,250	32,950	6,323	26,552	20,229	6,306	26,478	20,172	3,971	16,675	12,704
11	53,000	10,300	63,300	43,250	-20,050	37,010	25,287	-11,723	36,897	25,210	-11,687	22,186	15,159	-7,027
12		10,300	10,300	43,250	32,950	5,735	24,083	18,348	5,716	24,003	18,287	3,282	13,781	10,499
13		10,300	10,300	43,250	32,950	5,462	22,936	17,474	5,443	22,853	17,410	2,984	12,528	9,544
14		10,300	10,300	43,250	32,950	5,202	21,844	16,642	5,182	21,759	16,577	2,712	11,389	8,677
15		10,300	10,300	43,250	32,950	4,954	20,804	15,850	4,934	20,717	15,783	2,466	10,354	7,888
16	53,000	10,300	63,300	43,250	-20,050	28,998	19,813	-9,185	28,869	19,725	-9,144	13,776	9,412	-4,364
17		10,300	10,300	43,250	32,950	4,494	18,870	14,376	4,473	18,780	14,307	2,038	8,557	6,519
18		10,300	10,300	43,250	32,950	4,280	17,971	13,691	4,258	17,881	13,623	1,853	7,779	5,926
19		10,300	10,300	43,250	32,950	4,076	17,115	13,039	4,054	17,025	12,971	1,684	7,072	5,388
20		10,300	10,300	43,250	32,950	3,882	16,300	12,418	3,860	16,210	12,350	1,531	6,429	4,898
21	53,000	10,300	63,300	43,250	-20,050	22,721	15,524	-7,197	22,588	15,433	-7,155	8,554	5,844	-2,710
22		10,300	10,300	43,250	32,950	3,521	14,785	11,264	3,499	14,694	11,195	1,265	5,313	4,048
23		10,300	10,300	43,250	32,950	3,353	14,081	10,728	3,332	13,991	10,659	1,150	4,830	3,680
24		10,300	10,300	43,250	32,950	3,194	13,410	10,216	3,172	13,321	10,149	1,046	4,391	3,345
25		10,300	10,300	43,250	32,950	3,042	12,772	9,730	3,020	12,683	9,663	951	3,992	3,041
26	53,000	10,300	63,300	43,250	-20,050	17,803	12,164	-5,639	17,674	12,076	-5,598	5,311	3,629	-1,682
27		10,300	10,300	43,250	32,950	2,759	11,584	8,825	2,738	11,497	8,759	786	3,299	2,513
28		10,300	10,300	43,250	32,950	2,627	11,033	8,406	2,607	10,947	8,340	714	2,999	2,285
29		10,300	10,300	43,250	32,950	2,502	10,507	8,005	2,482	10,423	7,941	649	2,726	2,077
30		10,300	10,300	43,250	32,950	2,383	10,007	7,624	2,363	9,924	7,561	590	2,479	1,889
Total	660,514	309,000	969,514	1,297,500	327,986	663,760	664,855	1,095	662,640	662,642	2	528,292	407,713	-120,579

Table I.6-2 EIRR for Improved Jiko + Small-scale Industry in Salabani

EIRR: 5.3 %

Year	Cost (Ksh)			Benefit (Ksh)			Net Present Value (Ksh)							
	Investment	O&M	Total Cost	Benefit	Difference		(i = 5.0 %)		(i = 5.3 %)		(i = 10.0 %)			
					Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference	
1	355,166	9,507	364,673	39,920	-324,753	347,308	38,019	-309,289	346,284	37,907	-308,377	331,521	36,291	-295,230
2	9,507	9,507	19,014	39,920	30,413	8,623	36,209	27,586	8,572	35,996	27,424	7,857	32,992	25,135
3	9,507	9,507	19,014	39,920	30,413	8,213	34,484	26,271	8,140	34,181	26,041	7,143	29,992	22,849
4	9,507	9,507	19,014	39,920	30,413	7,821	32,842	25,021	7,730	32,457	24,727	6,493	27,266	20,773
5	9,507	9,507	19,014	39,920	30,413	7,449	31,278	23,829	7,340	30,820	23,480	5,903	24,787	18,884
6	48,919	9,507	58,426	39,920	-18,506	43,598	29,789	-13,809	42,833	29,266	-13,567	32,980	22,534	-10,446
7	9,507	9,507	19,014	39,920	30,413	6,756	28,370	21,614	6,618	27,790	21,172	4,879	20,485	15,606
8	9,507	9,507	19,014	39,920	30,413	6,435	27,019	20,584	6,285	26,389	20,104	4,435	18,623	14,188
9	9,507	9,507	19,014	39,920	30,413	6,128	25,733	19,605	5,968	25,058	19,090	4,032	16,930	12,898
10	9,507	9,507	19,014	39,920	30,413	5,836	24,507	18,671	5,667	23,795	18,128	3,665	15,391	11,726
11	48,919	9,507	58,426	39,920	-18,506	34,160	23,340	-10,820	33,070	22,595	-10,475	20,478	13,992	-6,486
12	9,507	9,507	19,014	39,920	30,413	5,294	22,229	16,935	5,110	21,456	16,346	3,029	12,720	9,691
13	9,507	9,507	19,014	39,920	30,413	5,042	21,170	16,128	4,852	20,374	15,522	2,754	11,563	8,809
14	9,507	9,507	19,014	39,920	30,413	4,802	20,162	15,360	4,607	19,346	14,739	2,503	10,512	8,009
15	9,507	9,507	19,014	39,920	30,413	4,573	19,202	14,629	4,375	18,371	13,996	2,276	9,557	7,281
16	48,919	9,507	58,426	39,920	-18,506	26,766	18,288	-8,478	25,531	17,445	-8,086	12,715	8,688	-4,027
17	9,507	9,507	19,014	39,920	30,413	4,148	17,417	13,269	3,945	16,565	12,620	1,881	7,898	6,017
18	9,507	9,507	19,014	39,920	30,413	3,950	16,588	12,638	3,746	15,730	11,984	1,710	7,180	5,470
19	9,507	9,507	19,014	39,920	30,413	3,762	15,798	12,036	3,557	14,936	11,379	1,554	6,527	4,973
20	9,507	9,507	19,014	39,920	30,413	3,583	15,045	11,462	3,378	14,183	10,805	1,413	5,934	4,521
21	48,919	9,507	58,426	39,920	-18,506	20,972	14,329	-6,643	19,712	13,468	-6,244	7,895	5,394	-2,501
22	9,507	9,507	19,014	39,920	30,413	3,250	13,647	10,397	3,046	12,789	9,743	1,168	4,904	3,736
23	9,507	9,507	19,014	39,920	30,413	3,095	12,997	9,902	2,892	12,144	9,252	1,062	4,458	3,396
24	9,507	9,507	19,014	39,920	30,413	2,948	12,378	9,430	2,746	11,532	8,786	965	4,053	3,088
25	9,507	9,507	19,014	39,920	30,413	2,807	11,788	8,981	2,608	10,950	8,342	877	3,684	2,807
26	48,919	9,507	58,426	39,920	-18,506	16,432	11,227	-5,205	15,218	10,398	-4,820	4,902	3,350	-1,552
27	9,507	9,507	19,014	39,920	30,413	2,546	10,693	8,147	2,351	9,874	7,523	725	3,045	2,320
28	9,507	9,507	19,014	39,920	30,413	2,425	10,183	7,758	2,233	9,376	7,143	659	2,768	2,109
29	9,507	9,507	19,014	39,920	30,413	2,310	9,698	7,388	2,120	8,903	6,783	599	2,517	1,918
30	9,507	9,507	19,014	39,920	30,413	2,200	9,237	7,037	2,013	8,454	6,441	545	2,288	1,743
Total	599,761	285,210	884,971	1,197,600	312,629	603,232	613,666	10,434	592,547	592,548	1	478,618	376,323	-102,295

Table L6-3 FIRR for PIM in Sandai

Year	Investment	Cost (Ksh)		Benefit (Ksh)		Net Present Value (Ksh)								
		O&M	Total Cost	Benefit	Difference	(i = 5.0 %)		(i = 9.2 %)		(i = 10.0 %)				
						Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference
1	16,251,907	162,519	16,414,426	522,960	-15,891,466	15,632,787	498,057	-15,134,730	15,028,774	478,813	-14,549,961	14,922,205	475,418	-14,446,787
2		162,519	162,519	1,282,320	1,119,801	147,410	1,163,102	1,015,692	136,239	1,074,960	938,721	134,313	1,059,769	925,456
3		162,519	162,519	2,041,200	1,878,681	140,390	1,763,265	1,622,875	124,738	1,566,676	1,441,938	122,103	1,533,584	1,411,481
4		162,519	162,519	2,421,120	2,258,601	133,705	1,991,861	1,858,156	114,208	1,701,405	1,587,197	111,003	1,653,658	1,542,655
5		162,519	162,519	2,800,800	2,638,281	127,338	2,194,500	2,067,162	104,567	1,802,069	1,697,502	100,912	1,739,076	1,638,164
6	5,100,000		5,262,519	2,800,800	-2,461,719	3,926,973	2,090,000	-1,836,973	3,100,137	1,649,944	-1,450,193	2,970,555	1,580,979	-1,389,576
7		162,519	162,519	2,800,800	2,638,281	115,499	1,990,476	1,874,977	87,658	1,510,661	1,423,003	83,398	1,437,253	1,353,855
8		162,519	162,519	2,800,800	2,638,281	109,999	1,895,692	1,785,693	80,258	1,383,136	1,302,878	75,816	1,306,594	1,230,778
9		162,519	162,519	2,800,800	2,638,281	104,761	1,805,421	1,700,660	73,483	1,266,377	1,192,894	68,924	1,187,813	1,118,889
10		162,519	162,519	2,800,800	2,638,281	99,773	1,719,448	1,619,675	67,280	1,159,473	1,092,193	62,658	1,079,830	1,017,172
11	5,100,000		5,262,519	2,800,800	-2,461,719	3,076,886	1,637,570	-1,439,316	1,994,666	1,061,594	-933,072	1,844,481	981,663	-862,818
12		162,519	162,519	2,800,800	2,638,281	90,497	1,559,590	1,469,093	56,400	971,978	915,578	51,784	892,421	840,637
13		162,519	162,519	2,800,800	2,638,281	86,187	1,485,324	1,399,137	51,639	889,927	838,288	47,076	811,292	764,216
14		162,519	162,519	2,800,800	2,638,281	82,083	1,414,594	1,332,511	47,280	814,802	767,522	42,796	737,538	694,742
15		162,519	162,519	2,800,800	2,638,281	78,174	1,347,233	1,269,059	43,288	746,019	702,731	38,906	670,489	631,563
16		162,519	162,519	2,800,800	2,638,281	74,102	1,283,079	-1,127,742	1,283,392	683,043	-600,349	1,145,277	609,536	-535,741
17	5,100,000		5,262,519	2,800,800	2,638,281	70,907	1,221,980	1,151,073	36,288	572,590	539,365	32,154	554,123	521,969
18		162,519	162,519	2,800,800	2,638,281	67,530	1,163,790	1,096,260	33,225	524,254	493,834	29,230	503,748	474,518
19		162,519	162,519	2,800,800	2,638,281	64,314	1,108,372	1,044,058	30,420	524,254	493,834	26,573	457,953	431,380
20		162,519	162,519	2,800,800	2,638,281	61,252	1,055,592	994,340	27,852	479,998	452,146	24,157	416,321	392,164
21		162,519	162,519	2,800,800	2,638,281	58,088	1,005,326	-883,615	825,750	439,478	-386,272	711,127	378,474	-332,653
22		162,519	162,519	2,800,800	2,638,281	55,557	957,453	901,896	23,348	402,379	379,031	19,965	344,067	324,102
23		162,519	162,519	2,800,800	2,638,281	52,912	911,860	858,948	21,377	368,411	347,034	18,150	312,788	294,638
24		162,519	162,519	2,800,800	2,638,281	50,392	868,438	818,046	19,573	337,311	317,738	16,500	284,353	267,853
25		162,519	162,519	2,800,800	2,638,281	47,992	827,084	779,092	17,921	308,837	290,916	15,000	258,503	243,503
26	5,100,000		5,262,519	2,800,800	-2,461,719	1,480,035	787,699	-692,336	531,238	282,766	-248,532	441,554	235,002	-206,552
27		162,519	162,519	2,800,800	2,638,281	43,530	760,190	706,660	15,023	258,895	243,872	12,397	213,639	201,242
28		162,519	162,519	2,800,800	2,638,281	41,458	714,466	673,008	13,754	237,040	223,286	11,270	194,217	182,947
29		162,519	162,519	2,800,800	2,638,281	39,483	660,444	630,961	12,593	217,030	204,437	10,245	176,561	166,316
30		162,519	162,519	2,800,800	2,638,281	37,603	648,042	610,439	11,530	198,709	187,179	9,314	160,510	151,196
Total	41,751,907	4,875,570	46,627,477	79,088,400	32,460,923	30,365,189	38,539,948	8,174,759	24,013,959	24,013,958	-1	23,199,843	22,247,172	-952,671

