TABLE

Table 2.2.1 SCHEDULES OF SCHEME REPAIRING AND TRAINING OF FARMERS ASSOCIATION

Name of Sector	Name of Zone	Irrigation Area(ha)	Nos of Users	Nos of Organization	2000	2001	2002	2003	2004	2005	2006	2007	Name of Major Canal	Source of Fund
Montante	Geral	General Canal					(TENTATIVE)						General Canal	(Japan)
Montante	Geral	2,270ha	2*[1]	1		(2,270)							General Canal	LOMACO+JFS[*3]
	Chokwe	3,738ha	2,503	4		*2	(1,500)	(1,500)	(738)				Canal Direito, Canal Esquerdo, D1, D2, D3, D4, D4A, D5, D6, D7	OPEC+Portugal[*3]
Sul	Lionde	3,987ha	659	3		(987)	(1,500)	(1,500)					Canal Direito,Nwachicoluane, RHS, D8, D9, D1N, D2N, D3N, D4N	OPEC[*3]
	Conhane	2,978ha	1,443	3	(500)	(500)			(1,978)				Canal Direito, D10, D11, D12, D13E	AFD[*3]
	Hokwe	2,397ha	1,783	3				*2	(1,000)	(1,000)	(397)		Canal Direito, D14, D15A, D15B, D16E, RHS	AFD[*4]
	Nwachicoluane	2,693ha	884	1			(765)	(1,000)	(928)				Canal Direito, D13D, D15D, D16D	OPEC [*3&*4]
Rio	Muianga	2,229ha	1,086	2				*2	(1,229)	(1,000)			Canal do Rio, RHS, D1CR, D2CR, D3CR, D4CR, D5CR	Portugal[*4]
	Chilembene	3,556ha	2,446	3			(1,000)	(1,000)	(1,000)	(556)			Canal do Rio, D6CR, D7CR, D8CR	OPEC[*4]
	Chiguidela	2,182ha	1,631	3				*2	(182)	(1,000)	(1,000)		Canal do Rio, D9CR, D10CR, D11CR, D12CR, RHS	Portugal[*4]
		(26,030ha)	12,437	23	500 (500)	3,757 (4,257)	4,765 (9,022)	5,000 (14,022)	7,055 (21,077)	3,556 (24,633)	1,397 (26,030)			

Note : Rehabilitation Schedule of General Canal

Repairing Schedule of Scheme

Strengthening Schedule of Farmers Association (Strengthening of farmers association will be executed by the fund of Portugal government)

*1 : Users are LOMACO and JFS, this area should be allocated into farmers.

*2 : The training of farmers association on this zones is being executed from 1999 under cooperation of Portugal government

