Table G-2-1 Comparison of Irrigation Rotation System

(1/2)

Description	Case-1	Case-2	Case-3	Case-4
1. Rotation type	(Rotation-1) Main canal Branch Sub-branch 5days	(Rotation-2-1) Main canal 5days 5days 5days	(Rotation-2-2) Main canal 5 5 5 ⑤(5) ⑤(5) ⑤(5)	(Rotation-3) Main canal Branch 5days 5days 5days Sub-branch
2. Canal water flow - Bahr Yusef main canal - Branch canal - Sub-branch canal	24 hrs continuous Three-turn rotation -do- (5/10)	24 hrs continuous 24 hrs continuous Three-turn rotation (5/10)		24 hrs continuous 24 hrs continuous 24 hrs continuous
		- Rotation block: Upstream, middle stream & down-stream.	- Rotation block: 1/3 area from up-stream, middlestream & downstream.	
- Meskas	Pump rotation (16 hr/d)	Pump rotation (16 hr/d)		Pump rotation (16 hr/d)
3. Capacity of canal - Bahr Yusef main canal - Branch canal - Sub-branch canal - Meskas	Same as others Large Large Same as others	Same as others Small Large Same as others		Sama as others Small Small Same as others
4. Distribution control point - Bahr Yusef main canal - Branch canal - Sub-branch canal - Meskas - No of control point	At regulators by ID At intake gate by ID (None) At intake pumps by WUA - Small	At regulators by ID (W.L. & quantity) At intake gate by ID (W.L. & quantity) At intake gate by ID (Gate open/close) At intake pumps by WUA (Pump operation) - Midium		At regulators by ID At intake gate by ID (None) At intake pumps by WUA - Many
5. Operation & maintenance - Delivery facility - Distribution control system - O/M staff required	Same as others Less complicated - Careful rotation block planning is required. - Many IAS staff required.	Same as others Rather complicated - Frequent gate operation and careful rotation block planning are required. - Many IAS staff required.		Same as others Complicated - Careful pump operation control at on-farm level is particularly required. - Many IAS staff required.

(2/2)

Description	Case-1	Case-2	Case-3	Case-4
6. Night storage - Bahr Yusef main canal - Branch/sub-branch - Meskas	(Not considered) Short in capacity *(3.9 hrs) (Not considered)	(Not considered) Short in capacity *(5.5hrs) (Not considered)	(Not considered) Sufficient in capacity *(8.1hrs) (Not considered)	(Not considered) Sufficient in capacity (11.8hrs) (Not considered)
7. Necessity of WUA	Less necessary	Necessary		Most necessary
8. Necessity of communication & evaluation system	Necessary	Necessary		Most necessary
9. Environmental aspect	Same as present	Little affect on mosquito control and weed control.		Rather affect on mosquito weed & schistosomiasis.
10. Problems and constraints of the present system	Problems ----- 1) Frequent occurrence of tail shortage that resulted inequitable water distribution, 2) Ineffective outflow partly due to the present rotation system, and 3) Low irrigation efficiency caused by the present rotation system. Constraints -- 1) 16 hrs/day irrigation time, thus night time flow be considered as primary factor. 2) Canal check(regulator) is downstream water level control system. 3) Unfamiliarity of corporate water use due to farmers' traditional custom of water use.			
11. System function expected - Water control/utilization conveniency - Ineffective outflow - Tail shortage occurrence - Equitable water supply - Water Users Associatio - Irrigation efficiency (At main system) (At micro system) - Affection to water-logging	- Easy for supplier but severe for users. - Much outflow is unavoidable. - Frequent due to farmers' trend of over irrigation - Often hard to attain. - Hard to function. - Could be improved. - Become lower than others - Least affect.	- Middle level for both supplier and users. - Much outflow is unavoidable. - Sometimes unavoidable. - Middle level. - Will be functioned. - Could be improved. - Middle level. - Middle level.	- Could be minimized. - Less frequency and could be avoided. - Could be attained. - Could be improved. - Middle level.	- Risky for supplier and secure for users. - Could be minimized. - Less frequency and could be avoided. - Could be attained. - Will be functioned - Could be improved. - Could be improved. - Most affect.
12. Judgement	- Present system but not recommendable.	- Not recommendable.	- Recommendable.	- Less recommendable due to unrealistic water use system at present.

Note: *: Figure shows night storage capacity by hours taken from Harika canal study as described in next page.

Table G-2-1 (cont'd)

** *Study of night storage capacity at Harika branch canal.*

Since irrigation time by pump operation is constrained to be 16 hours and canal water flow is designed to be 24 hours, night storage shall be considered on the improved canal system. Possible night storage capacity can be estimated from differences between design water levels and storage water levels at branch and sub-branch canals. The study is undertaken at Harika branch canal and sub-branch canals at the pilot areas by rotation types.

1) Storage capacity at sub-branch canals

- storage capacity at pilot areas

Kom El Hasel sub-branch	(L=2.3km)	V= 9,210 m3
Nazlet Ramadan sub-branch	(L=2.4km)	V= 6,980 m3
El Baghour sub-branch	(L=6.4km)	V=13,370 m3
3rd branch	(L=2.56km)	V= 7,910 m3
Total for sub-branch	(L=11.1km)	V=29,560 m3
Total for 3rd branch	(L=2.56km)	V= 7,910 m3

- average storage capacity per km
  For sub-branch 29,560m3 / 11.1km = 2,660 m3/km
  For 3rd branch 7,910m3 / 2.56km = 3,090 m3/km

2) Storage capacity at Harika branch canal

For 1st reach (L=11.75km)	V= 75,080 m3
For 2nd reach (L=11.00km)	V= 37,580 m3
For 3rd reach (L=10.11km)	V= 26,990 m3
Total for Harika canal	V=139,650 m3

3) Storage capacity for 8 hours by rotation type

a. Case-1 (rotation-1)
- inflow volume at Harika intake
  6.978 m3/s * 8 * 3600 * 3 = 602,900 m3
- storage volume

(Harika)		= 139,650 m3
(Sub-branch)	2,660 m3 * 45.24 km	= 120,330 m3
(3rd branch)	3,090 m3 * 12.11 km	= 37,420 m3
	Total	297,400 m3

- storage ratio by hour
  297,400 / 602,900 * 8 hrs = 3.9 hrs

b. Case-2 (rotation-2-1)
- inflow volume at Harika intake
  6.978 m3/s * 8 * 3600 = 200,970 m3
- storage volume

(Harika)	volume at 1st reach	= 75,080 m3
(Sub-branch)	2,660 m3 * 15.79 km	= 42,000 m3
(3rd branch)	3,090 m3 * 6.86 km	= 21,200 m3
	Total	138,280 m3

- storage ratio by hour
  138,280 / 200,970 * 8 hrs = 5.5 hrs

c. Case-3 (rotation-2-2)
- inflow volume at Harika intake
  6.978 m3/s * 8 * 3600 = 200,970 m3
- storage volume

(Harika)		= 139,650 m3
(Sub-branch)	2,660 m3 * 15.79 km	= 42,000 m3
(3rd branch)	3,090 m3 * 6.86 km	= 21,200 m3
	Total	202,850 m3

- storage ratio by hour
  202,850 / 200,970 * 8 hrs = 8.1 hrs

d. Case-4 (rotation-3)
- inflow volume at Harika intake
  6.978 m3/s * 8 * 3600 = 200,970 m3
- storage volume

(Harika)		= 139,650 m3
(Sub-branch)	2,660 m3 * 45.24 km	= 120,330 m3
(3rd branch)	3,090 m3 * 12.11 km	= 37,420 m3
	Total	297,400 m3

