

EASTERN NILE IRRIGATION AND DRAINAGE STUDY/FEASIBILITY STUDY
DINGER BEREHA IRRIGATION PROJECT

ANNEX 12: Financial and Economic Analysis

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APPENDIX 12-1 1/2 PRODUCTION COSTS with economic prices							
DINGER BEREHA - IRRIGATION PROJECT - PRODUCTION COSTS							
date of value : ETB November 09							
Costs for 1 ha	Maize irrig			Maize Rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparatio	540		540	540	1	540	
Labor operation	1 660	0.5	830	1 320	0.5	660	
seeds	225	0.76	171	225	0.76	171	
DAP	410	1.25	513	410	1.25	513	
Urea	360	1.33	479	360	1.33	479	
Chemicals	425	1	425	425	1	425	
Others	550	1	550	250	1	250	
Total costs	4 170		3 507	3 530		3 037	
Farm Gate Price	307	0.76	233	307	0.76	233	
Yields qt/ha	56			49			
Costs for 1 ha	Sorghum			Sorghum Rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparation				540	1	540	
Labor operations				1 320	0.5	660	
seeds				35	1.143	40	
DAP				410	1.25	513	
Urea				360	1.33	479	
Chemicals				255	1	255	
Others				150	1	150	
Total costs				3 070		2 636	
Farm Gate Price ETB/qt				325	1.143	371	
Yields qt/ha	0			43			
Costs for 1 ha	Rice irrig			Rice Rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparatio	900		900	900	1	900	
Labor operation	2 120	0.5	1 060	1 520	0.5	760	
seeds	1 000	0.844	844	1 000	0.844	844	
DAP	80	1.25	100	80	1.25	100	
Urea	115	1.33	153	115	1.33	153	
Chemicals	0	1	0	0	1	0	
Others	850	1	850	350	1	350	
Total costs	5 065		3 907	3 965		3 107	
Farm Gate Price ETB/qt		0.844	0	450	0.844	380	
Yields qt/ha				45			
Costs for 1 ha	Har. bean irrig.			H. bean rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparatio	432		432	432	1	432	
Labor operation	1 960	0.5	980	1 560	0.5	780	
seeds	240	1.11	266	240	1.11	266	
DAP	410	1.25	513	410	1.25	513	
Urea		1.33	0		1.33	0	
Chemicals	170	1	170	170	1	170	
Others	1 100	1	1 100	100	1	100	
Total costs	4 312		3 461	2 912		2 261	
Farm Gate Price	365	1.11	405	365	1.11	405	
Yields qt/ha	25			22			
Costs for 1 ha	Soya bean irrig			Soya bean Rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparatio	515		515	515	1	515	
Labor operation	1 900	0.5	950	1 500	0.5	750	
seeds	595	0.8	476	595	0.8	476	
DAP	410	1.25	513	410	1.25	513	
Urea	180	1.33	239	180	1.33	239	
Chemicals	255	1	255	255	1	255	
Others	1 100	1	1 100	100	1	100	
Total costs	4 955		4 048	3 555		2 848	
Farm Gate Price	584	0.8	467	584	0.8	467	
Yields qt/ha	31			25			
Costs for 1 ha	Sesame irrig.			Sesame Rainfed			
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	
Land Preparatio	324		324	324	1	324	
Labor operation	1 760	0.5	880	1 360	0.5	680	
seeds	42	1.18	50	42	1.18	50	
DAP	410	1.25	513	410	1.25	513	
Urea	180	1.33	239	180	1.33	239	
Chemicals	170	1	170	170	1	170	
Others	1 100	1	1 100	100	1	100	
Total costs	3 986		3 275	2 586		2 075	
Farm Gate Price	1 127	1.18	1 330	1 127	1.18	1 330	
Yields qt/ha	9.0			7.5			

APPENDIX 12-1 2/2 PRODUCTION COSTS with economic prices									
Costs for 1 ha Potato irrigated									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value			
Land Preparatio	324		324	324	1	324			
Labor operation	3 940	0.5	1 970	3 440	0.5	1 720			
seeds	250	0.8	200	250	0.8	200			
DAP	410	1.25	513	410	1.25	513			
Urea	0	1.33	0	0	1.33	0			
Chemicals	255	1	255	255	1	255			
Others	1 500	1	1 500	500	1	500			
Total costs	6 679		4 762	5 179		3 512			
Farm Gate Price	334	0.8	268		0.8	0			
Yields qt/ha	240								
Costs for 1 ha Cabbage									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value			
Land Preparatio	486		486	486	1	486			
Labor operation	3 800	0.5	1 900	5 000	0.5	2 500			
seeds	76	1	76	76	1	76			
DAP	375	1.25	469	375	1.25	469			
Urea	300	1.33	399	300	1.33	399			
Chemicals		1	0		1	0			
Others	1 200	1	1 200	300	1	300			
Total costs	6 237		4 530	6 537		4 230			
Farm Gate Price	197			197	1	197			
Yields qt/ha	180								
Costs for 1 ha Pepper									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value			
Land Preparatio	324		324	324	1	324			
Labor operation	3 600	0.5	1 800	3 260	0.5	1 630			
seeds	36	1	36	36	1	36			
DAP	615	1.25	769	615	1.25	769			
Urea	540	1.33	718	540	1.33	718			
Chemicals	680	1	680	680	1	680			
Others	1 200	1	1 200	100	1	100			
Total costs	6 995		5 527	5 555		4 257			
Farm Gate Price	597	1	597	597	1	597			
Yields qt/ha	80								
Costs for 1 ha Onion irrig.									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value			
Land Preparatio	486		486						
Labor operation	4 400	0.5	2 200						
seeds	225	0.8	180						
DAP	410	1.25	513						
Urea	360	1.33	479						
Chemicals	425	1	425						
Others	1 250	1	1 250						
Total costs	7 556		5 532						
Farm Gate Price	436	0.8	349						
Yields qt/ha	220								
Costs for 1 ha Mango irrig 1st year									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value
Land Preparatio	324		324	324	1	324	324	1	324
Labor operation	3 040	0.5	1 520	1 040	0.5	520	1 840	0.5	920
Plants	1 250	1	1 250			0			0
DAP	328	1.25	410	430	1.25	538	500	1.25	625
Urea	360	1.33	479	400	1.33	532	420	1.33	559
Chemicals	255	1	255	255	1	255	255	1	255
Others	600	1	600	600	1	600	1 400	1	1 400
Total costs	6 157		4 838	3 049		2 769	4 739		4 083
Farm Gate Price ETB/qt		1	0		1	0	271	1	271
Yields qt/ha	0			0			150		
Costs for 1 ha Citrus irrig 1st year									
	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value	Financial Value	CF	Economic Value
Land Preparatio	324		324	324	1	324	324	1	324
Labor operation	1 840	0.5	920	1 040	0.5	520	1 840	0.5	920
seeds	3 000	1	3 000			0			0
DAP	500	1.25	625	240	1.25	300	500	1.25	625
Urea	100	1.33	133	140	1.33	186	140	1.33	186
Chemicals	660	1	660	660	1	660	850	1	850
Others	600	1	600	800	1	800	1 350	1	1 350
Total costs	7 024		6 262	3 204		2 790	5 004		4 255
Farm Gate Price ETB/qt		1	0	371	1	371	371	1	371
Yields qt/ha	0			30			180		