Table I.6-4 FIRR for Livestock Improvement in Sandai and Arabai

Year	Investment	O&M	Total Cost	Benefit (Ksh)	Difference (Ksh)	Net Present Value (Ksh)								
						i = 31.8 %		i = 15.0 %		i = 35.0 %				
						Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference
1	349,480	17,474	366,954	90,000	-366,954	319,090	0	-319,090	278,427	0	-278,427	271,818	0	-271,818
2		17,474	17,474	180,000	72,526	13,213	68,053	54,840	10,060	51,814	41,754	9,588	49,383	39,795
3		17,474	17,474	180,000	162,526	11,489	118,353	106,864	7,633	78,627	70,994	7,102	73,160	66,058
4		17,474	17,474	180,000	162,526	9,991	102,916	92,925	5,792	59,659	53,867	5,261	54,192	48,931
5		17,474	17,474	180,000	162,526	8,688	89,492	80,804	4,394	45,266	40,872	3,897	40,142	36,245
6	224,961	17,474	242,435	180,000	-62,435	104,811	77,819	-26,992	46,259	34,346	-11,913	40,049	29,735	-10,314
7		17,474	17,474	180,000	162,526	6,569	67,669	61,100	2,530	26,080	23,530	2,138	22,026	19,888
8		17,474	17,474	180,000	162,526	5,712	58,842	53,130	1,920	19,773	17,853	1,584	16,316	14,732
9		17,474	17,474	180,000	162,526	4,967	51,167	46,200	1,456	15,003	13,547	1,173	12,086	10,913
10		17,474	17,474	180,000	162,526	4,319	44,493	40,174	1,105	11,383	10,278	869	8,952	8,083
11	224,961	17,474	242,435	180,000	-62,435	52,110	38,690	-13,420	11,633	8,637	-2,996	8,931	6,631	-2,300
12		17,474	17,474	180,000	162,526	3,266	33,643	30,377	636	6,554	5,918	477	4,912	4,435
13		17,474	17,474	180,000	162,526	2,840	29,255	26,415	483	4,973	4,490	353	3,639	3,286
14		17,474	17,474	180,000	162,526	2,470	25,439	22,969	366	3,773	3,407	262	2,695	2,433
15		17,474	17,474	180,000	162,526	2,147	22,121	19,974	278	2,863	2,585	194	1,996	1,802
16	224,961	17,474	242,435	180,000	-62,435	25,908	19,236	-6,672	2,925	2,172	-753	1,992	1,479	-513
17		17,474	17,474	180,000	162,526	1,624	16,727	15,103	160	1,648	1,488	106	1,095	989
18		17,474	17,474	180,000	162,526	1,412	14,545	13,133	121	1,250	1,129	79	811	732
19		17,474	17,474	180,000	162,526	1,228	12,648	11,420	92	949	857	58	601	543
20	47,200	17,474	64,674	180,000	115,326	3,952	10,998	7,046	259	720	461	160	445	285
21	224,961	17,474	242,435	180,000	-62,435	12,881	9,564	-3,317	736	546	-190	444	330	-114
22		17,474	17,474	180,000	162,526	807	8,316	7,509	40	414	374	24	244	220
23		17,474	17,474	180,000	162,526	702	7,231	6,529	31	314	283	18	181	163
24		17,474	17,474	180,000	162,526	610	6,288	5,678	23	239	216	13	134	121
25		17,474	17,474	180,000	162,526	531	5,468	4,937	18	181	163	10	99	89
26	224,961	17,474	242,435	180,000	-62,435	6,404	4,755	-1,649	185	137	-48	99	74	-25
27		17,474	17,474	180,000	162,526	401	4,135	3,734	10	104	94	5	54	49
28		17,474	17,474	180,000	162,526	349	3,595	3,246	8	79	71	4	40	36
29		17,474	17,474	180,000	162,526	303	3,126	2,823	6	60	54	3	30	27
30		17,474	17,474	180,000	162,526	264	2,719	2,455	4	46	42	2	22	20
Total	1,521,485	524,220	2,045,705	5,130,000	3,084,295	609,058	957,303	348,245	377,590	377,590	0	356,713	331,504	-25,209

Table 1.6-5 FIRR for Communal Resource Management in Sandai

Year	Investment	O&M	Total Cost	9.8 %				5.0 %				9.8 %				15.0 %			
				Cost (Ksh)		Benefit (Ksh)	Difference	Cost		Benefit	Difference	Cost		Benefit	Difference	Cost		Benefit	Difference
				Cost (Ksh)	Difference			Cost	Difference			Cost	Difference			Cost	Difference		
1	16,601,387	179,993	16,781,380	522,960	-16,258,420	15,982,267	498,057	-15,484,210	15,287,598	476,409	-14,811,189	14,592,504	454,748	-14,137,756					
2	0	179,993	179,993	1,372,320	1,192,327	163,259	1,244,735	1,081,476	149,375	1,138,882	989,507	136,101	1,037,671	901,570					
3	0	179,993	179,993	2,221,200	2,041,207	155,485	1,918,756	1,763,271	136,079	1,679,277	1,543,198	118,348	1,460,475	1,342,127					
4	0	179,993	179,993	2,601,120	2,421,127	148,081	2,139,948	1,991,667	123,966	1,791,459	1,667,493	102,912	1,487,199	1,384,287					
5	0	179,993	179,993	2,980,800	2,800,807	141,029	2,335,535	2,194,506	112,931	1,870,212	1,757,281	89,488	1,481,984	1,392,496					
6	5,324,961	179,993	5,504,954	2,980,800	-2,524,154	4,107,881	2,224,319	-1,883,562	3,146,468	1,703,736	-1,442,732	2,379,944	1,288,682	-1,091,922					
7	0	179,993	179,993	2,980,800	2,800,807	127,918	2,118,399	1,990,481	93,721	1,552,080	1,458,359	67,666	1,120,593	1,052,927					
8	0	179,993	179,993	2,980,800	2,800,807	121,826	2,017,523	1,895,697	85,378	1,413,922	1,328,544	58,840	974,429	915,589					
9	0	179,993	179,993	2,980,800	2,800,807	116,025	1,921,450	1,805,425	77,779	1,288,063	1,210,284	51,165	847,329	796,164					
10	0	179,993	179,993	2,980,800	2,800,807	110,500	1,829,953	1,719,453	70,855	1,173,407	1,102,552	44,482	736,808	692,316					
11	5,324,961	179,993	5,504,954	2,980,800	-2,524,154	3,218,633	1,742,812	-1,475,821	1,974,155	1,068,957	-905,198	1,183,253	640,703	-542,550					
12	0	179,993	179,993	2,980,800	2,800,807	100,227	1,659,821	1,559,594	58,802	973,805	915,003	33,642	557,133	523,491					
13	0	179,993	179,993	2,980,800	2,800,807	95,454	1,580,782	1,485,328	53,568	887,122	833,554	29,254	484,463	455,209					
14	0	179,993	179,993	2,980,800	2,800,807	90,909	1,505,507	1,414,598	48,800	808,156	759,356	25,438	421,272	395,834					
15	0	179,993	179,993	2,980,800	2,800,807	86,580	1,433,816	1,347,236	44,456	736,219	691,763	22,120	366,324	344,204					
16	5,324,961	179,993	5,504,954	2,980,800	-2,524,154	2,521,883	1,365,539	-1,156,344	1,238,623	670,685	-567,938	588,286	318,543	-269,743					
17	0	179,993	179,993	2,980,800	2,800,807	78,530	1,300,513	1,221,983	36,894	610,984	574,090	16,726	276,993	260,267					
18	0	179,993	179,993	2,980,800	2,800,807	74,791	1,238,584	1,163,793	33,610	556,598	522,988	14,544	240,864	226,320					
19	0	179,993	179,993	2,980,800	2,800,807	71,229	1,179,604	1,108,375	30,618	507,053	476,435	12,647	209,447	196,800					
20	47,200	179,993	227,193	2,980,800	2,753,607	85,827	1,123,432	1,037,805	35,207	461,918	426,711	13,882	182,128	168,246					
21	5,324,961	179,993	5,504,954	2,980,800	-2,524,154	1,975,961	1,069,935	-906,026	777,136	420,801	-356,335	292,482	158,372	-134,110					
22	0	179,993	179,993	2,980,800	2,800,807	61,531	1,018,986	957,455	23,148	383,343	360,195	8,316	137,715	129,399					
23	0	179,993	179,993	2,980,800	2,800,807	58,601	970,463	911,862	21,087	349,220	328,133	7,231	119,752	112,521					
24	0	179,993	179,993	2,980,800	2,800,807	55,810	924,250	868,440	19,210	318,135	298,925	6,288	104,132	97,844					
25	0	179,993	179,993	2,980,800	2,800,807	53,152	890,239	827,087	17,500	289,816	272,316	5,468	90,550	85,082					
26	5,324,961	179,993	5,504,954	2,980,800	-2,524,154	1,548,217	838,322	-709,895	487,590	284,018	-223,572	145,415	78,739	-66,676					
27	0	179,993	179,993	2,980,800	2,800,807	48,211	798,402	750,191	14,523	240,517	225,994	4,134	68,469	64,335					
28	0	179,993	179,993	2,980,800	2,800,807	45,915	760,383	714,468	13,231	219,108	205,877	3,595	59,538	55,943					
29	0	179,993	179,993	2,980,800	2,800,807	43,729	724,174	680,445	12,053	199,604	187,551	3,126	48,646	45,772					
30	0	179,993	179,993	2,980,800	2,800,807	41,646	689,690	648,044	10,980	181,836	170,856	2,718	45,019	42,301					
Total	43,273,392	5,399,790	48,673,182	84,218,400	35,545,218	31,530,907	41,053,929	9,523,022	24,235,341	24,235,342	1	20,060,025	15,501,846	-4,558,179					