- storage ratio by hour
  297,400 / 200,970 * 8 hrs = 11.8 hrs

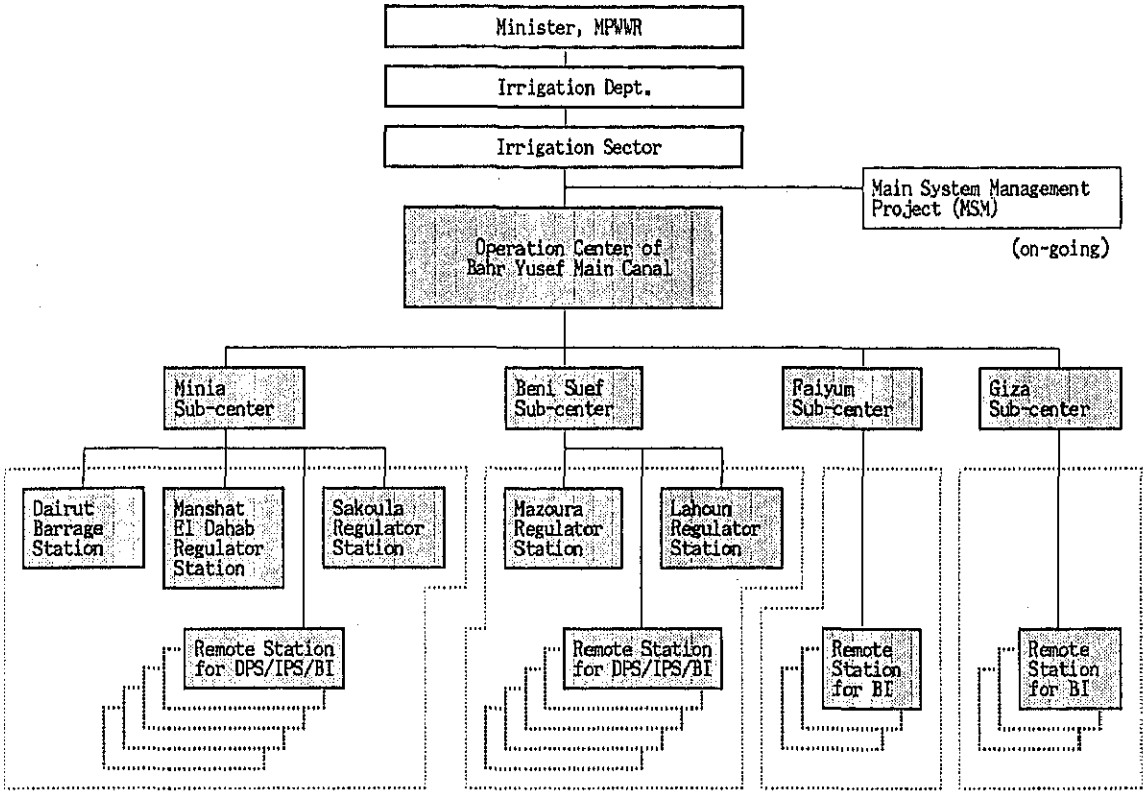
Table G-2-2 Identification of Problems and Solutions on On-farm Irrigation System Improvement

(Causes)

(Problems)	1) Over irrigation by pumps (upstream priority)	2) Many direct intakes to Meskas	3) Inadequate present irrigation rotation & farmers unreliability	4) No cooperation among farmers (individual pump operation)	5) Main canal water levels not well maintained	6) Shortage of night storage capacity	7) On-farm delivery inconveniency	8) Poor land leveling	9) Improper structure conditions (tail escapes, etc)	10) lack of canal maintenance
1) Water shortage in sub-branch canals	☆	☆	☆	☆	☆				☆	
2) Much water level fluctuation					☆					
3) Irrigation from drainage canals	☆					☆				
4) Low irrigation efficiency	☆	☆	☆				☆	☆		
5) Inequitable distribution (tail water shortage)	☆			☆						
6) Much ineffective outflow			☆		☆	☆			☆	
7) Thickly growing of water plants/weeds										☆

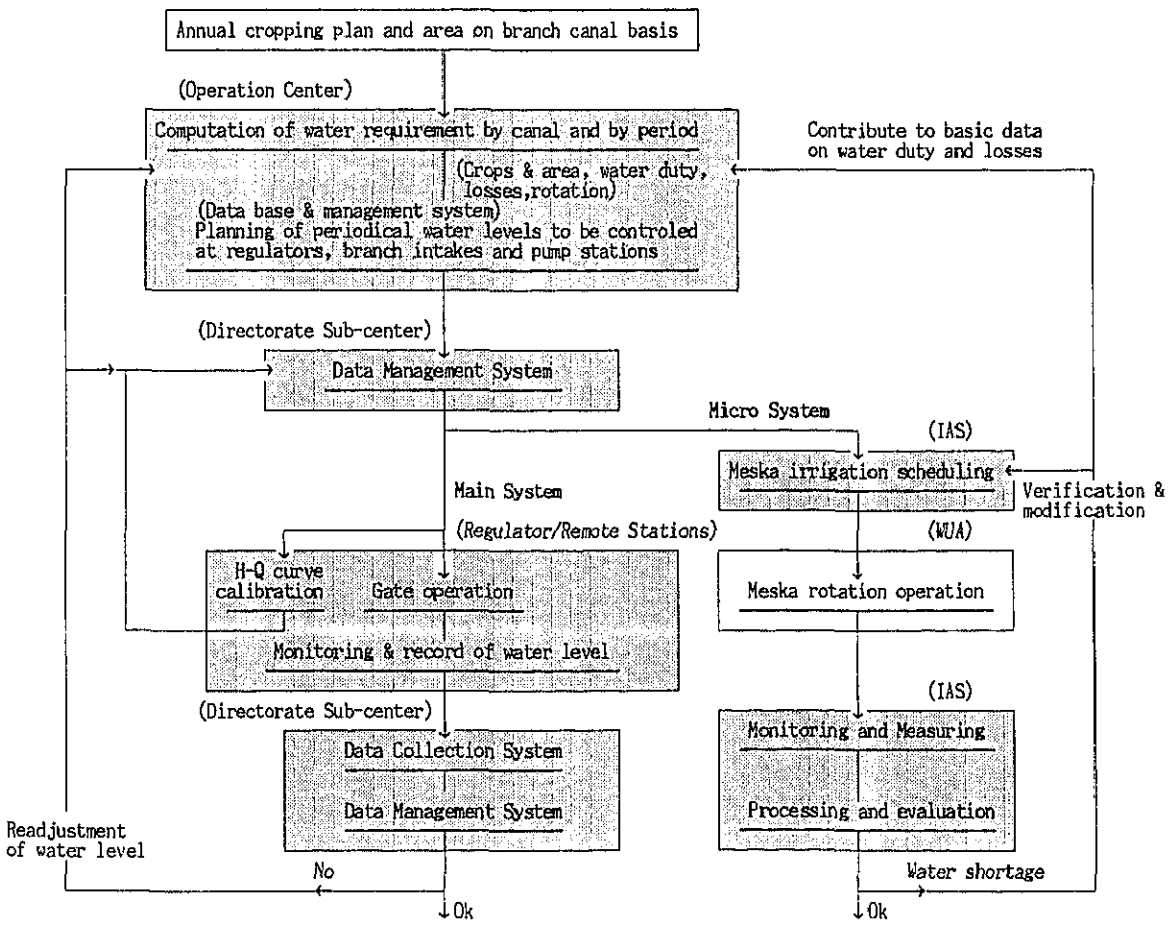
(Solutions)	1) Irrigation rotation system improvement	2) Distribution system improve.(main system)	3) Establishment of WUAs (on-farm system)	4) Sub-branch canal improvement	5) Meska intake & on-farm improvement	6) Strengthening of maintanance
1) Irrigation rotation system improvement	★		★		★	
2) Distribution system improve.(main system)		★		★		
3) Establishment of WUAs (on-farm system)	★	★		★		
4) Sub-branch canal improvement				★		★
5) Meska intake & on-farm improvement	★	★			★	★
6) Strengthening of maintanance						★

Figure G-2-1 Proposed Organizational Structure for Operation and Maintenance of the Main System



(IPS: Irrigation pump station, DPS: Drainage pump station, BI: Branch intake)

Figure G-2-2 Chart of Proposed Water Distribution Control System for Bahr Yusef Canal