APPENDIX 12-2				AGRICULTURAL INCOME								
DINGER BEREHA IRRIGATION PROJECT				Financial Values								
Production revenue for 7 500 ha	Cropping Pattern	Cropping Pattern	Farm Gate Price	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production	Value of agricultural production
7 500	ha	%	Birr/qst	1st Y	2nd Y	3rd Y	4th Y	5th Y	6th Y	7th Y	following Y	
Rainy season	Maize *	750	10%	276	2 664 321	3 235 247	3 901 328	4 662 563	4 662 563	4 662 563	4 662 563	4 662 563
	Sorghum *	2 625	35%	293	13 058 424	15 234 826	18 499 435	23 396 344	23 396 344	23 396 344	23 396 344	23 396 344
	Rice *	1 500	20%	405	14 944 500	17 435 250	19 926 000	22 416 750	22 416 750	22 416 750	22 416 750	22 416 750
	Har.bean *	375	5%	328	845 613	986 549	1 197 952	1 550 291	1 550 291	1 550 291	1 550 291	1 550 291
	Soya bean *	1 125	15%	526	5 367 213	8 050 819	10 287 158	11 181 694	11 181 694	11 181 694	11 181 694	11 181 694
	Sesame *	750	10%	1 014	2 203 567	2 403 891	2 604 215	3 004 864	3 004 864	3 004 864	3 004 864	3 004 864
	Mango	75	1%	244	0	0	0	0	0	0	0	0
	Citrus	300	4%	334	0	0	0	0	0	0	0	0
Dry season	Maize irrig.	2 250	30%	276	15 186 632	18 223 959	22 779 948	28 348 380	28 348 380	28 348 380	28 348 380	28 348 380
	Har.bean irrig.	1 125	15%	328	6 644 106	8 305 133	9 966 159	8 305 133	8 305 133	8 305 133	8 305 133	8 305 133
	Soya bean irrig.	750	10%	526	6 744 514	7 809 437	8 874 360	11 004 206	11 004 206	11 004 206	11 004 206	11 004 206
	Sesame irrig.	1 875	25%	1 014	10 269 788	11 981 419	13 693 050	15 404 681	15 404 681	15 404 681	15 404 681	15 404 681
	Potato irrig.	375	5%	301	13 178 211	14 191 919	18 246 753	24 329 004	24 329 004	24 329 004	24 329 004	24 329 004
	Cabbage irrig.	225	3%	177	2 868 262	3 943 860	5 377 990	6 453 589	6 453 589	6 453 589	6 453 589	6 453 589
	Pepper irrig.	225	3%	537	4 340 807	6 511 210	7 596 412	8 681 613	8 681 613	8 681 613	8 681 613	8 681 613
	Onion irrig.	300	4%	392	12 688 332	15 860 416	17 975 138	23 261 943	23 261 943	23 261 943	23 261 943	23 261 943
	Mango	75	1%	244	0	0	0	0	600 083	1 200 165	2 250 310	2 250 310
	Citrus	300	4%	334	0	0	0	2 590 236	5 180 472	10 360 944	15 541 416	15 541 416
	Total		200%		111 004 290	134 173 936	160 925 898	194 591 290	197 781 609	203 562 163	209 792 780	209 792 780
	Face Value for 1 ha		INCOME		14 801	17 890	21 457	25 946	26 371	27 142	27 972	27 972