Table I.6-6 EIRR for PIM in Sandai

EIRR: 14.6 %

Year	Investment	O&M	Total Cost	Benefit			Difference			Net Present Value (Ksh)					
				(Ksh)	(Ksh)	(Ksh)	(Ksh)	(Ksh)	(Ksh)	(i = 10.0 %)		(i = 14.6 %)			
										Cost	Benefit	Difference	Cost	Benefit	Difference
1	14,767,182	147,672	14,914,854	1,122,480	-13,792,374	13,558,958	1,020,436	-12,538,522	13,010,558	979,164	-12,031,394	12,429,045	935,400	-11,493,645	
2		147,672	147,672	1,823,040	1,675,368	122,043	1,506,645	1,384,602	112,370	1,387,235	1,274,865	102,550	1,266,000	1,163,450	
3		147,672	147,672	2,523,840	2,376,168	110,948	1,896,198	1,785,250	98,023	1,675,300	1,577,277	85,458	1,460,556	1,375,098	
4		147,672	147,672	2,874,240	2,726,568	100,862	1,963,145	1,862,283	85,508	1,664,296	1,578,788	71,215	1,386,111	1,314,896	
5		147,672	147,672	3,224,400	3,076,728	91,693	2,002,099	1,910,406	74,590	1,628,671	1,554,081	59,346	1,295,814	1,236,468	
6	4,903,650	147,672	5,051,322	3,224,400	-1,826,922	2,851,340	1,820,090	-1,031,250	2,225,699	1,420,726	-804,973	1,691,678	1,079,845	-611,833	
7		147,672	147,672	3,224,400	3,076,728	75,779	1,654,627	1,578,848	56,759	1,239,331	1,182,572	41,213	899,871	858,658	
8		147,672	147,672	3,224,400	3,076,728	68,890	1,504,206	1,435,316	49,512	1,081,096	1,031,584	34,344	749,892	715,548	
9		147,672	147,672	3,224,400	3,076,728	62,627	1,367,460	1,304,833	43,191	943,064	899,873	28,620	624,910	596,290	
10		147,672	147,672	3,224,400	3,076,728	56,934	1,243,146	1,186,212	37,676	822,655	784,979	23,850	520,759	496,909	
11	4,903,650	147,672	5,051,322	3,224,400	-1,826,922	1,770,458	1,130,133	-640,325	1,124,219	717,621	-406,598	679,847	433,966	-245,881	
12		147,672	147,672	3,224,400	3,076,728	47,053	1,027,393	980,340	28,670	625,996	597,326	16,562	361,638	345,076	
13		147,672	147,672	3,224,400	3,076,728	42,775	983,994	891,219	25,009	546,070	521,061	13,802	301,365	287,563	
14		147,672	147,672	3,224,400	3,076,728	38,887	849,085	810,198	21,816	476,349	454,533	11,502	251,137	239,635	
15		147,672	147,672	3,224,400	3,076,728	35,352	771,896	736,544	19,031	415,530	396,499	9,585	209,281	199,696	
16	4,903,650	147,672	5,051,322	3,224,400	-1,826,922	1,099,315	701,723	-397,592	567,853	362,476	-205,377	273,215	174,401	-88,814	
17		147,672	147,672	3,224,400	3,076,728	29,216	637,930	608,714	14,481	316,196	301,715	6,656	145,334	138,678	
18		147,672	147,672	3,224,400	3,076,728	26,560	579,937	553,377	12,632	275,825	263,193	5,547	121,112	115,565	
19		147,672	147,672	3,224,400	3,076,728	24,146	527,215	503,069	11,019	240,608	229,589	4,622	100,927	96,305	
20		147,672	147,672	3,224,400	3,076,728	21,951	479,287	457,336	9,612	209,888	200,276	3,852	84,105	80,253	
21	4,903,650	147,672	5,051,322	3,224,400	-1,826,922	682,588	435,715	-246,873	286,827	183,090	-103,737	109,799	70,088	-39,711	
22		147,672	147,672	3,224,400	3,076,728	18,141	396,105	377,964	7,315	159,713	152,398	2,675	58,407	55,732	
23		147,672	147,672	3,224,400	3,076,728	16,492	360,095	343,603	6,381	139,321	132,940	2,229	48,672	46,443	
24		147,672	147,672	3,224,400	3,076,728	14,992	327,359	312,367	5,566	121,533	115,967	1,858	40,560	38,702	
25		147,672	147,672	3,224,400	3,076,728	13,630	297,599	283,969	4,855	106,016	101,161	1,548	33,800	32,252	
26	4,903,650	147,672	5,051,322	3,224,400	-1,826,922	423,833	270,545	-153,288	144,879	92,480	-52,399	44,126	28,167	-15,959	
27		147,672	147,672	3,224,400	3,076,728	11,264	245,950	234,686	3,695	80,672	76,977	1,075	23,472	22,397	
28		147,672	147,672	3,224,400	3,076,728	10,240	223,591	213,351	3,223	70,372	67,149	896	19,560	18,664	
29		147,672	147,672	3,224,400	3,076,728	9,309	203,264	193,955	2,811	61,387	58,576	747	16,300	15,553	
30		147,672	147,672	3,224,400	3,076,728	8,463	184,786	176,323	2,452	53,550	51,098	622	13,583	12,961	
Total	39,285,432	4,430,160	43,715,592	92,178,000	48,462,408	21,444,739	26,561,654	5,116,915	18,096,232	18,096,231	-1	15,758,084	12,755,033	-3,003,051	

Table I.6-7 EIRR for Livestock Improvement in Sandai and Arabal

Year	Investment	O&M	Total Cost	Benefit			Difference			Net Present Value (Ksh)		
				Cost	Benefit	Difference	Cost	Benefit	Difference	(i = 30.0 %)		
										Cost	Benefit	Difference
1	337,104	16,855	353,959	321,781	0	-321,781	272,304	0	-272,304	272,276	0	-272,276
2		16,855	16,855	13,930	68,760	54,830	9,975	49,241	39,266	9,973	49,231	39,258
3		16,855	16,855	12,663	149,545	112,356	7,674	75,763	68,089	7,672	75,740	68,068
4		16,855	16,855	11,512	149,545	102,141	5,904	58,285	52,381	5,901	58,261	52,360
5		16,855	16,855	10,466	149,545	92,855	4,542	44,839	40,297	4,540	44,816	40,276
6	217,646	16,855	234,501	132,370	93,928	-38,442	48,613	34,495	-14,118	48,583	34,474	-14,109
7		16,855	16,855	8,649	149,545	76,741	2,688	26,538	23,850	2,686	26,519	23,833
8		16,855	16,855	7,863	149,545	69,764	2,068	20,416	18,348	2,066	20,399	18,333
9		16,855	16,855	7,148	149,545	63,422	1,591	15,706	14,115	1,589	15,691	14,102
10		16,855	16,855	6,498	149,545	57,656	1,224	12,083	10,859	1,223	12,070	10,847
11	217,646	16,855	234,501	82,191	58,322	-23,869	13,100	9,295	-3,805	13,085	9,285	-3,800
12		16,855	16,855	5,371	149,545	47,649	724	7,151	6,427	723	7,142	6,419
13		16,855	16,855	4,882	149,545	43,318	557	5,501	4,944	557	5,494	4,937
14		16,855	16,855	4,438	149,545	39,380	429	4,232	3,803	428	4,226	3,798
15		16,855	16,855	4,035	149,545	35,800	330	3,256	2,926	329	3,251	2,922
16	217,646	16,855	234,501	51,034	36,213	-14,821	3,530	2,505	-1,025	3,524	2,501	-1,023
17		16,855	16,855	3,335	149,545	29,586	195	1,927	1,732	195	1,924	1,729
18		16,855	16,855	3,032	149,545	26,897	150	1,482	1,332	150	1,480	1,330
19		16,855	16,855	2,756	149,545	24,452	116	1,140	1,024	115	1,138	1,023
20	47,200	16,855	64,055	9,521	24,734	15,213	338	877	539	337	876	539
21	217,646	16,855	234,501	31,688	22,486	-9,202	951	675	-276	949	674	-275
22		16,855	16,855	2,071	20,442	18,371	53	519	466	52	518	466
23		16,855	16,855	1,882	18,583	16,701	40	399	359	40	399	359
24		16,855	16,855	1,711	16,894	15,183	31	307	276	31	307	276
25		16,855	16,855	1,556	15,358	13,802	24	236	212	24	236	212
26	217,646	16,855	234,501	19,676	13,962	-5,714	256	182	-74	256	181	-75
27		16,855	16,855	1,286	12,693	11,407	14	140	126	14	140	126
28		16,855	16,855	1,169	11,539	10,370	11	108	97	11	107	96
29		16,855	16,855	1,063	10,490	9,427	8	83	75	8	83	75
30		16,855	16,855	966	9,536	8,570	6	64	58	6	64	58
Total	1,472,534	505,650	1,978,184	766,543	1,348,605	582,062	377,446	377,445	-1	377,343	377,227	-116