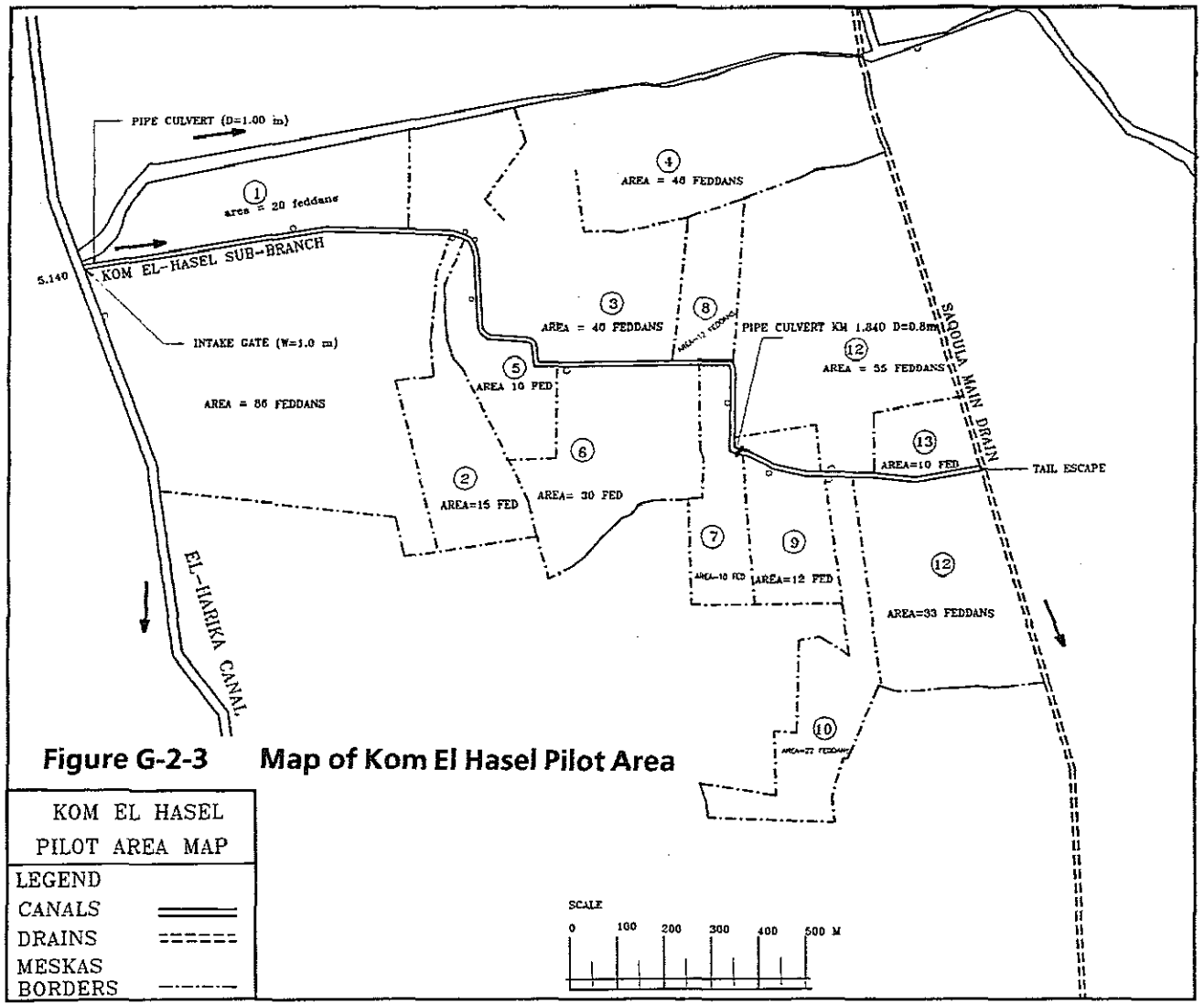
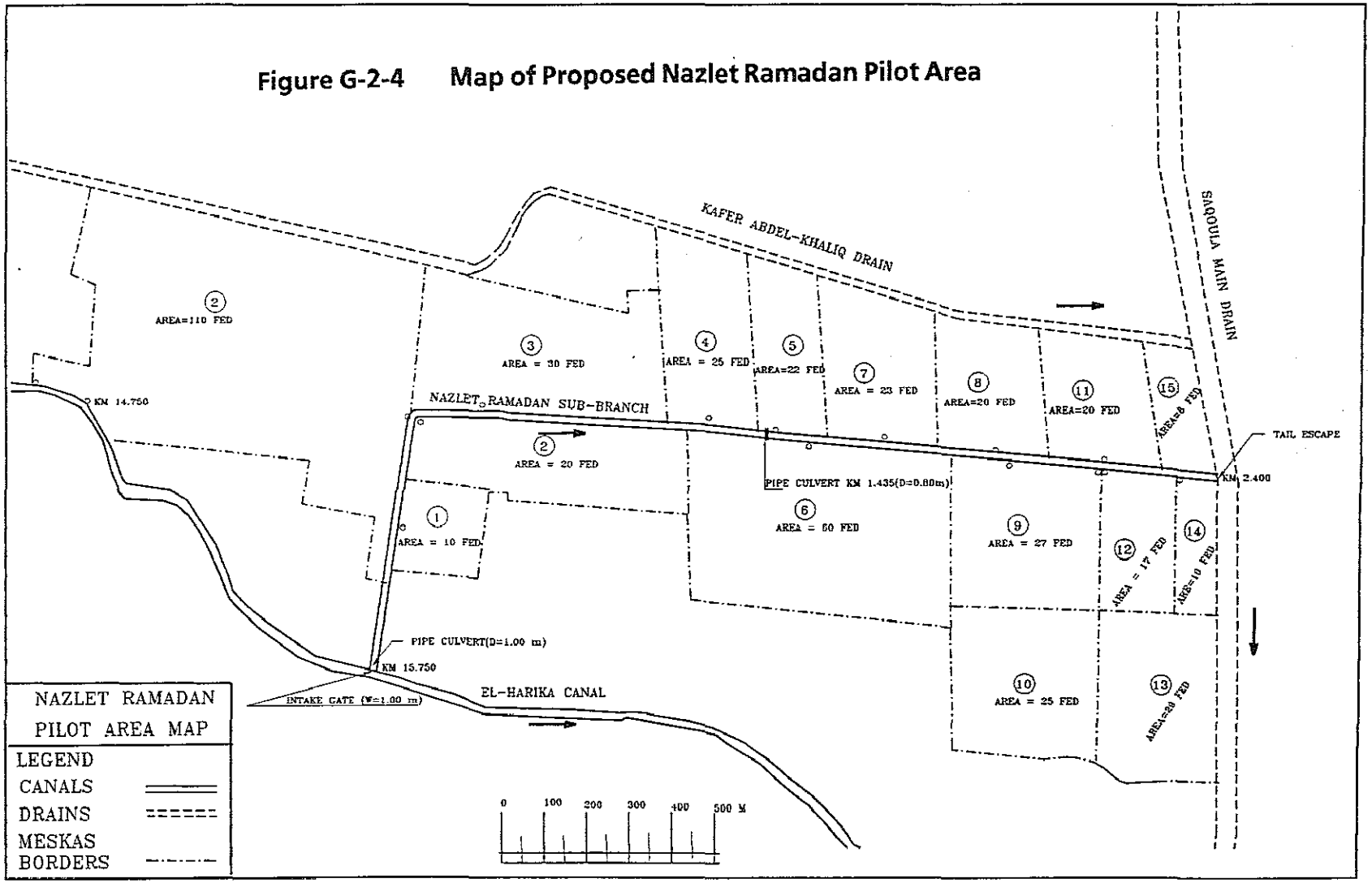