APPENDIX 12-3			PRODUCTION COSTS								
DINGER BEREHA IRRIGATION PROJECT			Financial Values								
Production costs for 7 500 ha		Cropping Pattern	Cropping Pattern	Inputs	Inputs	Inputs	Inputs	Inputs	Inputs	Inputs	Inputs
7 500		ha	%	1st Y	2nd Y	3rd Y	4th Y	5th Y	6th Y	7th Y	following Y
Rainy season	Maize *	750	10%	2 535 000	2 572 500	2 610 000	2 647 500	2 647 500	2 647 500	2 647 500	2 647 500
	Sorghum *	2 625	35%	7 140 000	7 796 250	7 927 500	8 058 750	8 058 750	8 058 750	8 058 750	8 058 750
	Rice *	1 500	20%	4 163 250	4 758 000	5 352 750	5 947 500	5 947 500	5 947 500	5 947 500	5 947 500
	Har.bean *	375	5%	1 035 750	1 054 500	1 073 250	1 092 000	1 092 000	1 092 000	1 092 000	1 092 000
	Soya bean *	1 125	15%	3 493 125	3 661 875	3 830 625	3 999 375	3 999 375	3 999 375	3 999 375	3 999 375
	Sesame *	750	10%	1 602 000	1 714 500	1 827 000	1 939 500	1 939 500	1 939 500	1 939 500	1 939 500
	Mango	75	1%	0	0	0	0	0	0	0	0
	Citrus	300	4%	0	0	0	0	0	0	0	0
Dry season	Maize irrig.	2 250	30%	9 045 000	9 157 500	9 270 000	9 382 500	9 382 500	9 382 500	9 382 500	9 382 500
	Har.bean irrig.	1 125	15%	4 682 250	4 738 500	4 794 750	4 851 000	4 851 000	4 851 000	4 851 000	4 851 000
	Soya bean irrig.	750	10%	3 603 750	3 641 250	3 678 750	3 716 250	3 716 250	3 716 250	3 716 250	3 716 250
	Sesame irrig.	1 875	25%	7 192 500	7 286 250	7 380 000	7 473 750	7 473 750	7 473 750	7 473 750	7 473 750
	Potato irrig.	375	5%	2 392 125	2 429 625	2 467 125	2 504 625	2 504 625	2 504 625	2 504 625	2 504 625
	Cabbage irrig.	225	3%	1 285 200	1 324 575	1 363 950	1 403 325	1 403 325	1 403 325	1 403 325	1 403 325
	Pepper irrig.	225	3%	1 459 125	1 497 375	1 535 625	1 573 875	1 573 875	1 573 875	1 573 875	1 573 875
	Onion irrig.	300	4%	2 109 300	2 161 800	2 214 300	2 266 800	2 266 800	2 266 800	2 266 800	2 266 800
	Mango	75	1%	461 775	228 675	228 675	228 675	239 925	251 175	355 425	355 425
	Citrus	300	4%	2 107 200	961 200	961 200	961 200	1 021 200	1 081 200	1 501 200	1 501 200
	Total			200%	54 307 350	54 984 375	56 515 500	58 046 625	58 117 875	58 189 125	58 713 375
Face Value for 1 ha		INPUTS		7 241	7 331	7 535	7 740	7 749	7 759	7 828	7 828

APPENDIX 12-4 INVESTMENTS AND RENEWAL EXPENSES										
DINGER BEREHA IRRIGATION PROJECT										
Investments	Implemented Project area	Preliminaries costs & ing. Services	Headworks Sec. Canal civil works	C. engin. works	Reservoirs Drainage	GRP syphons Sideweirs road bridges	Main canal Offtakes	S&Tdistribution system	Pump station	Total Investments & Renewal Birrs
	ha	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs
			1.0%	0.5%	0.5%	1.0%	1.5%	2.2%	3.5%	
1	0	17 779 568	18 422 098	192 456 271	8 020 356	36 103 201	1 437 122			274 218 616
2	0	4 889 381	8 828 251	82 481 259	41 248 029	15 472 800			10 762 525	163 682 246
3	1 700	4 889 381	8 828 251					98 805 385	53 812 627	166 335 644
4	2 000		612 666					116 241 630	43 050 102	159 904 397
5	2 000							116 241 630		116 241 630
6	1 800							104 617 467		104 617 467
7	0									0
8	0									0
9	0									0
10	0									0
11	0									0
12	0						500 000			500 000
13	0							9 066 667		9 066 667
14	0		500 000					10 666 667		11 166 667
15	0							10 666 667		10 666 667
16	0							9 600 000		9 600 000
17	0									0
18	0									0
19	0									0
20	0									0
21	0									0
22	0						500 000			500 000
23	0							9 066 667		9 066 667
24	0		500 000					10 666 667		11 166 667
25	0							10 666 667		10 666 667
26	0							9 600 000		9 600 000
27	0								30 000 000	30 000 000
28	0									0
29	0									0
30	0									0
31	0									0
32	0						500 000			500 000
33	0							9 066 667		9 066 667
34	0		500 000					10 666 667		11 166 667
35	0							10 666 667		10 666 667
36	0							9 600 000		9 600 000
37	0									0
38	0									0
39	0									0
40	0									0
41	0									0
42	0						500 000			500 000
43	0							9 066 667		9 066 667
44	0		500 000					10 666 667		11 166 667
45	0							10 666 667		10 666 667
46	0							9 600 000		9 600 000
47	0								30 000 000	30 000 000
48	0									0
49	0									0
50	0									0
Total Investments		27 558 330	36 691 267	274 937 530	49 268 385	51 576 001	1 437 122	435 906 111	107 625 254	985 000 000
Total renewal		0	2 000 000	0	0	0	2 000 000	160 000 000	60 000 000	224 000 000
Total		27 558 330	38 691 267	274 937 530	49 268 385	51 576 001	3 437 122	595 906 111	167 625 254	1 209 000 000

Appendix 12-5 OPERATION AND MAINTENANCE COSTS										
DINGER BEREHA IRRIGATION PROJECT										
O&M	Preliminaries costs & ing. Services Birrs	Headworks Sec. Canal civil works PS Birrs	C. engin. works Birrs	Reservoirs Drainage Birrs	GRP syphons Sideweirs road bridges Birrs	Main canal Offtakes Birrs	S&Tdistribution system Birrs	Pump station Birrs	Total O&M costs Birrs	
		1.0%	0.5%	0.5%	1.0%	1.5%	2.2%	3.5%		
1										
2										
3										
4		366 913	1 374 688	246 342	515 760	21 557	4 731 034	3 766 884	11 023 177	
5		366 913	1 374 688	246 342	515 760	21 557	7 288 350	3 766 884	13 580 493	
6		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
7		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
8		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
9		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
10		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
11		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
12		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
13		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
14		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
15		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
16		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
17		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
18		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
19		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
20		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
21		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
22		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
23		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
24		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
25		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
26		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
27		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
28		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
29		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
30		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
31		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
32		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
33		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
34		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
35		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
36		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
37		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
38		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
39		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
40		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
41		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
42		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
43		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
44		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
45		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
46		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
47		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
48		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
49		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
50		366 913	1 374 688	246 342	515 760	21 557	9 589 934	3 766 884	15 882 077	
Total		0	17 244 895	64 610 320	11 578 070	24 240 720	1 013 171	443 566 435	177 043 543	739 297 154