*3 : Financial resources already assured

*4 : Financil resources under discussion

*3&*4 : Financial resources partially assured and partially under discussion

Resource: HICEP Mar. 2001

Table 2.3.1 Irrigation Area and Discharge of Secondary Canals

Name of Canal	Irrigable Area (ha)			Design Dischrge (l/sec)		
	Rice	Other crops	Total	for Rice	for Other crops	Total
Canal Esquerdo	587	465	1,052	939	409	1,348
(secondary canal)						
Canal Direito	**10,267**	**1,913**	**12,180**	**20,534**	**2,104**	**22,638**
D1	37	253	290	59	223	282
D2	52	203	255	83	179	262
D3	88	62	150	141	55	195
D4	205	32	237	328	28	356
D4A	0	83	83	0	73	73
D5	249	326	575	398	287	685
D6	447	126	573	715	111	826
D7	337	186	523	539	164	703
D8	315	83	398	504	73	577
D9	1,028	0	1,028	1,645	0	1,645
D10	858	0	858	1,373	0	1,373
D11	919	0	919	1,470	0	1,470
D12	643	0	643	1,029	0	1,029
D13D	1,915	24	1,939	3,064	21	3,085
D13E	558	0	558	893	0	893
D14	869	312	1,181	1,390	275	1,665
D15A	429	41	470	686	36	722
D15D	339	10	349	542	9	551
D15B	386	0	386	618	0	618
D16D	405	0	405	648	0	648
D16E	89	118	207	142	104	246
RSH	99	54	153	158	48	206
Canal Do Rio	**5,726**	**2,648**	**8,374**	**11,452**	**2,913**	**14,365**
D1CR	562	15	577	899	13	912
D2CR	116	58	174	186	51	237
D3CR	139	37	176	222	33	255
D4CR	372	85	457	595	75	670
D5CR	412	223	635	659	196	855
D6CR	442	319	761	707	281	988
D7CR	309	669	978	494	589	1,083
D8CR	1,223	594	1,817	1,957	523	2,480
D9CR	78	168	246	125	148	273
D10CR	678	268	946	1,085	236	1,321
D11CR	51	65	116	82	57	139
D12CR	103	19	122	165	17	182
RSH	1,241	128	1,369	1,986	113	2,098
Canal Nwachicoluane	**2,106**	**48**	**2,154**	**4,212**	**53**	**4,265**
D1N	627	35	662	1,003	31	1,034
D2N	315	13	328	504	11	515
D3N	734	0	734	1,174	0	1,174
D4N	430	0	430	688	0	688
Canal Geral	**18,686**	**5,074**	**23,760**	**37,372**	**5,581**	**42,953**
Pump Irrigation Area	0	2,270	2,270	0	2,497	2,497
Total Intake Discharge			**26,030**		**8,078**	**45,450**

Note, RSH: Tertiary canals directly diverted from the Principal canal
Source : Report of HICEP in 1995

Table 3.2.1 Staff of HICEP Headquarters

Category	Class	Staff Nos
Administration Counsel(CA)		**7**
• President of CA(PCA)	-	1
• Member of CA with worker	-	3
• Member of CA	-	3
Supervisor Counsel(CF)		**3**
• President of CF	-	1
• Member of CF	-	2
Cabinet of PCA		**8**
• Lawyer	A	1
• Management Controller	A	1
• Budget Controller	B	1
• Secretary	C	1
• Typist	D	1
• Driver	D	1
• Servant	E	1
• Guardsman	E	1
Technical Directorate(DT)		**6**
• Director	A	1
• Chief of Section of Water	A	1
• Hydraulic Technician	B	1
• Chief of Section of maintenance	A	1
• Surveyor	B	1
• Draftsman	C	1
Administration Directorate(DA)		**9**
• Director	A	1
• Chief of Section of Finance	B	1
• Accountant	B	1
• Treasure	B	1
• Computer Programmer	B	1
• Chief of Section of Administration	B	1
• Administrator	B	2
• Office Assistant	C	1
Secretary		**7**
• Chief of Administration	B	1
• Typist	D	1
• Operator	D	1
• Driver	D	1
• Servant	E	2
• Guardsman	E	1
TOTAL	**-**	**40**

Resource; HICEP Dec. 2000

Table 3.2.2 Staff of HICEP Hydraulic Sectors

Category	Class	Staff Nos in Sector			
		Upper	South	Rio	Total
Direction Section		**2**	**2**	**2**	**6**
• Chief of Sector	A	1	1	1	3
• Secretary	C1	1	1	1	3
Water Management Section		**37**	**38**	**41**	**116**
• Section Chief	B	1	1	1	3
• Zone Chief	C	1	3	2	6
• General Canal	D	1	-	-	1
• UHP	D	8	8	12	28
• UHS	D	26	26	26	78
Administration and Finance Section		**8**	**8**	**8**	**24**
• Section Chief	B	1	1	1	3
• Accountant	B	1	1	1	3
• Administration	B	1	1	1	3
• Computer Programmer	B	1	1	1	3
• Typist	D	1	1	1	3
• Driver	D	1	1	1	3
• Servant	D	1	1	1	3
• Guardsman	E	1	1	1	3
TOTAL	-	**47**	**48**	**51**	**146**
UHP	-	17	16	20	53
UHS	-	30	32	31	93