Figure G-2-3 Map of Kom El Hasel Pilot Area

Figure G-2-4 Map of Proposed Nazlet Ramadan Pilot Area



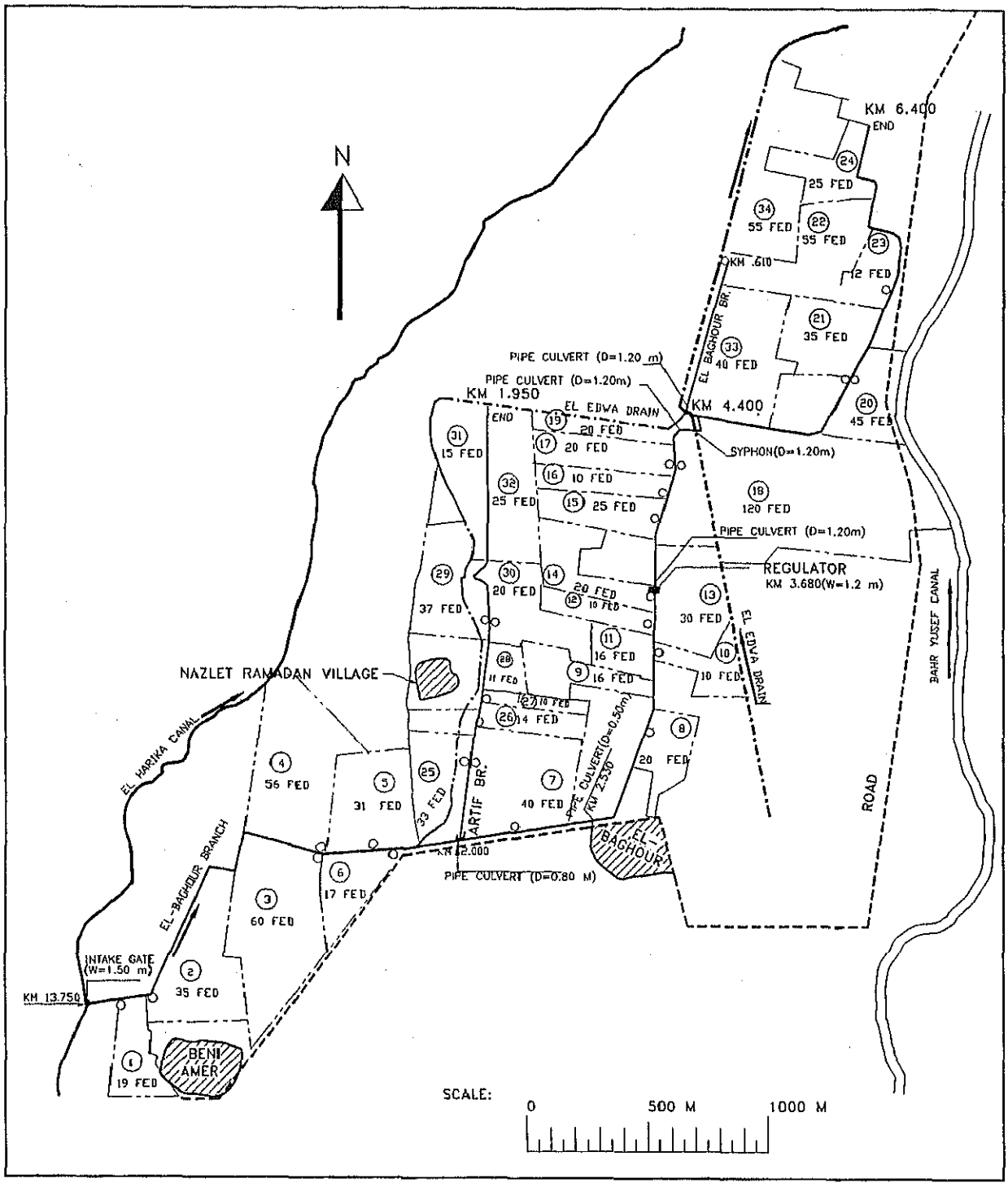


Figure G-2-5 Map of Proposed El Baghour Pilot Area

Figure G-2-6 Proposed Irrigation Network of Kom El Hasel Sub-branch Canal

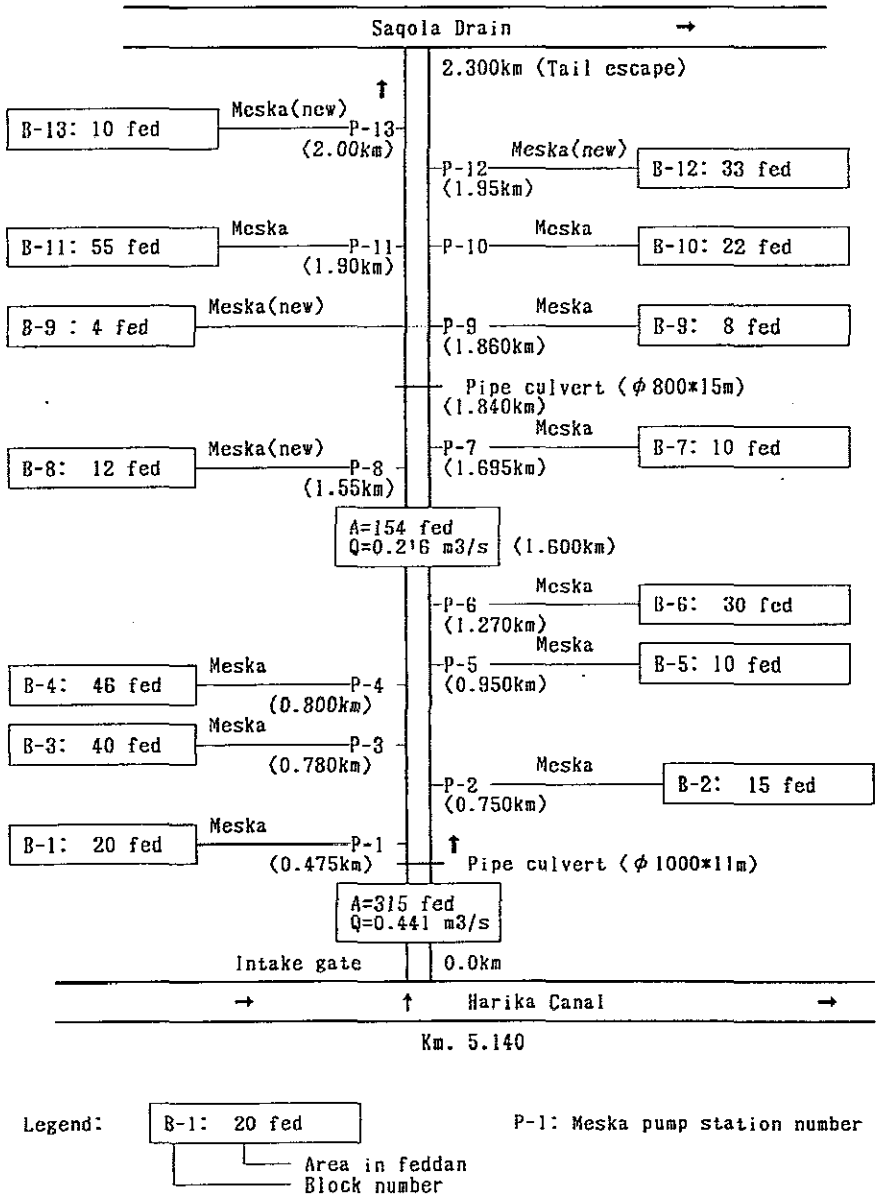


Figure G-2-7 Proposed Irrigation Network of Nazlet Ramadan Sub-branch Canal

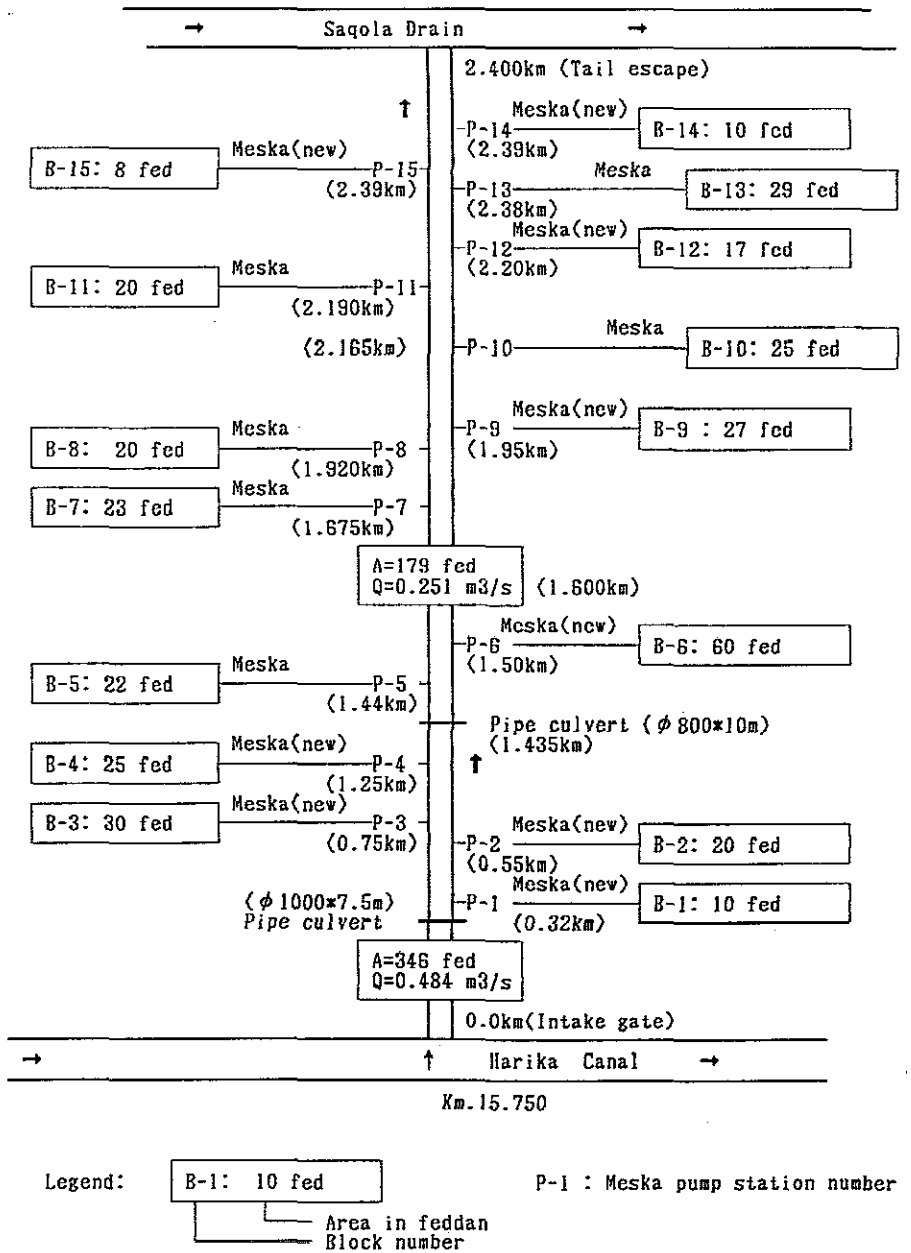
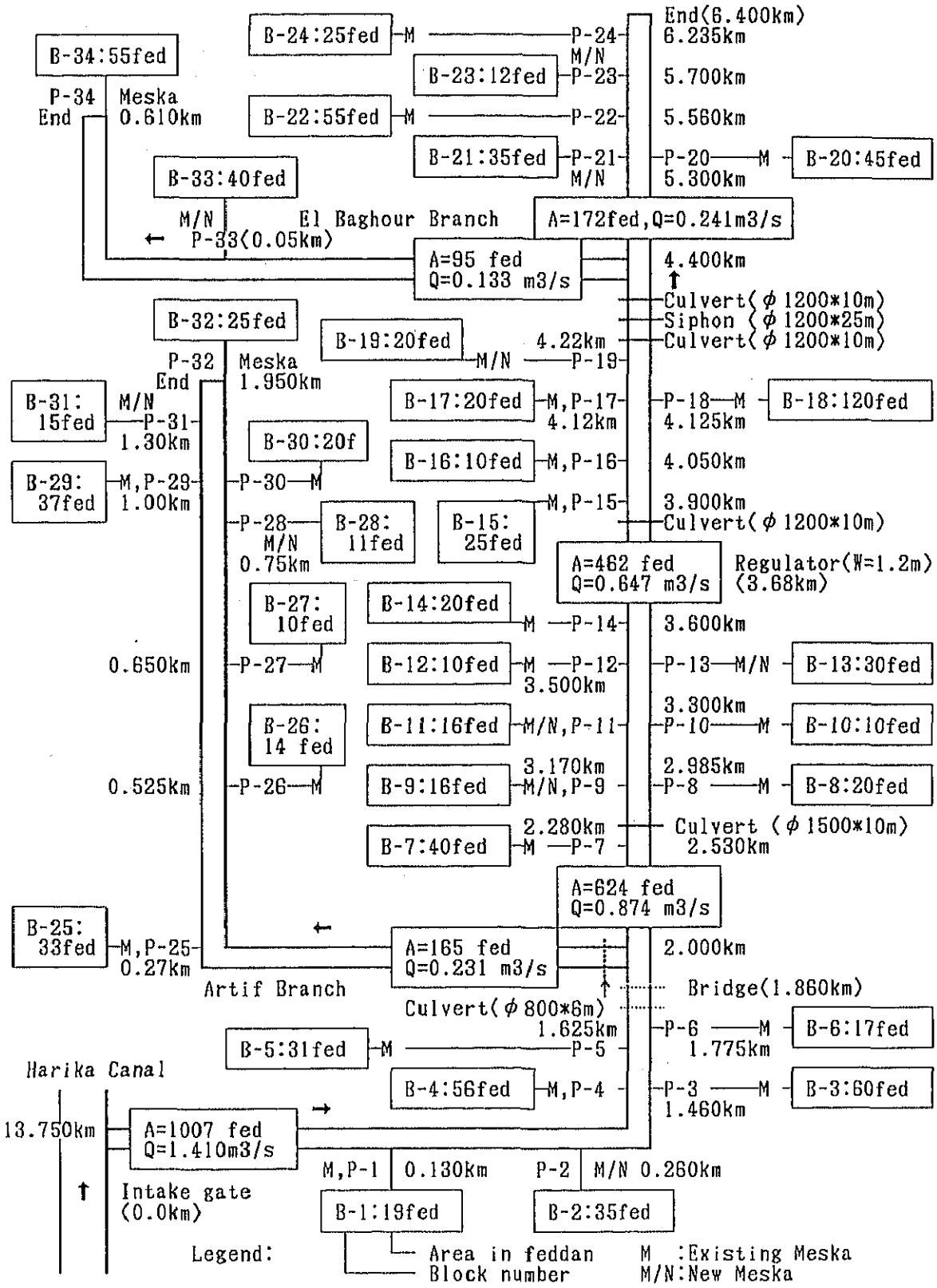