APPENDIX 12-6			BASIC ITEMS				
DINGER BEREHA IRRIGATION PROJECT							
Basic items	Cultivated land without project ha	Present profit /ha Birrs / ha	Total profit of production Birrs	Value of lost production Birrs	Implemented Project area ha	Irrigated area in service ha	Volumes used m ³
1	4 942	1 167	5 768 308		0	0	0
2	4 942	1 167	5 768 308		0	0	0
3	4 942	1 167	5 768 308	0	1 700	0	0
4	3 242	1 167	3 784 066	1 984 242	2 000	1 700	11 560 000
5	1 242	1 167	1 449 664	4 318 644	2 000	3 700	25 160 000
6	0			5 768 308	1 800	5 700	38 760 000
7	0			5 768 308		7 500	51 000 000
8	0			5 768 308		7 500	51 000 000
9	0			5 768 308		7 500	51 000 000
10	0			5 768 308		7 500	51 000 000
11	0			5 768 308		7 500	51 000 000
12				5 768 308		7 500	51 000 000
13				5 768 308		7 500	51 000 000
14				5 768 308		7 500	51 000 000
15				5 768 308		7 500	51 000 000
16				5 768 308		7 500	51 000 000
17				5 768 308		7 500	51 000 000
18				5 768 308		7 500	51 000 000
19				5 768 308		7 500	51 000 000
20				5 768 308		7 500	51 000 000
21				5 768 308		7 500	51 000 000
22				5 768 308		7 500	51 000 000
23				5 768 308		7 500	51 000 000
24				5 768 308		7 500	51 000 000
25				5 768 308		7 500	51 000 000
26				5 768 308		7 500	51 000 000
27				5 768 308		7 500	51 000 000
28				5 768 308		7 500	51 000 000
29				5 768 308		7 500	51 000 000
30				5 768 308		7 500	51 000 000
31				5 768 308		7 500	51 000 000
32				5 768 308		7 500	51 000 000
33				5 768 308		7 500	51 000 000
34				5 768 308		7 500	51 000 000
35				5 768 308		7 500	51 000 000
36				5 768 308		7 500	51 000 000
37				5 768 308		7 500	51 000 000
38				5 768 308		7 500	51 000 000
39				5 768 308		7 500	51 000 000
40				5 768 308		7 500	51 000 000
41				5 768 308		7 500	51 000 000
42				5 768 308		7 500	51 000 000
43				5 768 308		7 500	51 000 000
44				5 768 308		7 500	51 000 000
45				5 768 308		7 500	51 000 000
46				5 768 308		7 500	51 000 000
47				5 768 308		7 500	51 000 000
48				5 768 308		7 500	51 000 000
49				5 768 308		7 500	51 000 000
50				5 768 308		7 500	51 000 000

APPENDIX 12-7			PROJECT PROFITS					
DINGER BEREHA IRRIGATION PROJECT								
Project Benefits	Irrigated area in service	Value of agricultural production /ha	Total Agricultural income	Production costs /ha	Total Production costs	Lost production	Total Gross Profit	
	ha	Birrs / ha	Birrs	Birrs / ha	Birrs	Birrs	Birrs	
1	0		0		0	0	0	
2	0		0		0	0	0	
3	0		0		0	0	0	
4	1 700	14 801	25 160 972	7 241	12 309 666	-1 984 242	10 867 064	
5	3 700	16 220	60 013 903	7 282	26 945 085	-4 318 644	28 750 174	
6	5 700	17 870	101 857 397	7 360	41 954 640	-5 768 308	54 134 450	
7	7 500	19 926	149 441 678	7 457	55 924 299	-5 768 308	87 749 071	
8	7 500	22 912	171 836 826	7 589	56 919 535	-5 768 308	109 148 984	
9	7 500	25 253	189 395 746	7 697	57 730 455	-5 768 308	125 896 983	
10	7 500	26 837	201 279 946	7 767	58 254 755	-5 768 308	137 256 883	
11	7 500	27 366	205 248 601	7 791	58 430 655	-5 768 308	141 049 638	
12	7 500	27 773	208 297 432	7 812	58 587 555	-5 768 308	143 941 569	
13	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
14	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
15	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
16	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
17	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
18	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
19	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
20	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
21	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
22	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
23	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
24	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
25	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
26	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
27	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
28	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
29	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
30	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
31	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
32	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
33	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
34	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
35	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
36	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
37	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
38	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
39	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
40	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
41	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
42	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
43	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
44	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
45	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
46	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
47	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
48	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
49	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
50	7 500	27 972	209 792 780	7 828	58 713 375	-5 768 308	145 311 097	
Total								