Remarks: (i) UHP = Unit of Main Canal, UHS = Unit of Secondary Canal

Source: HICEP Dec. 2000

Table 3.2.3 Zonal Irrigation Area of Secondary Canal and Farmers Association

Name of Sector	Name of Zone	Irrigation Area(ha)	Major Canal			Farmers Associations
			Name of Secondary Canal	Each Irrigation Area (ha)		
				Rice (ha)	Other crop (ha)	
Montante	Geral	2,270	General canal	0	2,270	○
	Chokwe	3,738	Canal Esquerdo	587	465	○
			D1	37	253	
			D2	52	203	○
			D3	88	62	
			D4	205	32	
			D4A	0	83	○
			D5	249	326	
			D6	447	126	○
			D7	337	186	
			Sub total	2,002	1,736	
Sul	Lionde	3,987	RHS*	390	17	○
			D8	315	83	○
			D9	1,028	0	
			D1N	627	35	○
			D2N	315	13	
			D3N	734	0	○
			D4N	430	0	
			Sub total	3,839	148	
	Conhane	2,978	D10	858	0	○
			D11	919	0	○
			D12	643	0	○
			D13E	558	0	
			Sub total	2,978	0	
	Hokwe	2,397	D14	869	312	○
			D15A	429	41	○
			D15B	386	0	
			D16E	89	118	○
			RSH	99	54	
			Sub total	1,872	525	
	Nwachicoluane	2,693	D13D	1,915	24	○
			D15D	339	10	○
			D16D	405	0	
			Sub total	2,659	34	
Rio	Muianga	2,229	RHS	210	0	
			D1CR	562	15	○
			D2CR	116	58	
			D3CR	139	37	
			D4CR	372	85	○
			D5CR	412	223	
			Sub total	1,811	418	
	Chilembene	3,556	D6CR	442	319	○
			D7CR	309	669	○
			D8CR	1,223	594	○
			Sub total	1,974	1,582	
	Chiguidela	2,182	D9CR	78	168	○
			D10CR	678	268	
			D11CR	51	65	○
			D12CR	103	19	
			RHS	641	111	
			Sub total	1,551	631	
Total		26,030		18,686	7,344	23

Note RHS : Tertiary canal directly diverted from the primary canal
RHS* : The area directly diverted from Canal Do Rio
○ : Farmers Association established

Resource: HICEP Mar. 2001

Table 4.1.1 Current Cost and Income per Ha for Paddy (less than 4ha)

Operation	Unit	Quantity/ha	Price	MT/ha	USD/ha
Production Cost					
Inputs					
NPK	100 kg	0.00	566,000	0	0
Seeds	100 kg	0.00	700,000	0	0
Urea	100 kg	0.00	566,000	0	0
Packing materials	LS	0.50	30,000	15,000	1
Sub-total for inputs				**15,000**	**1**
Other expenses					
Mechanized operations				**700,000**	41
Ploughing	unit	1.00	700,000	700,000	41
Man power				**1,675,000**	97
Harrowing + plot division	manday	5.00	0	0	0
Transplantation	manday	32.00	25,000	800,000	47
First irrigation	manday	2.00	0	0	0
Other irrigation	manday	5.00	0	0	0
Weeding	manday	32.00	0	0	0
Application of fertilizer	manday	1.00	0	0	0
Bird scaring	manday	15.00	0	0	0
Harvesting	manday	32.00	25,000	800,000	47
Packaging	manday	3.00	25,000	75,000	4
Sub-total for other expenses				**2,375,000**	**138**
Total direct expenses				**2,390,000**	**147**
Miscellaneous (5%)				119,500	7
Total expenses				**2,509,500**	**146**
Loan value				*715,000*	
Interest		0%		0	0
Total production costs				**2,509,500**	**146**
Income					
Production	kg	2,500.00	1,500	3,750,000	218
Total income				**3,750,000**	**218**
Benefits before deduction of water tax				**1,240,500**	72

Remark)

Exchange rate: USD 1 = MT 17,200

Source) Internal data of HICEP、Dec. 2000

Table 4.1.2 Proposed Cost and Income per Ha for Paddy (less than 4ha)