Figure G-2-8 Proposed Irrigation Network of El Baghour Sub-branch Canal



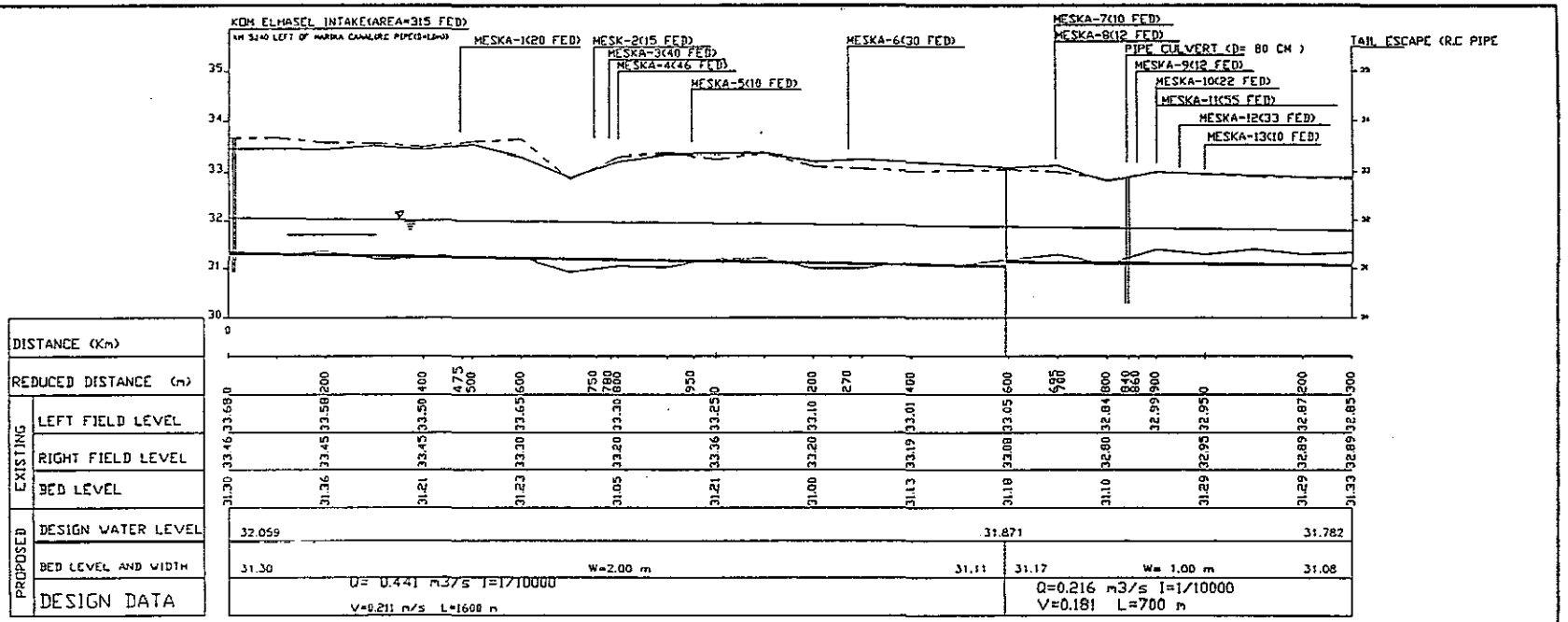
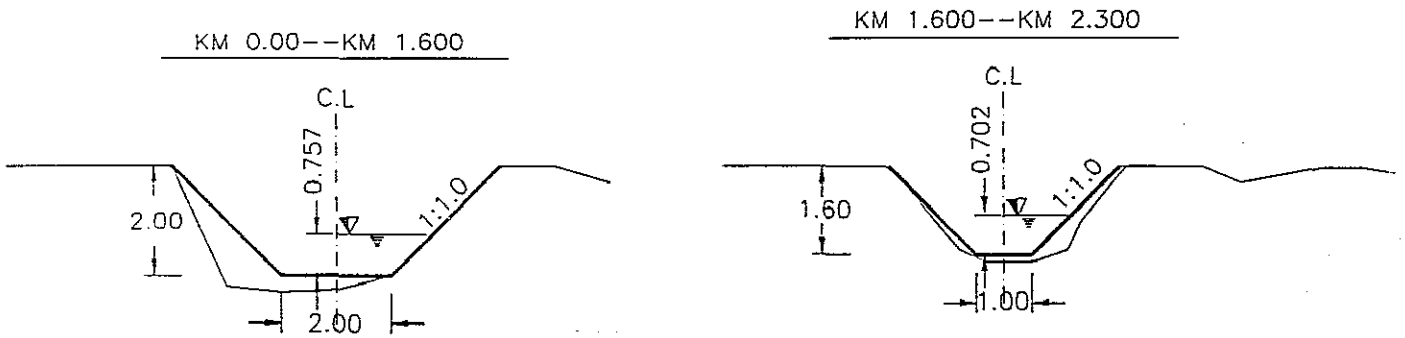