APPENDIX 12-8			RESULTS - FINANCIAL ANALYSIS					
							F-IRR 50 years	8.72%
							F-IRR 30 years	7.64%
							B/C	0.87
DINGER BEREHA IRRIGATION PROJECT								
FIRR	Total Investments	Total O&M costs	Energy costs	Management Costs	Total Project Costs	Total Gross Profit	Cash Flow	
	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs
			483.32	287.5				
1	274 218 616	0	0	0	274 218 616	0	-274 218 616	
2	163 682 246	0	0	0	163 682 246	0	-163 682 246	
3	166 335 644	0	0	244 375	166 580 019	0	-166 580 019	
4	159 904 397	11 023 177	821 644	488 750	172 237 969	10 867 064	-161 370 904	
5	116 241 630	13 580 493	1 788 284	1 063 750	132 674 157	28 750 174	-103 923 983	
6	104 617 467	15 882 077	2 754 924	1 638 750	124 893 218	54 134 450	-70 758 769	
7	0	15 882 077	3 624 900	2 156 250	21 663 227	87 749 071	66 085 844	
8	0	15 882 077	3 624 900	2 156 250	21 663 227	109 148 984	87 485 756	
9	0	15 882 077	3 624 900	2 156 250	21 663 227	125 896 983	104 233 756	
10	0	15 882 077	3 624 900	2 156 250	21 663 227	137 256 883	115 593 655	
11	0	15 882 077	3 624 900	2 156 250	21 663 227	141 049 638	119 386 411	
12	500 000	15 882 077	3 624 900	2 156 250	22 163 227	143 941 569	121 778 342	
13	9 066 667	15 882 077	3 624 900	2 156 250	30 729 894	145 311 097	114 581 203	
14	11 166 667	15 882 077	3 624 900	2 156 250	32 829 894	145 311 097	112 481 203	
15	10 666 667	15 882 077	3 624 900	2 156 250	32 329 894	145 311 097	112 981 203	
16	9 600 000	15 882 077	3 624 900	2 156 250	31 263 227	145 311 097	114 047 870	
17	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
18	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
19	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
20	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
21	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
22	500 000	15 882 077	3 624 900	2 156 250	22 163 227	145 311 097	123 147 870	
23	9 066 667	15 882 077	3 624 900	2 156 250	30 729 894	145 311 097	114 581 203	
24	11 166 667	15 882 077	3 624 900	2 156 250	32 829 894	145 311 097	112 481 203	
25	10 666 667	15 882 077	3 624 900	2 156 250	32 329 894	145 311 097	112 981 203	
26	9 600 000	15 882 077	3 624 900	2 156 250	31 263 227	145 311 097	114 047 870	
27	30 000 000	15 882 077	3 624 900	2 156 250	51 663 227	145 311 097	93 647 870	
28	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
29	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
30	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
31	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
32	500 000	15 882 077	3 624 900	2 156 250	22 163 227	145 311 097	123 147 870	
33	9 066 667	15 882 077	3 624 900	2 156 250	30 729 894	145 311 097	114 581 203	
34	11 166 667	15 882 077	3 624 900	2 156 250	32 829 894	145 311 097	112 481 203	
35	10 666 667	15 882 077	3 624 900	2 156 250	32 329 894	145 311 097	112 981 203	
36	9 600 000	15 882 077	3 624 900	2 156 250	31 263 227	145 311 097	114 047 870	
37	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
38	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
39	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
40	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
41	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
42	500 000	15 882 077	3 624 900	2 156 250	22 163 227	145 311 097	123 147 870	
43	9 066 667	15 882 077	3 624 900	2 156 250	30 729 894	145 311 097	114 581 203	
44	11 166 667	15 882 077	3 624 900	2 156 250	32 829 894	145 311 097	112 481 203	
45	10 666 667	15 882 077	3 624 900	2 156 250	32 329 894	145 311 097	112 981 203	
46	9 600 000	15 882 077	3 624 900	2 156 250	31 263 227	145 311 097	114 047 870	
47	30 000 000	15 882 077	3 624 900	2 156 250	51 663 227	145 311 097	93 647 870	
48	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
49	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
50	0	15 882 077	3 624 900	2 156 250	21 663 227	145 311 097	123 647 870	
Total	1 209 000 000	739 297 154	164 860 452	98 310 625	2 211 468 231	6 360 616 504	4 149 148 273	

APPENDIX 12-9 CASH FLOW – FINANCIAL VALUES

DINGER BEREHA IRRIGATION PROJECT																			
CASH FLOW Values 1/3																			
	Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Implemented project area	ha			1 700	2 000	2 000	1 800												
Irrigated area in service	ha			1 700	3 700	5 700	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500
Present profit / ha	birrs	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167
Value of agric. production / ha	birrs				14 801	16 220	17 870	19 926	22 912	25 253	26 837	27 366	27 773	27 972	27 972	27 972	27 972	27 972	27 972
Project production costs / ha	birrs				7 241	7 282	7 360	7 457	7 589	7 697	7 767	7 791	7 812	7 828	7 828	7 828	7 828	7 828	7 828
Cultivated land without project	ha	4 942	4 942	4 942	3 242	1 242													
Total present profit	million birrs	5.8	5.8	5.8	3.8	1.4													
Value of foregone production	million birrs				2.0	4.3	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Total project value of production	million birrs				25.2	60.0	101.9	149.4	171.8	189.4	201.3	205.2	208.3	209.8	209.8	209.8	209.8	209.8	209.8
Total project production costs	million birrs				12.3	26.9	42.0	55.9	56.9	57.7	58.3	58.4	58.6	58.7	58.7	58.7	58.7	58.7	58.7
Total project gross profit	million birrs				12.9	33.1	59.9	93.5	114.9	131.7	143.0	146.8	149.7	151.1	151.1	151.1	151.1	151.1	151.1
Total Project Benefit	million birrs				10.9	28.8	54.1	87.7	109.1	125.9	137.3	141.0	143.9	145.3	145.3	145.3	145.3	145.3	145.3
Investments	million birrs	274.2	163.7	166.3	159.9	116.2	104.6												
Renewal costs	million birrs												0.5	9.1	11.2	10.7	9.6	0.0	0.0
O&M costs	million birrs				11.0	13.6	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Energy costs	million birrs				0.8	1.8	2.8	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Management costs	million birrs				0.2	0.5	1.1	1.6	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Total Costs	million birrs	274.2	163.7	166.6	172.2	132.7	124.9	21.7	21.7	21.7	21.7	21.7	22.2	30.7	32.8	32.3	31.3	21.7	21.7
Cash Flow	million birrs	-274.2	-163.7	-166.6	-161.4	-103.9	-70.8	66.1	87.5	104.2	115.6	119.4	121.8	114.6	112.5	113.0	114.0	123.6	123.6

CASH FLOW Values 2/3																			
	Years	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Implemented project area	ha																		
Irrigated area in service	ha	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500
Present profit / ha	birrs	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167
Value of agric. production / ha	birrs	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972
Project production costs / ha	birrs	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828
Cultivated land without project	ha																		
Total present profit	million birrs																		
Value of foregone production	million birrs	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
Total project value of production	million birrs	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8
Total project production costs	million birrs	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7
Total project gross profit	million birrs	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1
Total Project Benefit	million birrs	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3
Investments	million birrs																		
Renewal costs	million birrs	0.0	0.0	0.0	0.5	9.1	11.2	10.7	9.6	30.0	0.0	0.0	0.0	0.0	0.5	9.1	11.2	10.7	9.6
O&M costs	million birrs	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Energy costs	million birrs	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Management costs	million birrs	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Total Costs	million birrs	21.7	21.7	21.7	22.2	30.7	32.8	32.3	31.3	51.7	21.7	21.7	21.7	21.7	22.2	30.7	32.8	32.3	31.3
Cash Flow	million birrs	123.6	123.6	123.6	123.1	114.6	112.5	113.0	114.0	93.6	123.6	123.6	123.6	123.6	123.6	123.1	114.6	112.5	113.0