Operation	Unit	Quantity/ha	Price	MT/ha	USD/ha
Production Cost					
Inputs					
NPK	100 kg	0.50	566,000	283,000	16
Seeds	100 kg	0.30	700,000	210,000	12
Urea	100 kg	1.00	566,000	566,000	33
Packing materials	LS	0.50	30,000	15,000	1
Sub-total for inputs				**1,074,000**	**62**
Other expenses					
Mechanized operations				**700,000**	41
Ploughing	unit	1.00	700,000	700,000	41
Man power				**2,750,000**	160
Harrowing + plot division	manday	5.00	0	0	0
Transplantation	manday	32.00	25,000	800,000	47
First irrigation	manday	2.00	0	0	0
Other irrigation	manday	5.00	0	0	0
Weeding	manday	32.00	25,000	800,000	47
Application of fertilizer	manday	1.00	0	0	0
Bird scaring	manday	15.00	0	0	0
Harvesting	manday	40.00	25,000	1,000,000	58
Packaging	manday	6.00	25,000	150,000	9
Sub-total for other expenses				**3,450,000**	**201**
Total direct expenses				**4,524,000**	**147**
Miscellaneous (5%)				226,200	13
Total expenses				**4,750,200**	**276**
Loan value				*1,774,000*	
Interest		15%		266,100	15
Total production costs				**5,016,300**	**292**
Income					
Production	kg	2,500.00	3,500	8,750,000	509
Total income				**8,750,000**	**509**
Benefits before deduction of water tax				**3,733,700**	217

Remark)

Exchange rate: USD 1 = MT 17,200

Source) Internal data of HICEP、Dec. 2000

Table 4.1.3 Current Cost and Income per Ha for Paddy (more than 4ha)

Operation	Unit	Quantity/ha	Price	MT/ha	USD/ha
Production Cost					
Inputs					
NPK	100 kg	0.00	566,000	0	0
Seeds	100 kg	0.00	700,000	0	0
Urea	100 kg	1.00	566,000	566,000	33
Rafter 100%	l	0.00	900,000	0	0
Propanil 30%	l	3.60	90,000	324,000	19
MCPA	l	0.90	68,000	61,200	4
Packing materials	LS	0.50	30,000	15,000	1
Sub-total for inputs				**966,200**	**56**
Other expenses					
Mechanized operations				**2,675,000**	**156**
Ploughing	unit	1.00	700,000	700,000	41
First harrowing	unit	1.00	350,000	350,000	20
Second harrowing	unit	1.00	350,000	350,000	20
Plot division	unit	1.00	175,000	175,000	10
Harvesting	unit	1.00	1,100,000	1,100,000	64
Man power				**962,500**	**56**
Seeds and fertilizer mixing	manday	1.00	25,000	25,000	1
First irrigation	manday	2.00	25,000	50,000	3
Other irrigation	manday	5.00	25,000	125,000	7
Herbicide spraying	manday	1.00	25,000	25,000	1
Manual weeding	manday	2.00	25,000	50,000	3
Retancha	manday	8.00	25,000	200,000	12
Application of fertilizer	manday	1.00	25,000	25,000	1
Seeding	manday	0.50	25,000	12,500	1
Bird scaring	manday	15.00	25,000	375,000	22
Packaging	manday	3.00	25,000	75,000	4
Transport				**650,000**	**38**
Transport urea	Transp.	0.15	500,000	75,000	4
Transport fertilizer and seeds	Transp.	0.15	500,000	75,000	4
Transport of the production	Transp.	1.00	500,000	500,000	29
Sub-total for other expenses				**4,287,500**	**249**
Total direct expenses				**5,253,700**	**305**
Miscellaneous (5%)				262,685	15
Total expenses				**5,516,385**	**321**
Loan value				*3,641,200*	
Interest		15%		546,180	32
Total production costs				**6,062,565**	**352**
Income					
Production	kg	2,500.00	3,500	8,750,000	509
Total income				**8,750,000**	**509**
Benefits before deduction of water tax				**2,687,435**	156

Remark)

Exchange rate: USD 1 = MT 17,200

Source) Internal data of HICEP、Dec. 2000

Table 4.1.4 Proposed Cost and Income per Ha for Paddy (more than 4ha)