Figure G-2-9 Proposed Profile of Kom El Hasel Sub-branch Canal



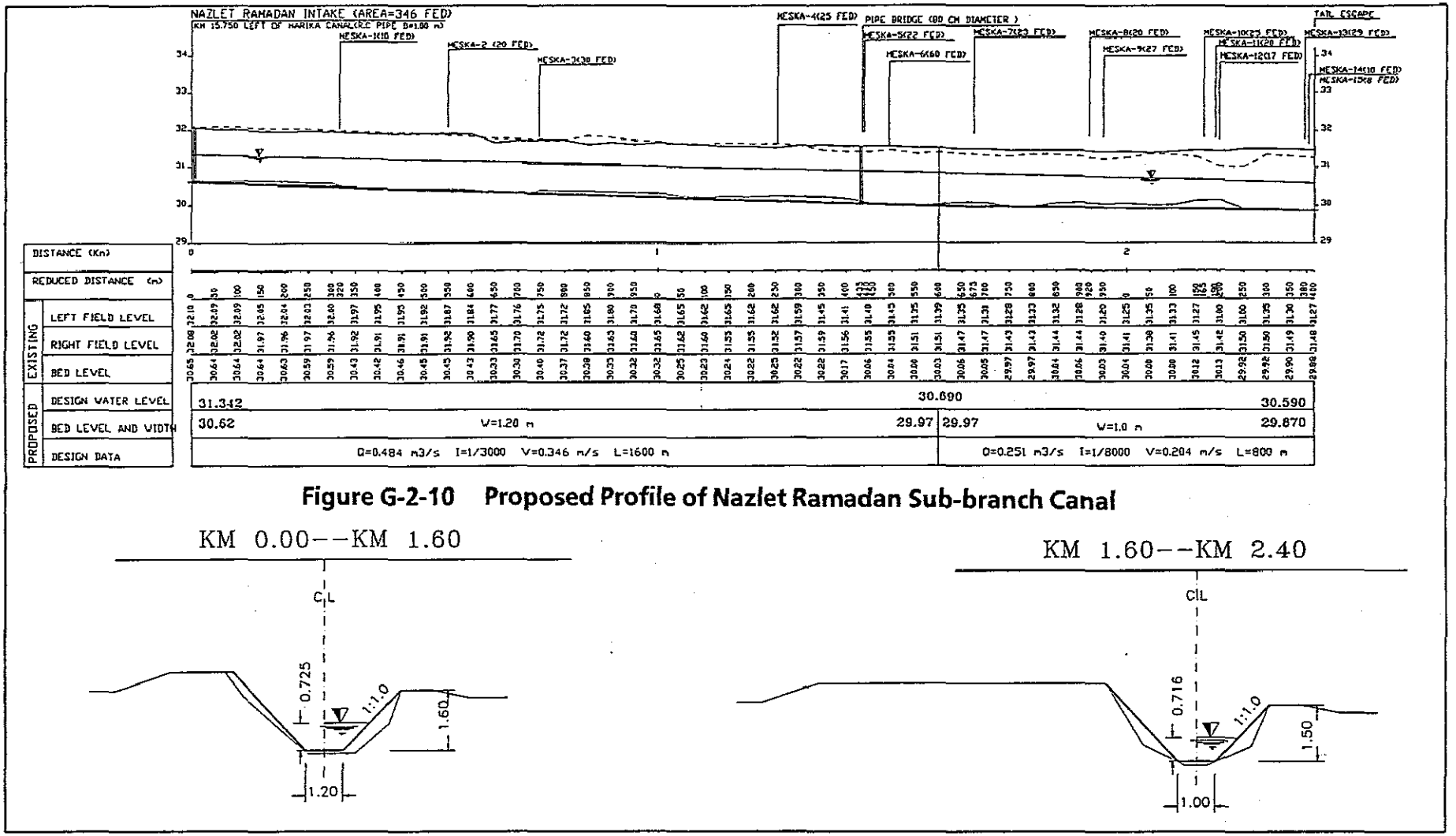


Figure G-2-10 Proposed Profile of Nazlet Ramadan Sub-branch Canal

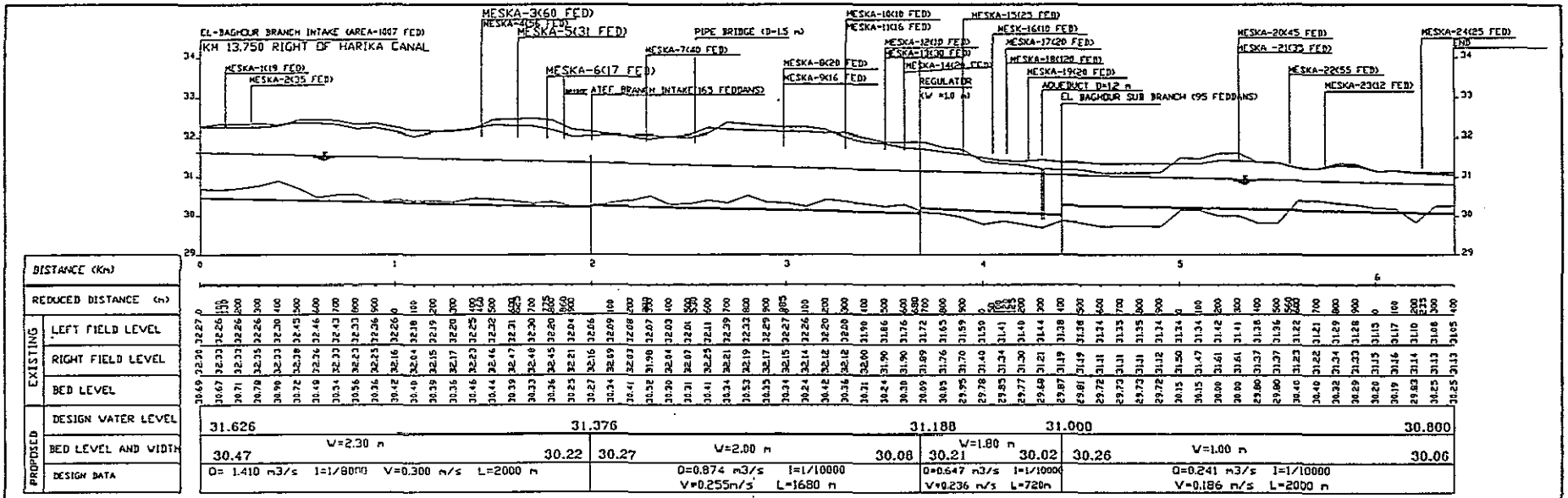
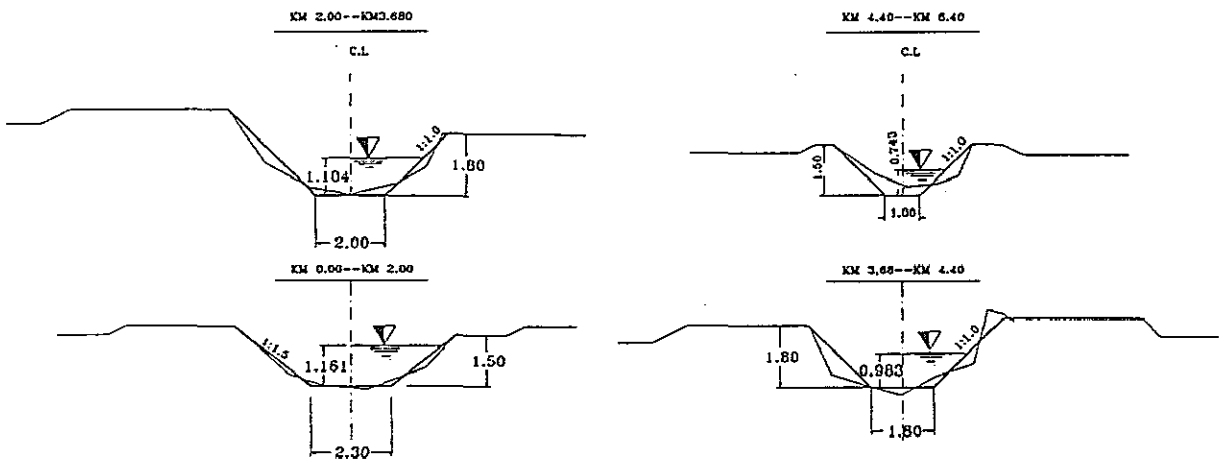