CASH FLOW Values 3/3																	
	Years	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
Implemented project area	ha																
Irrigated area in service	ha	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500		
Present profit / ha	birrs	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167	1 167		
Value of agric. production / ha	birrs	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972	27 972		
Project production costs / ha	birrs	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828	7 828		
Cultivated land without project	ha																
Total present profit	million birrs																
Value of foregone production	million birrs	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8			
Total project value of production	million birrs	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8	209.8			
Total project production costs	million birrs	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7			
Total project gross profit	million birrs	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1	151.1			
Total Project Benefit	million birrs	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3	145.3			
Investments	million birrs																
Renewal costs	million birrs	0.0	0.0	0.0	0.0	0.0	0.5	9.1	11.2	10.7	9.6	0.0	0.0	0.0			
O&M costs	million birrs	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9			
Energy costs	million birrs	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6			
Management costs	million birrs	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2			
Total Costs	million birrs	21.7	21.7	21.7	21.7	21.7	22.2	30.7	32.8	32.3	31.3	21.7	21.7	21.7			
Cash Flow	million birrs	123.6	123.6	123.6	123.6	123.6	123.1	114.6	112.5	113.0	114.0	123.6	123.6	123.6			

APPENDIX 12-10				RESULTS - ECONOMIC ANALYSIS			
							E-IRR 50 years 12.02%
							E-IRR 50 years 11.39%
							B/C 1.21
DINGER BEREHA IRRIGATION PROJECT							
EIRR	Total Investments	Total O&M costs	Energy costs	Management Costs	Total Project Costs	Total Gross Profit	Cash Flow
	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs	Birrs
			483.32	250			
1	246 796 755				246 796 755	0	-246 796 755
2	147 314 021				147 314 021	0	-147 314 021
3	149 702 080			212 500	149 914 580	0	-149 914 580
4	143 913 958	9 920 860	821 644	425 000	155 081 461	15 536 845	-139 544 616
5	104 617 467	12 222 444	1 788 284	925 000	119 553 195	39 583 862	-79 969 332
6	94 155 720	14 293 870	2 754 924	1 425 000	112 629 514	72 482 017	-40 147 497
7	0	14 293 870	3 624 900	1 875 000	19 793 770	114 686 205	94 892 435
8	0	14 293 870	3 624 900	1 875 000	19 793 770	138 789 055	118 995 285
9	0	14 293 870	3 624 900	1 875 000	19 793 770	157 683 092	137 889 323
10	0	14 293 870	3 624 900	1 875 000	19 793 770	170 602 304	150 808 535
11	0	14 293 870	3 624 900	1 875 000	19 793 770	175 103 490	155 309 720
12	450 000	14 293 870	3 624 900	1 875 000	20 243 770	178 546 175	158 302 405
13	9 066 667	14 293 870	3 624 900	1 875 000	28 860 436	180 202 448	151 342 012
14	11 116 667	14 293 870	3 624 900	1 875 000	30 910 436	180 202 448	149 292 012
15	10 666 667	14 293 870	3 624 900	1 875 000	30 460 436	180 202 448	149 742 012
16	9 600 000	14 293 870	3 624 900	1 875 000	29 393 770	180 202 448	150 808 678
17	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
18	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
19	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
20	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
21	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
22	450 000	14 293 870	3 624 900	1 875 000	20 243 770	180 202 448	159 958 678
23	9 066 667	14 293 870	3 624 900	1 875 000	28 860 436	180 202 448	151 342 012
24	11 116 667	14 293 870	3 624 900	1 875 000	30 910 436	180 202 448	149 292 012
25	10 666 667	14 293 870	3 624 900	1 875 000	30 460 436	180 202 448	149 742 012
26	9 600 000	14 293 870	3 624 900	1 875 000	29 393 770	180 202 448	150 808 678
27	27 000 000	14 293 870	3 624 900	1 875 000	46 793 770	180 202 448	133 408 678
28	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
29	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
30	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
31	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
32	450 000	14 293 870	3 624 900	1 875 000	20 243 770	180 202 448	159 958 678
33	9 066 667	14 293 870	3 624 900	1 875 000	28 860 436	180 202 448	151 342 012
34	11 116 667	14 293 870	3 624 900	1 875 000	30 910 436	180 202 448	149 292 012
35	10 666 667	14 293 870	3 624 900	1 875 000	30 460 436	180 202 448	149 742 012
36	9 600 000	14 293 870	3 624 900	1 875 000	29 393 770	180 202 448	150 808 678
37	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
38	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
39	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
40	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
41	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
42	450 000	14 293 870	3 624 900	1 875 000	20 243 770	180 202 448	159 958 678
43	9 066 667	14 293 870	3 624 900	1 875 000	28 860 436	180 202 448	151 342 012
44	11 116 667	14 293 870	3 624 900	1 875 000	30 910 436	180 202 448	149 292 012
45	10 666 667	14 293 870	3 624 900	1 875 000	30 460 436	180 202 448	149 742 012
46	9 600 000	14 293 870	3 624 900	1 875 000	29 393 770	180 202 448	150 808 678
47	27 000 000	14 293 870	3 624 900	1 875 000	46 793 770	180 202 448	133 408 678
48	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
49	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
50	0	14 293 870	3 624 900	1 875 000	19 793 770	180 202 448	160 408 678
Total	1 104 100 000	665 367 439	164 860 452	85 487 500	2 019 815 391	7 910 706 071	5 890 890 681