Table I.6-8 EIRR for Communal Resource Management in Sandai

Year	Investment	Cost (Ksh)		Benefit (Ksh)			Net Present Value (Ksh)							
		O&M	Total Cost	Benefit	Difference	(i = 10.0 %)		(i = 15.0 %)		(i = 20.0 %)				
						Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference
1	15,104,286	164,527	15,268,813	1,122,480	-14,146,333	13,880,739	1,020,436	-12,860,303	13,274,080	975,838	-12,298,242	12,724,011	935,400	-11,788,611
2	0	164,527	164,527	1,906,240	1,741,713	135,973	1,575,405	1,439,432	124,347	1,440,708	1,316,361	114,255	1,323,778	1,209,523
3	0	164,527	164,527	2,690,240	2,525,713	123,612	2,021,217	1,897,605	108,102	1,767,618	1,659,516	95,212	1,556,852	1,461,640
4	0	164,527	164,527	3,040,640	2,876,113	112,374	2,076,798	1,964,424	93,980	1,736,847	1,642,867	79,344	1,466,358	1,387,014
5	0	164,527	164,527	3,390,800	3,226,273	102,158	2,105,420	2,003,262	81,702	1,683,829	1,602,127	66,120	1,362,686	1,296,566
6	5,121,296	164,527	5,285,823	3,390,800	-1,895,023	2,983,709	1,914,018	-1,069,691	2,281,957	1,463,851	-818,106	1,770,211	1,135,572	-634,639
7	0	164,527	164,527	3,390,800	3,226,273	84,428	1,740,017	1,655,589	61,749	1,272,612	1,210,863	45,916	946,310	900,394
8	0	164,527	164,527	3,390,800	3,226,273	76,753	1,581,833	1,505,080	53,682	1,106,357	1,052,675	38,264	788,592	750,328
9	0	164,527	164,527	3,390,800	3,226,273	69,776	1,438,030	1,368,254	46,669	961,821	915,152	31,886	657,160	625,274
10	0	164,527	164,527	3,390,800	3,226,273	63,432	1,307,300	1,243,868	40,572	836,168	795,596	26,572	547,633	521,061
11	5,121,296	164,527	5,285,823	3,390,800	-1,895,023	1,852,649	1,188,455	-664,194	1,133,191	726,930	-406,261	711,408	456,361	-255,047
12	0	164,527	164,527	3,390,800	3,226,273	52,423	1,080,413	1,027,990	30,664	631,963	601,299	18,453	380,301	361,848
13	0	164,527	164,527	3,390,800	3,226,273	47,658	982,194	934,536	26,658	549,403	522,745	15,377	316,917	301,540
14	0	164,527	164,527	3,390,800	3,226,273	43,325	892,904	849,579	23,175	477,628	454,453	12,814	264,098	251,284
15	0	164,527	164,527	3,390,800	3,226,273	39,386	811,731	772,345	20,148	415,231	395,083	10,679	220,081	209,402
16	5,121,296	164,527	5,285,823	3,390,800	-1,895,023	1,150,349	737,937	-412,412	562,728	360,984	-201,744	285,899	183,401	-102,498
17	0	164,527	164,527	3,390,800	3,226,273	32,551	670,852	638,301	15,227	313,825	298,598	7,416	152,834	145,418
18	0	164,527	164,527	3,390,800	3,226,273	29,592	609,865	580,273	13,238	272,827	259,589	6,180	127,362	121,182
19	0	164,527	164,527	3,390,800	3,226,273	26,901	554,423	527,522	11,509	237,184	225,675	5,150	106,135	100,985
20	47,200	164,527	211,727	3,390,800	3,179,073	31,472	504,021	472,549	12,875	206,198	193,323	5,523	88,446	82,923
21	5,121,296	164,527	5,285,823	3,390,800	-1,895,023	714,276	458,201	-256,075	279,444	179,260	-100,184	114,896	73,705	-41,191
22	0	164,527	164,527	3,390,800	3,226,273	20,211	416,546	396,335	7,562	155,842	148,280	2,980	61,421	58,441
23	0	164,527	164,527	3,390,800	3,226,273	18,374	378,678	360,304	6,574	135,482	128,908	2,484	51,184	48,700
24	0	164,527	164,527	3,390,800	3,226,273	16,704	344,253	327,549	5,715	117,783	112,068	2,070	42,653	40,583
25	0	164,527	164,527	3,390,800	3,226,273	15,185	312,957	297,772	4,968	102,395	97,427	1,725	35,544	33,819
26	5,121,296	164,527	5,285,823	3,390,800	-1,895,023	443,509	284,507	-159,002	138,768	89,018	-49,750	46,174	29,620	-16,554
27	0	164,527	164,527	3,390,800	3,226,273	12,550	258,642	246,092	3,755	77,389	73,634	1,198	24,684	23,486
28	0	164,527	164,527	3,390,800	3,226,273	11,409	235,129	223,720	3,264	67,279	64,015	998	20,570	19,572
29	0	164,527	164,527	3,390,800	3,226,273	10,372	213,754	203,382	2,838	58,489	55,651	832	17,141	16,309
30	0	164,527	164,527	3,390,800	3,226,273	9,429	194,322	184,893	2,467	50,848	48,381	693	14,284	13,591
Total	40,757,966	4,935,810	45,693,776	96,920,400	51,226,624	22,211,279	27,910,258	5,698,979	18,471,608	18,471,607	-1	16,244,740	13,387,083	-2,857,657

Table I.6-9 FIRR for Rain Water Harvest in Arabal

Year	Investment	O&M	Total Cost	Benefit			Difference			Net Present Value (Ksh)					
				(Ksh)	Benefit	Difference	(Ksh)	Benefit	Difference	(i = 0.4 %)					
										Cost	Benefit	Difference	Cost	Benefit	Difference
1	1,198,780	5,994	1,204,774	18,104	-1,186,670	(Ksh)	1,203,570	18,086	-1,185,484	1,200,429	18,039	-1,182,390	1,192,846	17,925	-1,174,921
2		5,994	5,994	28,928	22,934	5,994	5,982	28,870	22,888	5,951	28,720	22,769	5,876	28,358	22,482
3		5,994	5,994	39,752	33,758	5,994	5,976	39,633	33,657	5,929	39,323	33,394	5,818	38,583	32,765
4		5,994	5,994	45,156	39,162	5,994	5,970	44,976	39,006	5,908	44,508	38,600	5,760	43,394	37,634
5		5,994	5,994	50,540	44,546	5,994	5,964	50,288	44,324	5,887	49,635	43,748	5,703	48,087	42,384
6		5,994	5,994	50,540	44,546	5,994	5,958	50,238	44,280	5,865	49,456	43,591	5,647	47,611	41,984
7		5,994	5,994	50,540	44,546	5,994	5,952	50,188	44,236	5,844	49,278	43,434	5,591	47,140	41,549
8		5,994	5,994	50,540	44,546	5,994	5,946	50,137	44,191	5,823	49,100	43,277	5,535	46,673	41,138
9		5,994	5,994	50,540	44,546	5,994	5,940	50,087	44,147	5,802	48,923	43,121	5,481	46,211	40,730
10		5,994	5,994	50,540	44,546	5,994	5,934	50,037	44,103	5,781	48,746	42,965	5,426	45,753	40,327
11		5,994	5,994	50,540	44,546	5,994	5,928	49,987	44,059	5,760	48,571	42,811	5,373	45,300	39,927
12		5,994	5,994	50,540	44,546	5,994	5,923	49,937	44,014	5,740	48,395	42,655	5,319	44,852	39,533
13		5,994	5,994	50,540	44,546	5,994	5,917	49,888	43,971	5,719	48,221	42,502	5,267	44,408	39,141
14		5,994	5,994	50,540	44,546	5,994	5,911	49,838	43,927	5,698	48,047	42,349	5,215	43,968	38,753
15		5,994	5,994	50,540	44,546	5,994	5,905	49,788	43,883	5,678	47,874	42,196	5,163	43,533	38,370
16		5,994	5,994	50,540	44,546	5,994	5,899	49,738	43,839	5,657	47,701	42,044	5,112	43,102	37,990
17		5,994	5,994	50,540	44,546	5,994	5,893	49,689	43,796	5,637	47,529	41,892	5,061	42,675	37,614
18		5,994	5,994	50,540	44,546	5,994	5,887	49,639	43,752	5,617	47,358	41,741	5,011	42,252	37,241
19		5,994	5,994	50,540	44,546	5,994	5,881	49,589	43,708	5,596	47,187	41,591	4,961	41,834	36,873
20		5,994	5,994	50,540	44,546	5,994	5,875	49,540	43,665	5,576	47,017	41,441	4,912	41,420	36,508
21		5,994	5,994	50,540	44,546	5,994	5,870	49,490	43,620	5,556	46,847	41,291	4,864	41,010	36,146
22		5,994	5,994	50,540	44,546	5,994	5,864	49,441	43,577	5,536	46,678	41,142	4,816	40,604	35,788
23		5,994	5,994	50,540	44,546	5,994	5,858	49,391	43,533	5,516	46,510	40,994	4,768	40,202	35,434
24		5,994	5,994	50,540	44,546	5,994	5,852	49,342	43,490	5,496	46,342	40,846	4,721	39,804	35,083
25		5,994	5,994	50,540	44,546	5,994	5,846	49,293	43,447	5,476	46,175	40,699	4,674	39,409	34,735
26		5,994	5,994	50,540	44,546	5,994	5,840	49,244	43,404	5,457	46,008	40,551	4,628	39,019	34,391
27		5,994	5,994	50,540	44,546	5,994	5,834	49,194	43,360	5,437	45,842	40,405	4,582	38,633	34,051
28		5,994	5,994	50,540	44,546	5,994	5,829	49,145	43,316	5,417	45,677	40,260	4,536	38,250	33,714
29		5,994	5,994	50,540	44,546	5,994	5,823	49,096	43,273	5,398	45,512	40,114	4,492	37,872	33,380
30		5,994	5,994	50,540	44,546	5,994	5,817	49,047	43,230	5,378	45,348	39,970	4,447	37,497	33,050
Total	1,198,780	179,820	1,378,600	1,445,980	67,380	1,445,980	1,374,644	1,422,856	48,212	1,394,564	1,364,567	3	1,341,605	1,235,379	-106,226