Figure G-2-11 Proposed Profile of El Baghour Sub-branch Canal



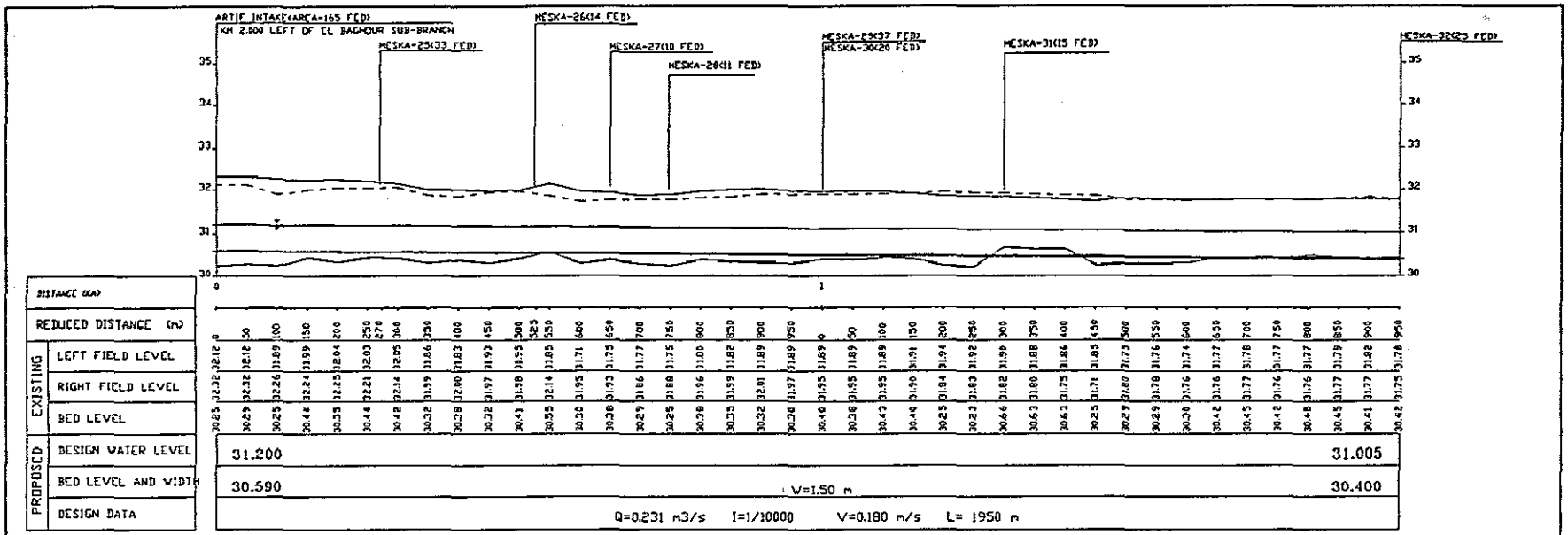
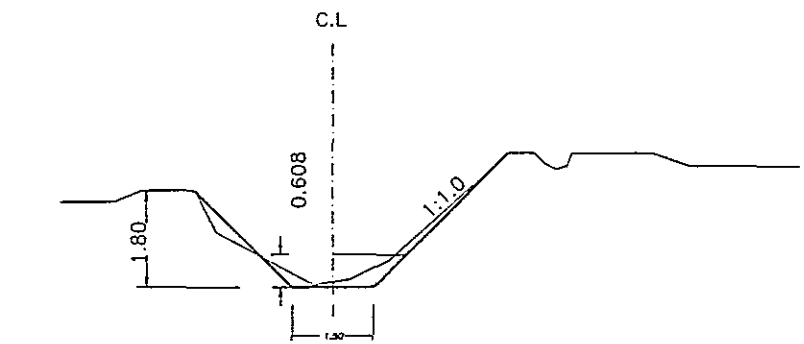


Figure G-2-12 Proposed Profile of Artif 3rd Sub-branch Canal

KM 0.00--KM 1.96



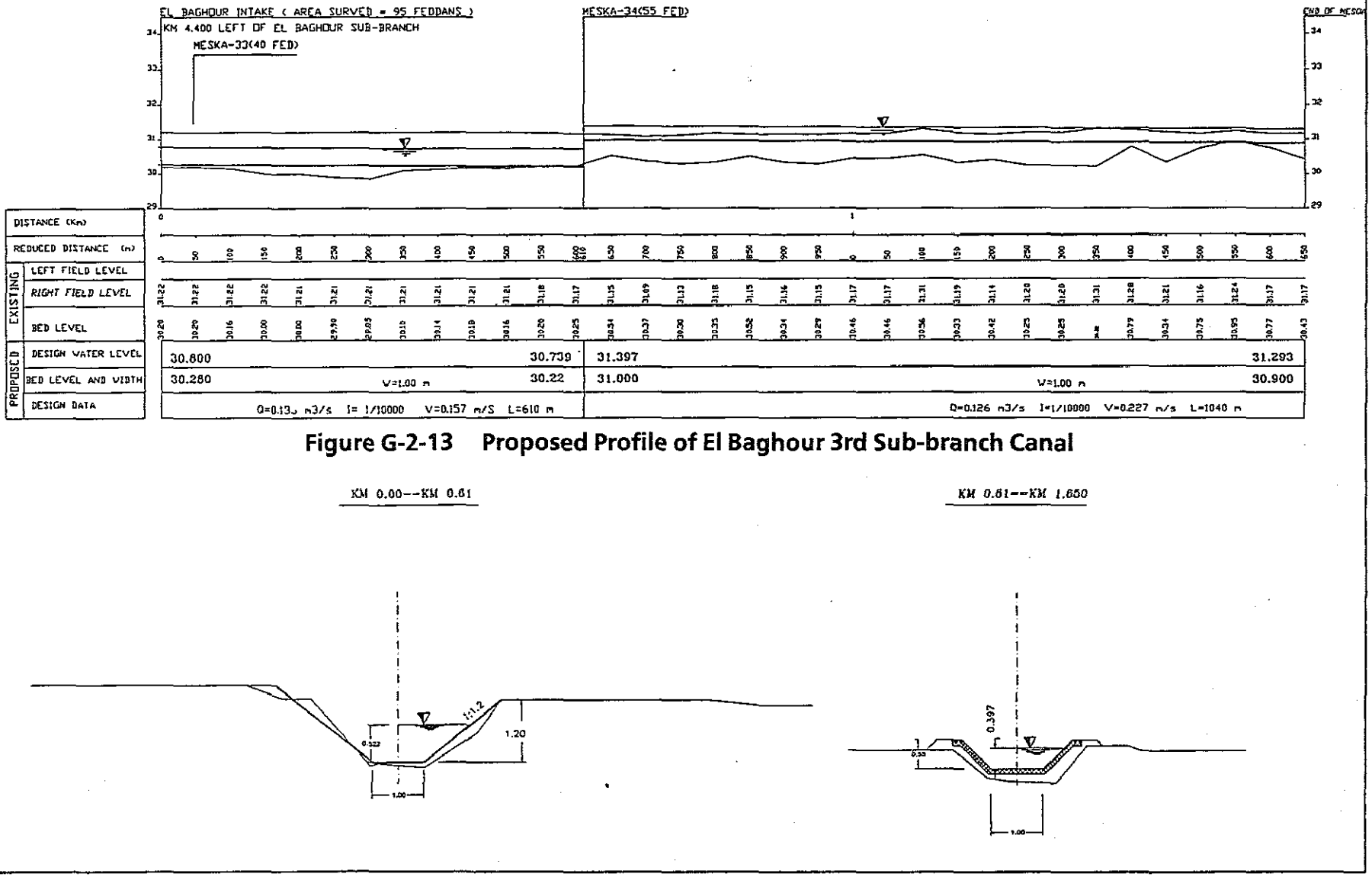
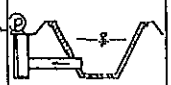
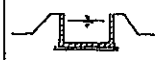
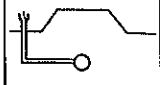


Figure G-2-13 Proposed Profile of El Baghour 3rd Sub-branch Canal

Table G-2-3 Comparison of Meska Improvement Alternatives

(1/2)

Description	Open Low Level Meska		Open Raised Meska			Closed Pipeline Meska	
	Earth	Lined	Earth	RC Flume	Trapezoid Sec.	PVC Pipe	RC Pipe
1. Structure	 Compacted earth	 Plane concrete Cast-in-place	 Compacted earth	 Precast reinforced concrete	 Plane concrete Cast-in-place	 Buried low pressure pipeline	 Buried low pressure pipeline
2. Water flow	-Gravity till Meska -Lift from Meska to Marwa (Slow delive.) (Quick deliv.)		-Gravity till sub-branch -Lift from sub-branch to Meaka (Slow delive.) (Quick delivery)			-Gravity till sub-branch -Lift from sub-branch to Meska (Quick delivery)	
3. Water losses -Convey. loss -Distri. loss	-Large -Large	-Small -Large	-Middle -Small	- Small - Small		-Very small -Small	-Small -Small
4. Construction easiness	-Hard earth work finish. w/ compaction	-Less difficulty	-Less difficulty	-Easy -Lifting equipment requir.	-Easy	-Easy	-Easy except pipe joint
5. Land required for improvement	-None, almost the same as existing		-Some area is necessary to widen	-None -New area may be produced	-none, almost the same as existing	-None -New area will be produced	
6. Operation & maintenance of facility	-By WUA -Hard cleaning & weeding	-By WUA -Easy	-By WUA -Easy	-By WUA -Easy		-By WUA -Required specialist for pipe mainte.	-By WUA -Difficult pipe repair
7. Distribution control -Meska intake -Meska to Marwa	-Difficult to control -Difficult and inconvenient due to pump	-Difficult pump suction when low W.L.	-Could be controled with one point lifting -Easy and convenient for farmers			-Could be controled -Easy and convenient	

(2/2)

Description	Open Low Level Meska		Open Raised Meska			Closed Pipeline Meska	
	Earth	Lined	Earth	RC flume	Trapezoid Sec.	PVC Pipe	RC Pipe
8. Acceptability for farmers with concern to WUA	-Acceptable for farmers -WUA will not be functioned	-Not acceptable	-Acceptable for farmers			-Less acceptable for farmers due to invisible water flow	
9. Economy -Const. cost -Opera. cost -Maintena.cost	-Low -High -High	-1st highest -High -Middle	-Lowest -Low -Low	-High -Low -Low	-Middle -Low -Low	-2nd highest -Middle -Middle	-3rd highest -Middle -Middle
10. Others	-Inadaptable for water use improvement through establishment of WUA. -Seldom found in Project area.		-Most existing Meskas are this type.	-New structure in Egypt.	-Common structure in Egypt	-Quite unfamilier delivery system for farmers.	
11. Principles of Meska improvement	1) To establish convenient on-farm delivery water system through which WUAs be functioned. 2) To avoid direct intake water from the branch or sub-branch canals through introduction of one point lifting at Meska intake. 3) To improve on-farm irrigation efficiency and water distribution conveniency.						
12. Judgement	-Not recommendable	-Not recommendable	-2nd recommendable	-Less recommendable	-1st recommendable	-Less recommendable	-Not recommendable