APPENDIX 12-11 CASH FLOW - ECONOMIC ANALYSIS

DINGER BEREHA IRRIGATION PROJECT																			
CASH FLOW Values 1/3																			
	Years	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Implemented project area	ha	0	0	1 700	2 000	2 000	1 800												
Irrigated area in service	ha				1 700	3 700	5 700	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500
Present profit / ha	birrs	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798
Value of agric. production / ha	birrs				16 800	18 393	20 241	22 525	25 853	28 467	30 246	30 865	31 341	31 574	31 574	31 574	31 574	31 574	31 574
Project production costs / ha	birrs				5 863	5 897	5 966	6 049	6 163	6 258	6 315	6 334	6 350	6 363	6 363	6 363	6 363	6 363	6 363
Cultivated land without project	ha	4 942	4 942	4 942	3 242	1 242													
Total present profit	million birrs	8.9	8.9	8.9	5.8	2.2													
Value of foregone production	million birrs				3.1	6.7	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Total project value of production	million birrs				28.6	68.1	115.4	168.9	193.9	213.5	226.8	231.5	235.1	236.8	236.8	236.8	236.8	236.8	236.8
Total project production costs	million birrs				10.0	21.8	34.0	45.4	46.2	46.9	47.4	47.5	47.6	47.6	47.6	47.6	47.6	47.6	47.6
Total project gross profit	million birrs				18.6	46.2	81.4	123.6	147.7	166.6	179.5	184.0	187.4	189.2	189.2	189.2	189.2	189.2	189.2
Total Project Benefit	million birrs				15.5	39.6	72.5	114.7	138.8	157.7	170.6	175.1	178.5	180.3	180.3	180.3	180.3	180.3	180.3
Investments	million birrs	246.8	147.3	149.7	143.9	104.6	94.2												
Renewal costs	million birrs												0.5	9.1	11.1	10.7	9.6	0.0	
O&M costs	million birrs				9.9	12.2	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
Energy costs	million birrs				0.8	1.8	2.8	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Management costs	million birrs			0.2	0.4	0.9	1.4	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total Costs	million birrs	246.8	147.3	149.9	155.1	119.6	112.6	19.8	19.8	19.8	19.8	19.8	20.2	28.9	30.9	30.5	29.4	19.8	19.8
Cash Flow	million birrs	-246.8	-147.3	-149.9	-139.5	-80.0	-40.1	94.9	119.0	137.9	150.8	155.3	158.3	151.4	149.4	149.8	150.9	160.5	160.5

CASH FLOW Values 2/3																			
	Years	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Implemented project area	ha																		
Irrigated area in service	ha	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500
Present profit / ha	birrs	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798
Value of agric. production / ha	birrs	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574
Project production costs / ha	birrs	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363
Cultivated land without project	ha																		
Total present profit	million birrs	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Value of foregone production	million birrs																		
Total project value of production	million birrs	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8
Total project production costs	million birrs	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6
Total project gross profit	million birrs	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2
Total Project Benefit	million birrs	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3
Investments	million birrs																		
Renewal costs	million birrs	0.0	0.0	0.0	0.5	9.1	11.1	10.7	9.6	27.0	0.0	0.0	0.0	0.0	0.5	9.1	11.1	10.7	9.6
O&M costs	million birrs	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3
Energy costs	million birrs	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
Management costs	million birrs	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Total Costs	million birrs	19.8	19.8	19.8	20.2	28.9	30.5	29.4	46.8	19.8	19.8	19.8	19.8	19.8	20.2	28.9	30.9	30.5	29.4
Cash Flow	million birrs	160.5	160.5	160.5	160.1	151.4	149.4	149.8	150.9	133.5	160.5	160.5	160.5	160.5	160.5	160.1	151.4	149.4	149.8

CASH FLOW Values 3/3																		
	Years	37	38	39	40	41	42	43	44	45	46	47	48	49	50			
Implemented project area	ha																	
Irrigated area in service	ha	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500	7 500			
Present profit / ha	birrs	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798	1 798			
Value of agric. production / ha	birrs	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574	31 574			
Project production costs / ha	birrs	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363	6 363			
Cultivated land without project	ha																	
Total present profit	million birrs																	
Value of foregone production	million birrs	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9			
Total project value of production	million birrs	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8	236.8			
Total project production costs	million birrs	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6			
Total project gross profit	million birrs	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2	189.2			
Total Project Benefit	million birrs	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3	180.3			
Investments	million birrs																	
Renewal costs	million birrs	0.0	0.0	0.0	0.0	0.0	0.0	0.5	9.1	11.1	10.7	9.6	27.0	0.0	0.0			
O&M costs	million birrs	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3	14.3			
Energy costs	million birrs	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6			
Management costs	million birrs	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9			
Total Costs	million birrs	19.8	19.8	19.8	19.8	19.8	19.8	19.8	20.2	28.9	30.9	30.5	29.4	46.8	19.8			
Cash Flow	million birrs	160.5	160.5	160.5	160.5	160.5	160.5	160.1	151.4	149.4	149.8	150.9	133.5	160.5	160.5			

APPENDIX 12-12		FAMILY FARM SCENARIO			
DINGER BEREHA IRRIGATION PROJECT					
Cropping pattern scenarios Household Farm		Cropping Pattern 1	Cropping Pattern 2	Cropping Pattern 3	
Area :	1.75 ha	%	%	%	
Rainy Season	Maize	10%	20%	10%	
	Sorghum	35%	40%	35%	
	Rice	20%		15%	
	Har.beans	5%	10%	10%	
	Soya bean	15%	15%	10%	
	Sesame	10%	15%	15%	
	Mango	1%		1%	
	Citrus	4%		4%	
	Dry Season	Maize irrig.	30%	30%	10%
Har.bean irrig.		15%	8%		
Soya bean irrig.		10%	15%		
Sesame irrig.		25%	17%		
Potato irrig.		5%	7%	20%	
Cabbage irrig.		3%	3%	5%	
Pepper irrig.		3%	3%	5%	
Onion irrig.		4%	4%	15%	
Mango		1%		1%	
Citrus		4%		4%	
	Total	200%	187%	160%	