Table I.6-10 FIRR for Livestock Improvement in Arabal

Year	Investment	Cost (Ksh)		Total Cost	Benefit (Ksh)		Difference (Ksh)	Net Present Value (Ksh)						
		O&M	Total Cost		Benefit	Difference		(i = 10.0 %)		(i = 9.5 %)		(i = 30.0 %)		
								Cost	Benefit	Difference	Cost	Benefit	Difference	Cost
1	1,548,260	23,468	1,571,728	18,104	-1,553,624	1,428,844	16,458	-1,412,386	1,435,896	16,539	-1,419,357	1,209,022	13,926	-1,195,096
2	0	23,468	23,468	118,928	95,460	19,395	98,288	78,893	19,587	99,260	79,673	13,886	70,372	56,486
3	0	23,468	23,468	219,752	196,284	17,632	165,103	147,471	17,894	167,560	149,666	10,682	100,024	89,342
4	0	23,468	23,468	225,156	201,688	16,029	153,785	137,756	16,348	156,843	140,495	8,217	78,833	70,616
5	0	23,468	23,468	230,540	207,072	14,572	143,147	128,575	14,935	146,715	131,780	6,321	62,091	55,770
6	224,961	23,468	248,429	230,540	-17,889	140,232	130,134	-10,098	144,436	134,036	-10,400	51,469	47,762	-3,707
7	0	23,468	23,468	230,540	207,072	12,043	118,303	106,260	12,465	122,452	109,387	3,740	36,740	33,000
8	0	23,468	23,468	230,540	207,072	10,948	107,549	96,601	11,388	111,869	100,481	2,877	28,262	25,385
9	0	23,468	23,468	230,540	207,072	9,953	97,771	87,818	10,404	102,201	91,797	2,213	21,740	19,527
10	0	23,468	23,468	230,540	207,072	9,048	88,883	79,835	9,505	93,369	83,864	1,702	16,723	15,021
11	224,961	23,468	248,429	230,540	-17,889	87,073	80,803	-6,270	91,919	85,300	-6,619	13,862	12,864	-998
12	0	23,468	23,468	230,540	207,072	7,478	73,457	65,979	7,933	77,928	69,995	1,007	9,895	8,888
13	0	23,468	23,468	230,540	207,072	6,798	66,779	59,981	7,247	71,193	63,946	775	7,612	6,837
14	0	23,468	23,468	230,540	207,072	6,180	60,708	54,528	6,621	65,041	58,420	596	5,855	5,259
15	0	23,468	23,468	230,540	207,072	5,618	55,189	49,571	6,049	59,420	53,371	458	4,504	4,046
16	224,961	23,468	248,429	230,540	-17,889	54,065	50,172	-3,893	58,497	54,285	-4,212	3,733	3,465	-268
17	0	23,468	23,468	230,540	207,072	4,643	45,611	40,968	5,048	49,593	44,545	271	2,665	2,394
18	0	23,468	23,468	230,540	207,072	4,221	41,465	37,244	4,612	45,307	40,695	209	2,050	1,841
19	0	23,468	23,468	230,540	207,072	3,837	37,695	33,858	4,213	41,392	37,179	161	1,577	1,416
20	47,200	23,468	70,668	230,540	159,872	10,504	34,268	23,764	11,591	37,815	26,224	372	1,213	841
21	224,961	23,468	248,429	230,540	-17,889	33,570	31,153	-2,417	37,227	34,546	-2,681	1,006	933	-73
22	0	23,468	23,468	230,540	207,072	2,883	28,321	25,438	3,213	31,561	28,348	73	718	645
23	0	23,468	23,468	230,540	207,072	2,621	25,746	23,125	2,935	28,833	25,898	56	552	496
24	0	23,468	23,468	230,540	207,072	2,383	23,406	21,023	2,681	26,342	23,661	43	425	382
25	0	23,468	23,468	230,540	207,072	2,166	21,278	19,112	2,450	24,065	21,615	33	327	294
26	224,961	23,468	248,429	230,540	-17,889	20,845	19,344	-1,501	23,691	20,985	-1,706	271	251	-20
27	0	23,468	23,468	230,540	207,072	1,790	17,585	15,795	2,045	20,085	18,040	20	193	173
28	0	23,468	23,468	230,540	207,072	1,627	15,986	14,359	1,868	18,349	16,481	15	149	134
29	0	23,468	23,468	230,540	207,072	1,479	14,533	13,054	1,706	16,764	15,058	12	114	102
30	0	23,468	23,468	230,540	207,072	1,345	13,212	11,867	1,559	15,315	13,756	9	88	79
Total	2,720,265	704,040	3,424,305	6,575,960	3,151,675	1,939,822	1,876,132	-63,690	1,975,963	1,975,963	0	1,333,111	531,923	-801,188

Table I.6-11 EIRR for Rain Water Harvest in Arabai

EIRR: 2.3 %

Year	Investment	O&M	Total Cost	Benefit		Difference		Net Present Value (Ksh)						
				(Ksh)	(Ksh)	(i = 1.0 %)		(i = 2.3 %)		(i = 2.0 %)				
						Cost	Benefit	Difference	Cost	Benefit	Difference	Cost	Benefit	Difference
1	1,027,862	5,139	1,033,001	22,728	-1,010,273	1,022,773	22,503	-1,000,270	1,009,615	22,213	-987,402	1,012,746	22,282	-990,464
2		5,139	5,139	33,520	28,381	5,038	32,860	27,822	4,909	32,019	27,110	4,939	32,218	27,279
3		5,139	5,139	44,312	39,173	4,988	43,009	38,021	4,798	41,370	36,572	4,843	41,756	36,913
4		5,139	5,139	49,704	44,565	4,938	47,765	42,827	4,689	45,354	40,665	4,748	45,919	41,171
5		5,139	5,139	55,104	49,965	4,890	52,430	47,540	4,583	49,143	44,560	4,655	49,909	45,254
6		5,139	5,139	55,104	49,965	4,841	51,910	47,069	4,479	48,030	43,551	4,563	48,931	44,368
7		5,139	5,139	55,104	49,965	4,793	51,396	46,603	4,378	46,943	42,565	4,474	47,971	43,497
8		5,139	5,139	55,104	49,965	4,746	50,888	46,142	4,279	45,880	41,601	4,386	47,031	42,645
9		5,139	5,139	55,104	49,965	4,699	50,384	45,685	4,182	44,841	40,659	4,300	46,109	41,809
10		5,139	5,139	55,104	49,965	4,652	49,885	45,233	4,087	43,826	39,739	4,216	45,204	40,988
11		5,139	5,139	55,104	49,965	4,606	49,391	44,785	3,995	42,834	38,839	4,133	44,318	40,185
12		5,139	5,139	55,104	49,965	4,561	48,902	44,341	3,904	41,894	37,960	4,052	43,449	39,397
13		5,139	5,139	55,104	49,965	4,515	48,418	43,903	3,816	40,916	37,100	3,973	42,597	38,624
14		5,139	5,139	55,104	49,965	4,471	47,938	43,467	3,729	39,990	36,261	3,895	41,762	37,867
15		5,139	5,139	55,104	49,965	4,428	47,464	43,038	3,645	39,085	35,440	3,818	40,943	37,125
16		5,139	5,139	55,104	49,965	4,383	46,994	42,611	3,563	38,200	34,637	3,743	40,140	36,397
17		5,139	5,139	55,104	49,965	4,339	46,529	42,190	3,482	37,335	33,853	3,670	39,353	35,683
18		5,139	5,139	55,104	49,965	4,296	46,068	41,772	3,403	36,490	33,087	3,598	38,582	34,984
19		5,139	5,139	55,104	49,965	4,254	45,612	41,358	3,326	35,664	32,338	3,528	37,825	34,297
20		5,139	5,139	55,104	49,965	4,212	45,160	40,948	3,251	34,856	31,605	3,458	37,083	33,625
21		5,139	5,139	55,104	49,965	4,170	44,713	40,543	3,177	34,067	30,890	3,391	36,356	32,965
22		5,139	5,139	55,104	49,965	4,129	44,270	40,141	3,105	33,296	30,191	3,324	35,643	32,319
23		5,139	5,139	55,104	49,965	4,088	43,832	39,744	3,035	32,542	29,507	3,259	34,945	31,686
24		5,139	5,139	55,104	49,965	4,047	43,398	39,351	2,966	31,806	28,840	3,195	34,259	31,064
25		5,139	5,139	55,104	49,965	4,007	42,968	38,961	2,899	31,095	28,186	3,132	33,588	30,456
26		5,139	5,139	55,104	49,965	3,968	42,543	38,575	2,833	30,382	27,549	3,071	32,929	29,858
27		5,139	5,139	55,104	49,965	3,928	42,122	38,194	2,769	29,694	26,925	3,011	32,283	29,272
28		5,139	5,139	55,104	49,965	3,889	41,705	37,816	2,707	29,022	26,315	2,952	31,650	28,698
29		5,139	5,139	55,104	49,965	3,851	41,292	37,441	2,645	28,365	25,720	2,894	31,030	28,136
30		5,139	5,139	55,104	49,965	3,813	40,883	37,070	2,585	27,722	25,137	2,837	30,421	27,584
Total	1,027,862	154,170	1,182,032	1,582,968	400,936	1,150,311	1,353,232	202,921	1,114,834	1,114,834	0	1,122,804	1,166,486	43,682