Operation	Unit	Quantity/ha	Price	MT/ha	USD/ha
Production Cost					
Inputs					
NPK	100 kg	1.00	566,000	566,000	33
Seeds	100 kg	1.00	700,000	700,000	41
Urea	100 kg	1.50	566,000	849,000	49
Rafter 100%	l	0.60	900,000	540,000	31
Propanil 30%	l	3.60	90,000	324,000	19
MCPA	l	0.90	68,000	61,200	4
Packing materials	LS	0.50	30,000	15,000	1
Sub-total for inputs				**3,055,200**	**178**
Other expenses					
Mechanized operations				**2,675,000**	**156**
Ploughing	unit	1.00	700,000	700,000	41
First harrowing	unit	1.00	350,000	350,000	20
Second harrowing	unit	1.00	350,000	350,000	20
Plot division	unit	1.00	175,000	175,000	10
Harvesting	unit	1.00	1,100,000	1,100,000	64
Man power				**962,500**	**56**
Seeds and fertilizer mixing	manday	1.00	25,000	25,000	1
First irrigation	manday	2.00	25,000	50,000	3
Other irrigation	manday	5.00	25,000	125,000	7
Herbicide spraying	manday	1.00	25,000	25,000	1
Manual weeding	manday	2.00	25,000	50,000	3
Retancha	manday	8.00	25,000	200,000	12
Application of fertilizer	manday	1.00	25,000	25,000	1
Seeding	manday	0.50	25,000	12,500	1
Bird scaring	manday	15.00	25,000	375,000	22
Packaging	manday	3.00	25,000	75,000	4
Transport				**650,000**	**38**
Transport urea	Transp.	0.15	500,000	75,000	4
Transport fertilizer and seeds	Transp.	0.15	500,000	75,000	4
Transport of the production	Transp.	1.00	500,000	500,000	29
Sub-total for other expenses				**4,287,500**	**249**
Total direct expenses				**7,342,700**	**427**
Miscellaneous (5%)				367,135	21
Total expenses				**7,709,835**	**448**
Loan value				*5,730,200*	
Interest		15%		859,530	50
Total production costs				**8,569,365**	**498**
Income					
Production	kg	2,500.00	5,000	12,500,000	727
Total income				**12,500,000**	**727**
Benefits before deduction of water tax				**3,930,635**	229

Remark)

Exchange rate: USD 1 = MT 17,200

Source) Internal data of HICEP、Dec. 2000

Table 4.1.5 Current Farm Economy

	Land Holding Size			
	<1.0ha	>1.0ha <4ha	>4ha <10ha	>10ha
Family member *1	8.5	7.3	6.2	14.2
Average farm holding size (ha) *2	0.5	1.0	4.0	10.0
Farm income (MT)				
Rainy season *3	620,000	1,241,000	10,750,000	26,874,000
Dry season *4	0	0	0	0
Sub-total	620,000	1,241,000	10,750,000	26,874,000
Livestock and non-farm income (MT) *1	6,384,000	9,606,000	8,010,000	9,735,000
Total income (MT)	7,004,000	10,847,000	18,760,000	36,609,000
Expenditure (MT) *1	6,066,000	6,398,000	7,876,000	16,296,000
Net income (MT) before deduction of water charge	938,000	4,449,000	10,884,000	20,313,000
Water charge (MT): USD45/ha/year	387,000	774,000	3,096,000	7,740,000
Net income (MT) after deduction of water charge	551,000	3,675,000	7,788,000	12,573,000

Remarks)
*1: based on the farm survey
*2: Farm land in the Chokwe Irrigation Scheme assumed by the Consultant
Some farmers have small lands outside the scheme, but it is excepted for the analysis.
*3: It is assumed that paddy cultivation in the whole area is carried out.
*4: No cultivation is assumed.