APPENDIX 12 - 13 1/3				RESULTS FOR PILOT FARM - SCENARIO 1					
DINGER BEREHA IRRIGATION PROJECT									
Results for scenario 1		Cropping Pattern	Cropping Pattern	YIELDS usable=90%	Production for 1.75 ha	Household Food requirement	Net tradable production	Gross profit for 1.75 ha	Labor requirements for 1.75 ha
1.75 ha		%	ha	qt/ha	qt	qt	qt	Birr	md/ha
Rainy season	Maize *	10%	0.18	44.1	7.72	3.78	3.94	426.3	12
	Sorghum *	35%	0.61	38.7	23.70	5.04	18.66	3 467.6	40
	Rice *	20%	0.35	40.5	14.18	1.26	12.92	3 761.7	27
	Har.bean *	5%	0.09	19.8	1.73	0.63	1.10	94.9	7
	Soya bean *	15%	0.26	22.5	5.91	0.95	4.96	1 615.2	20
	Sesame *	10%	0.18	6.8	1.18	0.49	0.69	224.9	12
	Mango	1%	0.02						
	Citrus	4%	0.07						
Dry season	Maize irrig.	30%	0.53	50.4	26.46	2.52	23.94	4 270.2	44
	Har.bean irrig.	15%	0.26	22.5	5.91	0.95	4.96	420.3	26
	Soya bean irrig.	10%	0.18	27.9	4.88	0.63	4.25	1 302.5	17
	Sesame irrig.	25%	0.44	8.1	3.54	0.49	3.05	1 228.7	39
	Potato irrig.	5%	0.09	216.0	18.90	0.04	18.86	5 060.7	17
	Cabbage irrig.	3%	0.05	162.0	8.51	0.02	8.49	1 163.0	10
	Pepper irrig.	3%	0.05	72.0	3.78	0.01	3.77	1 634.3	9
	Onion irrig.	4%	0.07	198.0	13.86	0.03	13.83	4 870.8	15
	Mango	1%	0.02	135.0	2.36	0.21	2.15	437.6	2
	Citrus	4%	0.07	162.0	11.34	0.49	10.85	3 270.9	6
Profit for 1 ha		200%	3.50		153.96	17.52	136.44	33 249.7	302

APPENDIX 12 - 13 1/2				RESULTS FOR PILOT FARM - SCENARIO 2					
DINGER BEREHA IRRIGATION PROJECT									
Results for scenario 2		Cropping Pattern	Cropping Pattern	YIELDS usable=90%	Production for 1.75 ha	Household Food requirement	Net tradable production	Gross profit for 1.75 ha	Labor requirements for 1.75 ha
1.75 ha		%	ha	qt/ha	qt	qt	qt	Birr	md/ha
Rainy season	Maize *	20%	0.35	44.1	15	3.78	11.66	1 897.1	23
	Sorghum *	40%	0.70	38.7	27	3.78	23.31	4 542.1	46
	Rice *	0%	0.00	40.5	0	0.00	0.00	0.0	0
	Har.bean *	10%	0.18	19.8	3	0.95	2.52	293.1	14
	Soya bean *	15%	0.26	22.5	6	0.95	4.96	1 615.2	20
	Sesame *	15%	0.26	6.8	2	0.39	1.38	685.3	18
	Mango	0%							
	Citrus	0%							
Dry season	Maize irrig.	30%	0.53	50.4	26	5.04	21.42	3 574.0	44
	Har.bean irrig.	8%	0.14	22.5	3	0.63	2.52	182.8	14
	Soya bean irrig.	15%	0.26	27.9	7	0.63	6.69	2 119.5	25
	Sesame irrig.	17%	0.30	8.1	2	0.59	1.82	577.1	26
	Potato irrig.	7%	0.12	216.0	26	0.04	26.42	7 089.5	24
	Cabbage irrig.	3%	0.05	162.0	9	0.01	8.49	1 164.0	10
	Pepper irrig.	3%	0.05	72.0	4	0.01	3.77	1 635.6	9
	Onion irrig.	4%	0.07	198.0	14	0.03	13.83	4 870.8	15
	Mango	0%	0.00	135.0	0	0.00	0.00	0.0	0
	Citrus	0%	0.00	162.0	0	0.00	0.00	0.0	0
Profit for 1 ha		1.87	3.27		145.6	16.8	128.8	30 246.1	288

APPENDIX 12 - 13 1/3		RESULTS FOR PILOT FARM - SCENARIO 3							
DINGER BEREHA IRRIGATION PROJECT									
Results for scenario 3		Cropping Pattern	Cropping Pattern	YIELDS usable=90%	Production for 1.75 ha	Household Food requirement	Net tradable production	Gross profit for 1.75 ha	Labor requirements for 1.75 ha
1.75 ha		%	ha	qt/ha	qt	qt	qt	Birr	md/ha
Rainy season	Maize *	10%	0.18	44.1	7.72	3.78	3.94	426.3	12
	Sorghum *	35%	0.61	38.7	23.70	5.04	18.66	3 467.6	40
	Rice *	15%	0.26	40.5	10.63	1.26	9.37	2 693.7	20
	Har.bean *	10%	0.18	19.8	3.47	1.58	1.89	86.4	14
	Soya bean *	10%	0.18	22.5	3.94	1.58	2.36	579.9	13
	Sesame *	15%	0.26	6.8	1.77	0.98	0.79	88.9	18
	Mango	1%	0.02	0.0	0.00	0.00	0.00		
	Citrus	4%	0.07	0.0	0.00	0.00	0.00		
Dry season	Maize irrig.	10%	0.18	50.4	8.82	2.52	6.30	959.2	15
	Har.bean irrig.	0%	0.00	22.5	0.00	0.00	0.00	0.0	0
	Soya bean irrig.	0%	0.00	27.9	0.00	0.00	0.00	0.0	0
	Sesame irrig.	0%	0.00	8.1	0.00	0.00	0.00	0.0	0
	Potato irrig.	20%	0.35	216.0	75.60	0.04	75.56	20 276.8	69
	Cabbage irrig.	5%	0.09	162.0	14.18	0.01	14.16	1 941.4	17
	Pepper irrig.	5%	0.09	72.0	6.30	0.01	6.29	2 727.9	16
	Onion irrig.	15%	0.26	198.0	51.98	0.03	51.95	18 295.5	58
	Mango	1%	0.02	135.0	2.36	0.21	2.15	437.6	2
Citrus	4%	0.07	162.0	11.34	0.49	10.85	3 270.9	6	
Profit for 1 ha		1.60	2.80		221.8	17.51	204.3	55 252.0	298