Table I.6-12 EIRR for Livestock Improvement in Arabal

Year	Investment	O&M	Total Cost	Benefit			Net Present Value (Ksh)							
				(Ksh)	Difference	(Ksh)	i = 10.6 %		i = 30.0 %					
							Cost	Benefit	Difference	Cost	Benefit	Difference		
1	1,364,966	21,994	1,386,960	22,728	-1,364,232	1,260,873	20,662	-1,240,211	1,254,388	20,556	-1,233,832	1,066,892	17,483	-1,049,409
2	0	21,994	21,994	116,720	94,726	18,177	96,463	78,286	17,990	95,473	77,483	13,014	69,065	56,051
3	0	21,994	21,994	210,712	188,718	16,524	158,311	141,787	16,271	155,881	139,610	10,011	95,909	85,898
4	0	21,994	21,994	216,104	194,110	15,022	147,602	132,580	14,716	144,589	129,873	7,701	75,664	67,963
5	0	21,994	21,994	221,504	199,510	13,657	137,587	123,880	13,309	134,036	120,727	5,924	59,657	53,733
6	217,646	21,994	239,640	221,504	-18,136	135,271	125,033	-10,238	131,150	121,224	-9,926	49,648	45,890	-3,758
7	0	21,994	21,994	221,504	199,510	11,286	113,667	102,381	10,886	109,637	98,751	3,505	35,300	31,795
8	0	21,994	21,994	221,504	199,510	10,260	103,333	93,073	9,846	99,158	89,312	2,696	27,154	24,458
9	0	21,994	21,994	221,504	199,510	9,328	93,939	84,611	8,905	89,680	80,775	2,074	20,888	18,814
10	0	21,994	21,994	221,504	199,510	8,480	85,399	76,919	8,054	81,108	73,054	1,595	16,067	14,472
11	217,646	21,994	239,640	221,504	-18,136	83,992	77,636	-6,356	79,361	73,355	-6,006	13,372	12,360	-1,012
12	0	21,994	21,994	221,504	199,510	7,008	70,578	63,570	6,588	66,344	59,756	944	9,507	8,563
13	0	21,994	21,994	221,504	199,510	6,371	64,162	57,791	5,958	60,002	54,044	726	7,313	6,587
14	0	21,994	21,994	221,504	199,510	5,792	58,329	52,537	5,388	54,267	48,879	559	5,626	5,067
15	0	21,994	21,994	221,504	199,510	5,265	53,026	47,761	4,873	49,080	44,207	430	4,327	3,897
16	217,646	21,994	239,640	221,504	-18,136	52,153	48,206	-3,947	48,023	44,389	-3,634	3,601	3,329	-272
17	0	21,994	21,994	221,504	199,510	4,351	43,823	39,472	3,986	40,146	36,160	254	2,561	2,307
18	0	21,994	21,994	221,504	199,510	3,956	39,839	35,883	3,605	36,308	32,703	196	1,970	1,774
19	0	21,994	21,994	221,504	199,510	3,596	36,218	32,622	3,261	32,838	29,577	150	1,515	1,365
20	47,200	21,994	69,194	221,504	152,310	10,285	32,925	22,640	9,277	29,699	20,422	364	1,166	802
21	217,646	21,994	239,640	221,504	-18,136	32,383	29,932	-2,451	29,060	26,860	-2,200	970	897	-73
22	0	21,994	21,994	221,504	199,510	2,702	27,211	24,509	2,412	24,293	21,881	68	690	622
23	0	21,994	21,994	221,504	199,510	2,456	24,737	22,281	2,182	21,971	19,789	53	530	477
24	0	21,994	21,994	221,504	199,510	2,233	22,488	20,255	1,973	19,871	17,898	41	408	367
25	0	21,994	21,994	221,504	199,510	2,030	20,444	18,414	1,784	17,971	16,187	31	314	283
26	217,646	21,994	239,640	221,504	-18,136	20,107	18,585	-1,522	17,584	16,254	-1,330	261	241	-20
27	0	21,994	21,994	221,504	199,510	1,678	16,896	15,218	1,460	14,700	13,240	18	186	168
28	0	21,994	21,994	221,504	199,510	1,525	15,360	13,835	1,320	13,295	11,975	14	143	129
29	0	21,994	21,994	221,504	199,510	1,386	13,963	12,577	1,194	12,024	10,830	11	110	99
30	0	21,994	21,994	221,504	199,510	1,260	12,694	11,434	1,080	10,875	9,795	8	85	77
Total	2,500,396	659,820	3,160,216	6,325,368	3,165,152	1,749,407	1,808,998	59,591	1,715,884	1,715,884	0	1,185,131	516,355	-668,776

Table I.7--1 Farm Budget and Cost Sharing in Salabani

Output	Unit	Unit Price	Without Project		With Project		Source
			Quantity	Price	Quantity	Price	
Unit Yield	Kg/hive(crude)		17.5		25		Field Survey
Price	Kg/hive(refined)	160	8.75	1,400	12.5		NBS*
	Ksh/kg(refined)	240				3,000	Field Survey
Output	Ksh/kg(refined)		1,400		3,000		NBS
Cost	Ksh/hive						
Log Hive	Ksh/hive/year	240	1	240	1		Field Survey (duration, 5 years)
KTBH	Ksh/hive/year	180			180		NBS (duration, 5 years)
Refining	Ksh/kg	164	0.2	33	1	164 **	
Whisky bottle	Ksh/bottle	10	18	180			Field Survey
Special jar +Label	Ksh/jar	30			25	750	NBS
Improved Jiko	Ksh/nos	75			1	75	Field Survey
Hired Labor	Ksh/hive	100	1	100	0.5	50	Field Survey
Total cost	Ksh/hive			553		1,219	
Net Profit				847		1,781	
Difference	Ksh/hive					934	

Note: * National Beekeeping Station

** Cost for with project is based on equipment with 5 years duration and community building cost with 9m3/70m3 and 30 years duration. Cost without duration was estimated referring to the cost with project.

Output	Unit	Unit Price	Without Project		With Project	
			Quantity	Price	Quantity	Price
Price	Ksh/kg	20	300	6,000	300	6,000
Output	Ksh/hive			6,000		6,000
Cost	Ksh/hive					
Fish	Ksh/kg	5	300	1,500	300	1,500
Improved Jiko	Ksh/nos	75			1	75
Firewood	Ksh/kg	2.5	300	750	150	375
Total cost	Ksh/hive			2,250		1,950
Net Profit				3,750		4,050
Difference	Ksh/jiko					300
Total Difference						1,234
						784

Table I.7-2 Farm Budget and Cost Sharing in Sandai

Sandai (Crop)	Without Project		With Project		Difference	Cost Sharing
	ha	Ksh/ha	ha	Ksh/ha		
0.4ha						
Maize	0.31	22,213	0.3	25,433	744	
Beans	0.06	15,430	0.06	38,206	2,292	1,366
Watermelon	0.01	96,588	0.02	123,572	2,471	1,505
Kale	0.01	64,742	0.02	90,378	1,808	1,161
	0.39	198,973	0.40	277,589	14,201	1,306,200
		9,425			4,776	2,177
Sandai (Goat)						
	Without Project		With Project		Difference	Cost Sharing
	head	Ksh/head	Ksh/head	Ksh		
Female	10.5	1,710	17,955	3,510	36,855	18,900
Total						23,676
						9,418

Table I.7-3 Farm Budget and Cost Sharing in Arabal

Arabal (Crop)	Without Project		With Project		Difference	Cost Sharing
	ha	Ksh/ha	ha	Ksh/ha		
0.4ha						
Maize	0.32	-1,367	0.24	6,129	1,471	1,908
Sorghum	0.01	5,190	0.04	45,236	1,809	1,757
Millet	0.06	3,110	0.08	8,458	677	490
Beans	0.01	6,430	0.04	23,930	957	893
	0.4	13,363	0.40	83,753	4,914	5,048
		-134				79,950
						7,995
Arabal (Goat)						
	Without Project		With Project		Difference	Cost Sharing
	head	Ksh/head	Ksh/head	Ksh		
Female	16	1,710	27,360	3,510	56,160	28,800
Total						33,848
						19,029

II. RECORD OF WORKSHOP

**Participants at Kampi ya Samaki Workshop
(23rd to 25th March 2000)**

Name	Ethnic Group	Major Source of Income	Firewood			Time for cooking			Time for fetching water	No. of Beehives	Women meetings		
			Distance	Means	Price	Volume / week	Morning	Lunch			Evening	Time	Week
Grace M. Asara	Njenps	Buying and Selling cattle	6Km	Fetching	Ksh. 40	1.5	30Min	45Min	45Min	2 Km	0	2.00p.m.	Wed, Sat
William Oie Siangiki	Njenps	Fishing	4Km	Fetching	Ksh. 30	2	10Min	Noon	Evening	30Min	0	N/A	N/A
Jane Parsalach	Njenps	Selling livestock	4Km	Fetching	0	2	35Min	45Min	45Min	6Km	0	2.00p.m.	Sat
Mary Lekipirich	Njenps	Goats/Cattle	2Km	Fetching	0	3	25Min	40Min	45Min	3 Km	0	2.00p.m.	Wed, Sat
Mary Kaploni	Njenps	Selling firewood	7Km	Fetching	Ksh. 40	2	25Min	40Min	45Min	2 Km	0	2.00p.m.	Wed, Sat
Margaret Kajos	Njenps	Selling firewood	4Km	Fetching	Ksh. 40	3	40Min	1Hr	1.5Hrs	4 Km	3	2.00p.m.	Wed, Sat
Maria Kiseku	Njenps	Farming maize	4Km	Fetching	0	4	1Hr	45Min	1Hr	2 Km	0	2.00p.m.	Wed, Sat
Maria Letiliyo	Njenps	Selling goats/cattle	5Km	Fetching	Ksh. 40	3	25Min	35Min	35Min	4 Km	0	2.00p.m.	Wed, Sat
Ann Kiptala	Tugen	Buy goats/cattle	6Km	Fetching	Ksh. 40	2	30Min	40Min	45Min	4 Km	2	2.00p.m.	Wed, Fri
Natalina Lenasiaku	Njenps	Farmer	6Km	Fetching	0	2	1Hr	1.5Hrs	1Hr	4 Km	1	2.00p.m.	Wed, Fri
Lina Cheptoo	Tugen	Restaurant/Hotel	10Km	Buying	Ksh. 50	5	1Hr	1.5Hrs	30Min	7 drums /day	2	2.00p.m.	Wed, Fri, Sat
Dennis Otiro	Luo	Boat Ride	0.5Km	Buying	Ksh. 40	2	20Min	40Min	45Min	1Km	0	N/A	N/A
Johana Chepngeny	Tugen	Kiosk retailer	10Km	Buying	Ksh. 40	2	1Hr	1Hr	1Hr	10Km	8	N/A	N/A
Hellen Ngolianga	Njenps	Farming/Selling cattle	3Km	Fetching	Ksh. 40	1	10Min	20Min	15Min	2Hrs	8	2.00p.m.	Wed, Sat
Eleen Chebbi	Tugen	Retailer	3Km	Buying	Ksh. 40	2	10Min	2 Hrs	20Min	10Mins	4	2.00p.m.	Sat
Teresia Kenya	Mswahili	Retailer	Charcoal	Buying	Ksh. 50	3 tins of charcoal	1Hr	3Hrs	1.5Hrs	1Hr	0	2.00p.m.	Sat
Martha Aktiela	Turkana	Buying and Selling eggs	12Km	Both	Ksh. 50	2	45Min	1Hr	1.5Hrs	1Hr	0	2.00p.m.	Mon, Fri
Joel Kimosop	Tugen	Buying selling honey	10Km	Both	Ksh. 50	5	45Min	1Hr	1Hr	45Min	120	N/A	N/A
Miriam Aktiano	Turkana	Basket making	10Km	Fetching	Ksh. 40	1	20Min	40Min	45Min	30Min	0	N/A	N/A
Paulina Atuko	Turkana	staff health centre	3Km	Buying	Ksh. 60	1	10Min	1 Hrs	20Min	10Min	0	N/A	N/A
Margaret Thomas	Turkana	Labourer	3Km	Fetching	Ksh. 60	1	20Min	10Min	45Min	10Min	0	N/A	N/A
William Lempakany	Njenps	Civil servant	N/A	Fetching	Ksh. 50	1	30Min	50Min	45Min	3Km	1	N/A	N/A
Josephine Etapal	Turkana	Making Tie & dye	1Km	Both	Ksh. 50	1	20Min	30Min	30Min	1Km	0	2.00p.m.	Sat
Miriam Tilia	Turkana	Selling baskets	2Km	Fetching	0	1	20Min	40Min	30Min	1Km	0	2.00p.m.	Sat