Table 4.1.6 Proposed Farm Economy

	Land Holding Size			
	<1.0ha	>1.0ha <4ha	>4ha <10ha	>10ha
Family member *1	8.5	7.3	6.2	14.2
Average farm holding size (ha) *2	0.5	1.0	4.0	10.0
Farm income (MT)				
Rainy season *3	1,867,000	3,734,000	15,723,000	39,306,000
Dry season *4	934,000	1,867,000	7,862,000	19,653,000
Sub-total	2,801,000	5,601,000	23,585,000	58,959,000
Livestock and non-farm income (MT) *1	6,384,000	9,606,000	8,010,000	9,735,000
Total income (MT)	9,185,000	15,207,000	31,595,000	68,694,000
Expenditure (MT) *1	6,066,000	6,398,000	7,876,000	16,296,000
Net income (MT) before deduction of water charge	3,119,000	8,809,000	23,719,000	52,398,000
Water charge (MT) :USD111/ha/year	954,600	1,909,200	7,636,800	19,092,000
Net income (MT) after deduction of water charge	2,164,400	6,899,800	16,082,200	33,306,000

Remarks)
*1: based on the farm survey
*2: Farm land in the Chokwe Irrigation Scheme assumed by the Consultant
Some farmers have small lands outside the scheme, but it is excepted for the analysis.
*3: It is assumed that paddy cultivation in the whole area is carried out.
*4: It is assumed that 50% of holding area is cultivated for paddy in the dry season .

Table 4.1.7 Project Design Matrix for the Rehabilitation of Chokwe Irrigation Scheme

Project： Rehabilitation of Chokwe Irrigation Scheme　　Period：2000 to 2007　　Date of issue：March 2001
Project area：Chokwe Irrigation Scheme　　Target Group：HICEP and farmers

Project Summary	Verifiable Indicators	Means of Verification	Important Assumptions
Overall goals			
1. Sustainable Development of Agriculture in the Scheme is accomplished.	1. Agricultural production - 3.5tons/ha for small scale farmers - 5.0tons/ha in medium and large scale farmers 2. Actual irrigated area 26,000ha from 2007	・ Monitoring on agricultural production ・ Annual report of HICEP ・ Annual report of Chokwe district	・ There is no drastic change concerning irrigation policy, system, etc. in the country ・ There is no floods from which any serous damages will be brought about.
Project purpose			
・ Function of Chokwe Irrigation Scheme is recovered.	1. Design discharge of 45.5 m^3/sec is secured for the irrigable area. 2. More than 20 of water users' associations will be organized. 3. Implementation of repair work to be scheduled in 2003: 14,000ha in 2004: 20,000ha in 2005: 23,000ha in 2006: 26,000ha 4. Implementation of irrigation to be scheduled from 2004: 14,000ha from 2005: 20,000ha from 2006: 23,000ha from 2007: 26,000ha	1. Record of water management 2. List of water users' groups 3. Annual report of HICEP 4. Annual report of HICEP	・ Agricultural extension work is carried out in cooperation with all stakeholders. ・ Water tax is securely collected by HICEP. ・ Users pay water tax. ・ Research work is undertaken in cooperation with all stakehollders. ・ HICEP tries to deduct the amount of water tax.
Outputs			
1. General canal and relevant facilities are rehabilitated.	1. Rehabilitation ・ General canal: 14.3km ・ Intake: one site ・ Regulator: one site ・ Cross road: two sites ・ Drain inlet: one site 2. Dischage capacity of the General Canal ・ 45.5m^3/sec at BP ・ 43.0m^3/sec at EP	・ Progress of construction work ・ Technical specification for construction ・ Completion report of construction	・ O&M work is done properly. ・ Water users' associations function well. ・ Each donor implements technical and financial assistance on shcedule. ・ Water tax is securely collected by HICEP. ・ Users pay water tax.
Activities	**Inputs**		
1. Background, purpose, request, etc. are grapsed. 2. Technical and financial adaptability are checked. 3. Undertaken for the Country is clarified. 4. Current situations of river and facilities are clarified. 5. Current situation of agriculture is checked. 6. Users' needs for O&M work are confirmed. 7. Practical design plan is formulated as Japanese grant aid project. 8. Proposal for sustainable O&M plan is formulated.	Japan 1. Implementation of the basic design study Mozambique 1. Supply of every facility to the study team	・ Detailed design is completed by the Consultant on schedule. ・ Construction is commensed on schedue. ・ Construction is completed by reliable contractor under proper supervision on schedule. ・ Stakeholders sustain good relationship concerning relevant studies and construction work. **Pre-conditions** ・ HICEP and users request rehabilitation of general canal and relevant facilities.