Women Groups in Salabani
(23rd to 25th March 2000)

Name of Women Group	Started	Chairperson	Committee	Members	Activities	Strength	Weakness	For verification of project
Melsori Women group	1993	Hellen Koipiri	8	12	1. Making beads 2. Selling beads 3. Selling honey	1. Bead making	1. No enough place to work 2. No markets	Can make beads
Londiani Women group	1998	Naitoti Koipiri	9	17	1. Making beads 2. Keeping poultry 3. Farming 4. Merry-go-round	1. Team work	1. Illiteracy	Harambee Farming
Lorecho Women group	1994	Margaret Kajos	9	24	1. Making leather Belts 2. Selling cattle 3. Rope Making	1. Enough teamwork	1. Illiteracy	Can work in the farms
Salabani Women group	1981	Jane Parsalach	10	20	1. Fishing 2. Cattle keeping 3. Selling honey	1. Fishing	1. Illiteracy 2. No Markets 3. No Boat 4. No enough water	Farming
Turkama Women group	1989	Jecinta Edapal	8	15	1. Making baskets/beads 2. Making mats	1. Have skills to make variety of baskets	1. No markets to sell products	Embroidery
Nguyin Women group	1997	Christina Kipchilot	12	60	1. Buying and selling fish 2. Buying & selling honey 3. Mary go round	1. Many members	1. No Market 2. No enough money 3. Buying firewood from far	Can sell fish and buy fishing facilities
Longron Women group	1994	Lilian Lekosiek	5	8	1. Keeping poultry 2. Growing crops (Maize)	1. Selling poultry Selling far crops	1. Illiteracy	Skills artcraft making
Kampi Ya Samaki Thapia		Teresa Otwour	7	21	1. Nursery school 2. Fishing not working	1. Having Bank account	2. Severe drought	N/A
Kampi Ya samaki women		Mary Cherop	10	113	1. Mary go round 2. Fishing	1. Have a plot in town	1. No enough money to build the plot	N/A

**For the Verification Project at Kampi ya Samaki
(23rd to 25th March 2000)**

What they can do	Problems	Result	Solution	Design
<ol style="list-style-type: none"> 1. Cooperation as a team 2. They can contribute 10% 	<ol style="list-style-type: none"> 1. Building Materials not available e.g. Blocks 2. Inadequate water supply 3. No money to hire for security 4. Acquiring a plot takes time from County Council of Baringo 	<ol style="list-style-type: none"> 1. Women groups will not benefit most tourists customers 2. Small women retailers will miss customers 3. Women groups will not have more skills in selling their products 	<ol style="list-style-type: none"> 1. Form one organisation 2. Make price mechanism for products 3. Create mutual understanding among all members 4. Keep time during meetings 5. To acquire the plot requires time 	<ol style="list-style-type: none"> 1. Roofing with iron sheets ,ceiling and good ventilation 2. Modern stone building 3. Furniture e.g. Seats, benches, tables 4. Doors/ windows made of steel frames 5. Modern iron hangers , to hang crafts

Products of Women Groups
(23rd to 25th March 2000)

Cost and price of Njemps traditional belts

Leather belt Ksh. 120	Treads Ksh. 100 for 5 belts	Skill Weaving	Beads K.sh. 250	Purchase place Nakuru	Time to make one 1-2 weeks	Selling price K.sh. 800
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Cost and price of Turkana Mats/Baskets

Material Reed/ palm	Skill Weaving	Cost of material Vary	Purchase place from Kapedo	Time to make one Vary	Selling price 750 -3000
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Activities of Women Groups in Salabani
(23rd to 25th March 2000)

Name of Group	Chairperson	Activity	Handicraft	Honey Processing	Fishing Processing
Meisori Women Group	* Helen Koipiri	1. Making belts/beads 2. Selling honey	●	○	
Londiani Women Group	* Naitoti Lekoipiri Anna Kiptala	1. Craft making 2. Poultry keeping 3. Farming/Mary -go round		○	
Longirion Women Group	* Lilian Lekosiek	1. Craft making /growing maize 2. Buying selling honey 3. Making table cloths	●	○	
Loresho Women Group	* Margaret Kajos	1. Making leather belts/ropes 2. Poultry keeping/selling cattle		○	
Nginyin Women Group	* Lois Raymond	1. Craft making /selling honey 2. Buying and selling fish	●	○	☉
Tilapia Women Group	* Teressia Owour	1. Fishing not working 2. Running nursery school			☉
Salabani Women Group	* Jane Parsalach	1. Making handicrafts 2. Making leather belts	●		
Turkana Women Group	* Mary Kaploni Paulina Kaundu Margaret Thomas Paulina Atuko Margaret Atuko Miriam Akeno Damaris Lochorchoria Monica Mbeyo	1. Making crafts, mats, belts and beads 2. Making baskets/mats	●		

**Problems and Solutions of Sandai Irrigation Scheme
(21st March 2000)**

Upper Part	Total Acres	Kimaech	Chepkention	Kabasikari	Problems	Solutions	Activities
	173 acres	62 acres	80-81 acres	30 acres	<ol style="list-style-type: none"> Spillage of water to farms Shallow canals Silting of canals causing logging Poor Leveling of farms Farmers increase by 10 yearly Main intake area Rocky No gates at division boxes Cattle spoil canals when crossing No Culverts dividing roads and farms Ostriches spoil germinating crops 	<ol style="list-style-type: none"> proper water management Use locked gates at division boxes Weekly removal of silted canals Farmers should cooperate A time table schedule to all farmers Main intake to be cemented 	<ol style="list-style-type: none"> Water users Association Maintenance of division boxes Seed supply Buying of foodstuffs

Middle Part	Total acres	Farmers	Good yields	Less yields	Problems	Solutions	Activities
	115 acres	50	60 acres	55 acres	<ol style="list-style-type: none"> No division boxes Shortage of water for irrigation By -laws are weak Canals are not well prepared Canals not supervised Floods during rainy season Some introduce new canals Farmers in upper part block division boxes 	<ol style="list-style-type: none"> A rotational type of irrigation Well improved and strict by-laws Proper schedule of canal cleaning Increase more division boxes Proper supervision within the scheme Control of main intake during rains season Farmer to agree on water distribution 	<ol style="list-style-type: none"> Association to assist farmers buy certified seeds Marketing strategies by association Association confine all farmers in the scheme

Lower Part	Total Acres	Farmers	Cultivated	Uncultivated	Problems	Solutions	Activities
	1,118 acres	234	289 acres	829 acres	<ol style="list-style-type: none"> Small main intake of water Less management of water Silted and shallow canals New unprocessed canals Shifting cultivation and overgrazing Evaporation too high Movement of farmers to middle and upper parts 	<ol style="list-style-type: none"> Widening the main intake Strengthening by-laws Canals be cleaned regularly Improved canals e.g. cementing Repairing existing division boxes Other farmers to respect lower farmers 	<ol style="list-style-type: none"> Setting up lower farmers committee Digging up canals and cleaning Harambee contributions to make canal good

**Groups and Associations in Sandai
(21st March 2000)**

	Major Activities	Main Actors	Strength	Weakness	For Verification of Projects
Sandai W.U.A.	<ol style="list-style-type: none"> 1. Buying and selling seeds to farmers 2. Selling seeds 3. Buying and selling maize to farmers 	<ol style="list-style-type: none"> 1. Farmers Committee 2. Min. Of Agriculture Technicians 3. NGOs (FAO, World Vision, CCF) 4. Kenya seed Co. Ltd., 	<ol style="list-style-type: none"> 1. Repairing canals 2. Bank account 3. Enough income 4. Farmers Contributions 	<ol style="list-style-type: none"> 1. No by-laws 2. Farmers use local seeds 3. No tools for cultivation 4. Inadequate water supply 5. Inadequate marketing 	<ol style="list-style-type: none"> 1. Making by-laws by members 2. Trained personnel 3. Use Certified seeds by farmers 4. Buying tools for making intake 5. Search for markets e.g. N.C.P.B
Irrigation Scheme	<ol style="list-style-type: none"> 1. Cultivate land 2. Digging of canals 3. Water Management 4. Clearing canals by farmers 5. Fencing 6. Repairing division boxes 	<ol style="list-style-type: none"> 1. NGOs (World vision, C.C.F) 2. Scheme committee 3. Min. Of Agriculture Technicians 4. Planting trees along canals 	<ol style="list-style-type: none"> 1. Provide labour by farmer 2. Provide labour by community 	<ol style="list-style-type: none"> 1. Poor water management 2. Poor water distribution 3. Blocked canals 	<ol style="list-style-type: none"> 1. Hire a watchman to control intakes
Livestock groups	<ol style="list-style-type: none"> 1. Dipping animals 2. Grazing animals 3. Repairing Dip crushes 4. Deworming animals 5. Castration of animals 6. Ear marking the animals 	<ol style="list-style-type: none"> 1. Animal farmers 2. Dipping committee 3. Veterinary officers 	<ol style="list-style-type: none"> 1. Keeping of livestock 		

**Activities of Sandai Women
(21st March 2000)**

Daily	
Time	Activities
4:00 a.m.	Light fire Sweep House
5:00 a.m.	Milk animals Make tea
7:00 a.m.	Fetch water Wash dishes clean house
7:30 a.m.	Take animals grazing
10:30 a.m.	Back from grazing Cooking lunch
1:00 - 12:30 a.m.	Wash clothes Take early lunch
1:00 p.m.	Wash dishes
2:00 p.m.	Farming vegetable garden 5km
4:30 p.m.	Home from fetching firewood
5:00 - 6:00 p.m.	Milking cows Prepare supper
7:30 p.m.	Close the closure Prepare children to sleep
8:00 p.m.	Eat dinner Wash dishes
9:00 p.m.	Children sleep
10:00 p.m.	Fetch water (drought time)
1:00 a.m.	Back from fetching water
1:30 a.m.	Sleep

Weekly	
Day	Activities
Monday	Farming
Tuesday	Look after animals
Wednesday	Fetch grass for thatching as groups
Thursday	Market Day
Friday	Fetch firewood as a group
Saturday	Wash clothes
Sunday	Church / rest

Monthly	
Week	Activities
1st Week	Farm Fetch water Dipping
2nd Week	House maintenance
3rd Week	Women meetings
4th Week	Women visit each other

Yearly	
Month	Activities
January	Look after animals
February	Look after animals, prepare land
March	Fetch water/prepare land
April	Planting/Fencing
May	Weeding/Thinning/Taking care of farms
June	Weeding second time/irrigating farms
July	Harvest Beans/Millet
August	Harvest maize/Storage for harvest
September	Harvest maize/collecting to Prepare farms for vegetable
October	Plant beans/vegetable
November	Weeding vegetable/beans Prepare for Christmas
December	Take care of Vegetable gardens Christmas holiday

**Sandai Irrigation Scheme
(21st March 2000)**

Upper part	No. of farmers	Total Acres	Cultivated
Kamaech	N/A	62 acres	62 acres
Chepkenion	N/A	80-81 acres	80-81 acres
Kabasikari	N/A	30 acres	30 acres
Total	N/A	172-3 acres	172-3 acres

Middle Part	No. of farmers	Total Acres	Cultivated	Major Crops		
				Maize	Beans	Millet
Total	50	115 acres	115 acres	75%	12.5%	12.5%

Lower Part	No. of farmers	Total Acres	Cultivated	Uncultivated
Sesia	38	100 acres	30 acres	70 acres
Cheploch	40	300 acres	120 acres	180 acres
Kapchepkendi	38	390 acres	76 acres	320 acres
Tambarawe	30	335 acres	15 acres	320 acres
Sokoteiwo	40	170 acres	18 acres	152 acres
Kesubo	25	21 acres	30 acres	7 acres
Total	234	1,118 acres	289 acres	829 acres

Possible negative impacts by/on the Verification Project
(20th April 2000)

Possible problems in the future	Negative impacts by the verification project	Negative impacts on the verification project
<ol style="list-style-type: none"> 1. Shortage of water 2. Lack of corporation of farmers 3. Expensive to maintain 4. Poor management of controlling water 5. Over population of animals in grazing fields/overgrazing 6. Low population of goats 7. Outbreak of diseases - can easily be spread 8. Shortage of fresh drinking water to maintain animals 9. Lack of marketing, lateral lining 	<ol style="list-style-type: none"> 1. Floods of the river 2. Destruction of crops by wild animals 3. Less income 4. Poverty will go up 5. Silt of intake 6. Block of water at upstream 	<ol style="list-style-type: none"> 1. Lack of technical know-how 2. Lack of tools 3. Lack of tractor 4. Famine and drought may affect the bulks 5. Less division boxes 6. Pests and diseases

Villages in Arabal
(16th and 17th March 2000)

	Villagers Present at Workshop		Village Population		Livestock Census (August 1999)				Livestock Death of drought				Major crops			Schools		Primary School				Secondary School			
	Male	Female	Male	Female	Cattle	Goats	Sheep	Poultry	Cattle	Goats	Sheep	Poultry	Primary	Secondary	Tertiary	Primary	Nursery	Attending	Drop outs	Male	Female	Attending	Drop outs	Male	Female
Partalo	6	1	185	182	100	320	20	30	20	120	15	10	Maize	Millet	Sorghum	0	1	N/A	N/A	N/A	N/A	N/A	N/A	0	1
Kabirwok	8	9	150	157	418	1,256	502	50	100	200	300	20	Maize	Millet	Beans	0	1	N/A	N/A	N/A	N/A	N/A	N/A	2	0
Embossos	9	3	240	242	115	1,453	106	80	30	34	46	0	Maize	Millet	Vegetables	1	1	113	70	N/A	N/A	N/A	N/A	0	3
Karna	10	9	200	295	1,046	2,322	273	40	150	120	130	0	Maize	Millet	Sorghum	1	1	43	33	N/A	N/A	N/A	N/A	0	0
Ramacha	3	0	87	79	470	520	100	100	200	300	70	50	Millet	Sorghum	Maize	0	0	4	N/A	N/A	N/A	N/A	0	0	
Tandar	3	0	103	85	203	413	81	0	32	73	21	0	Maize	Beans	Tomatoes	0	1	N/A	30	N/A	N/A	N/A	1	0	
Katilonwo	1	2	130	162	1,036	3,204	293	59	380	100	53	0	Millet	Sorghum	Maize	0	1	N/A	N/A	N/A	N/A	N/A	0	0	
Chemorongion	5	2	217	170	656	600	70	80	270	70	20	20	Maize	Beans	Millet	1	1	N/A	35	N/A	N/A	N/A	6	2	
Loronoru	1	0	150	154	101	211	159	97	15	113	104	45	Millet	Maize	Sorghum	0	0	N/A	N/A	N/A	N/A	N/A	2	0	
Chesirim	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	0
Ngeleda	0	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	46	26	1,462	1,526	4,145	10,299	1,604	536	1,197	1,130	759	145	Maize	Millet	Sorghum	3	7	160	188	0	0	18	5	7	6

(Mortality Rate)

28.9% 11.0% 47.3% 27.1%

Villages in Rugus (29th - 31st March 2000)

Village	Population	Area (Km ²)	Farm (acres)	Livestock Population						No. of livestock died of drought						No. of livestock died of diseases						Major problems in relation to pan	What they can do for verification of Project	Nursery		Primary		Secondary	
				Cattle	Goats	Sheep	Poultry	Don.	Cattle	Goats	Sheep	Poultry	Don.	Cattle	Goats	Sheep	Poultry	Don.	Male	Female	Male			Female	Male	Female			
Rugus	179	150	300	550	650	160	200	0	280	130	280	200	0	50	70	20	30	0	1. Shallow pan 2. Sited pan 3. No tractor	1. Dig pan 2. Dig trenches 3. Fence pan 4. Prepare road	22		15	N/A	0				
Lebes	120	4	170	362	500	305	220	0	62	120	30	20	0	40	50	21	45	0	1. No pan 2. Shanting pan with Rugus	1. Grow crops	N/A	N/A	N/A	N/A	N/A				
Longicharo	60	6	30	100	200	30	100	0	0	0	0	0	0	10	5	2	10	0	1. Villagers get stuck in mud	1. Make boat 2. Fishing 3. Dig small pan	N/A	N/A	N/A	N/A	N/A	N/A			
Lokicha (Men)	52	12	30	360	420	200	300	0	160	80	20	5	0	47	0	9	0	0	1. Farming 2. Digging the pan 3. Fencing the pan	1. Farming Animal keeping	26	29	14	18	0	1			
Tonokole	305	10	60	480	540	360	0	350	215	150	40	0	142	44	89	60	0	1. No pan	1. Livestock keeping 1. Growing crops	12	30	32	28	2	1				
Total	716	182	590	1,852	2,310	1,055	820	0	852	545	480	265	0	289	169	141	145	0			60	59	61	46	2	2			

Mortality Rate) 46.0% 23.6% 45.5% 32.3% 0.0% 0.0% 15.6% 7.3% 13.4% 17.7% 0.0%

Alternatives for Verification Project in Rugus
(30th March 2000)

Alternatives	Reasons for pan location	Beneficiaries	No. of Livestock in rainy season						No. of Livestock in drought season						Cattlement area	Water Quality	Farm land	Fencing Materials	Who will participate
			Cattle	Goats	Sheep	Poultry	Donkey	Cattle	Goats	Sheep	Poultry	Donkey	Cattle	Goats					
Lebiricha	1. Central point to four Villages 2. Far from the lake	1. Rugus 300 2. Liepes 120 3. Lebiricha 160 4. Longicharo 150 Total 730	1,500 2,800 2,300 150	3,500 5,000 400 800	700 100 160 80	0 0 80 150	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	250 Acres	Plenty of Fencing Materials around the pan	1. All Rugus, Liepes, Lebiricha and Longicharo 2. Men will provide man power	
Rugus	1. School children and teachers need water 2. Near the lake	1. Rugus 300 2. Liepes 120 3. Lebiricha 160 4. Longicharo 150 Total 730	350 700 550 35	9,700 1,040 1,700 2,900	1,040 150 25 20	230 0 0 35	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	250 Acres 150 Acres	1. To get fencing up to 2.5 kms from pan		
Villagers not included (Turokole, Nonsikro and Nhasotob)	1. Pan 7 Km from these Villages 2. Can provide labour for the pan 3. Nonsikro schools need water tank	1. Nonsikro Primary with 125 children	1,635	1,650	235	55	0	0	0	0	0	0	0	0	0	150 Acres			

Community proposals

1. Form Village committee to organize plan of action for the pan
2. The villagers will remove any barriers and work towards the rehabilitation of the pan
3. The pan would benefit both villagers inside and outside Lebiricha

Major Activities of Verification Project in Rugus
(31st March 2000)

Overall Goal	People of Rugus get enough drinking water
Project purpose	Clean water for both human and livestock
Results/Outputs	<ol style="list-style-type: none"> 1. Rehabilitation of the pan by community 2. The community will maintain the pan
Activities	<ol style="list-style-type: none"> 1. Forming planning committee 2. Measuring Pan site 3. Clearing the bushes 4. Digging the pan 5. Removing of soil in the pan 6. Removing soil and depositing far from the pan 7. Separate human and animal drinking places 8. Digging of channels that bring water to the pan 9. Fencing around the pan 10. Control soil erosion 11. Put up toilets at home, steams and schools 12. Digging channels to drain out dirty water from animal waste 13. Put filter media at the community drinking points 14. Planting life fence around the pan 15. Planting trees and grass on the catchment area 16. By -laws especially (Ideketa) to strictly guard the pan

Community Participation
for Verification Project in Rugus (31st March 2000)

Groups	What they can do	Available day	Available time	What they cannot do
Women Group	Women	Saturday	8:00 am - 12:00 noon	1. Cannot dig pan 2. Cannot collect/carry soil from pan
	Village elders			1. Cannot dig pan 2. Cannot collect/carry soil from pan
	Men			1. Cannot dig pan 2. Cannot collect/carry soil from pan
Elders group	Village elders	Monday	8:00 am - 12:00 noon	1. They are not able to dig a large and deep pan
	Men	Wednesday Saturday		
	Women			
	Children			
	Teachers			
	Men		Apr-00	8:00 am - 12:00 noon
Men Group	Elders			2. Cannot remove soil from pan
	Teachers			
	Children			