Figure G-2-14 General Plan for Raised Meska Intake

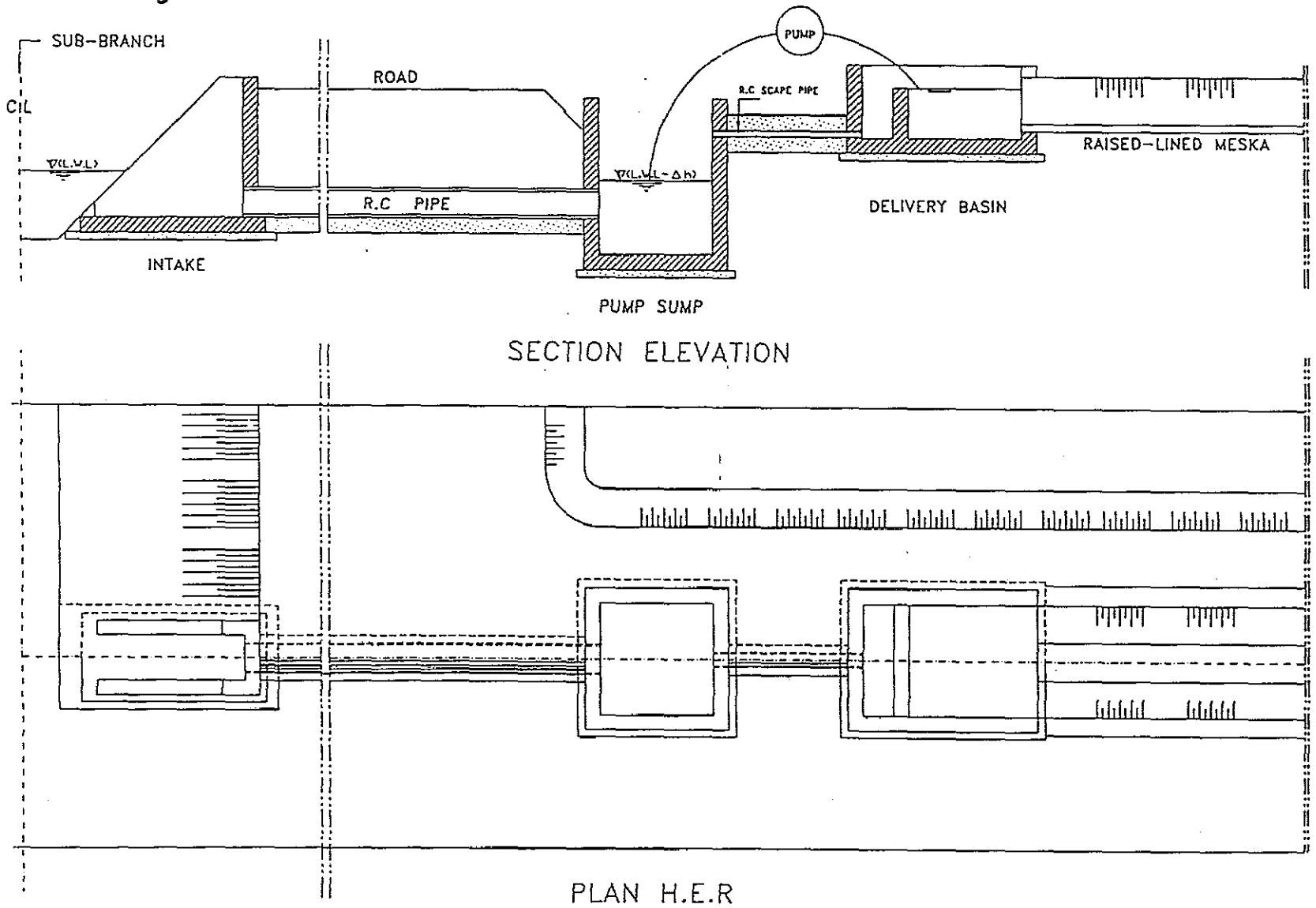


Table G-2-4 List of Meskas at Pilot Areas in Proposed Irrigation Network

(1/2)

Meska No.	Location	R/L Bank	Area Served	Meska Length	Intake Pumps	Exist/New
	(Km)		(Fed)	(m)	(Dia.× No.)	
1. Kom El Hasel Sub-branch Area						
M-1	0.475	L	20	300	φ6 ×2	Existing
M-2	0.750	R	15	300	φ8 ×1	Existing
M-3	0.780	L	40	750	φ8 ×2	Existing
M-4	0.800	L	46	850	φ8 ×2	Existing
M-5	0.950	R	10	540	φ6 ×1	Existing
M-6	1.270	R	30	650	φ6 ×2	Existing(Ext.)
M-7	1.695	R	10	340	φ6 ×1	Existing
M-8	1.550	L	12	120	φ6 ×1	New
M-9	1.860	R	12	170	φ6 ×1	Existing
M-10	1.900	R	22	500	φ6 ×2	Existing
M-11	1.900	L	55	850	φ8 ×2	Existing
M-12	1.950	R	33	250	φ6 ×2	New
M-13	2.000	L	10	180	φ6 ×1	New
Total			315	5,125		
2. Nazlet Ramadan Sub-branch Area						
M-1	0.320	R	10	180	φ6 ×1	New
M-2	0.550	R	20	600	φ6 ×2	New
M-3	0.750	L	30	500	φ6 ×2	New
M-4	1.250	L	25	400	φ6 ×2	New
M-5	1.440	L	22	350	φ6 ×2	Existing
M-6	1.500	R	60	600	φ8 ×3	New
M-7	1.675	L	23	350	φ6 ×2	Existing
M-8	1.920	L	20	300	φ6 ×2	Existing
M-9	1.950	R	27	320	φ6 ×2	New
M-10	2.165	R	25	650	φ6 ×2	Existing
M-11	2.190	L	20	300	φ6 ×2	Existing
M-12	2.200	R	17	150	φ8 ×1	New
M-13	2.380	R	29	550	φ6 ×2	Existing
M-14	2.390	R	10	70	φ6 ×1	New
M-15	2.390	L	8	300	φ6 ×1	New
Total			346	5,620		
3. El Baghour Sub-branch Area						
M-1	0.130	R	19	400	φ6 ×2	Existing
M-2	0.260	R	35	600	φ8 ×2	New
M-3	1.460	R	60	790	φ8 ×3	Existing
M-4	1.460	L	56	900	φ8 ×2	Existing
M-5	1.625	L	31	400	φ6 ×2	Existing
M-6	1.775	R	17	100	φ8 ×1	Existing
M-7	2.280	L	40	150	φ8 ×2	Existing
M-8	2.985	R	20	475	φ6 ×2	Existing
M-9	3.170	L	16	300	φ8 ×1	New
M-10	3.300	R	10	500	φ6 ×1	Existing
M-11	3.300	L	16	250	φ8 ×1	New
M-12	3.500	L	10	350	φ6 ×1	Existing
M-13	3.500	R	30	380	φ6 ×2	New
M-14	3.600	L	20	700	φ6 ×2	Existing
M-15	3.900	L	25	550	φ6 ×2	Existing
M-16	4.050	L	10	400	φ6 ×1	Existing
M-17	4.120	L	20	450	φ6 ×2	Existing
M-18	4.125	R	120	1,650	φ8 ×4	Existing
M-19	4.220	L	20	580	φ6 ×2	New
M-20	5.300	R	45	560	φ8 ×2	Existing
M-21	5.300	L	35	350	φ8 ×2	New
M-22	5.560	L	55	925	φ8 ×2	Existing
M-23	5.700	L	12	250	φ6 ×1	New
M-24	6.235	L	25	400	φ6 ×2	Existing
M-25	0.270	L	33	400	φ8 ×2	Existing, Artif B.
M-26	0.525	R	14	400	φ8 ×1	Existing -do-
M-27	0.650	R	10	400	φ6 ×1	Existing -do-
M-28	0.750	R	11	200	φ6 ×1	New -do-
M-29	1.000	L	37	500	φ8 ×2	Existing -do-
M-30	1.000	R	20	250	φ6 ×2	Existing -do-
M-31	1.300	L	15	500	φ8 ×1	New -do-
M-32	1.950	R	25	200	φ6 ×2	Existing -do-
M-33	0.050	R	40	500	φ8 ×2	New Baghour B.
M-34	0.610	-	55	1,50	φ8 ×2	Existing -do-
Total			1007	16,810		

Table G-2-4 (cont'd)

(2/2)

Table G-2-5 Proposed On-farm Improvement in Pilot Area

Description		Kom El Hasel	Nazlet Ramadan	El Baghour	Total
Command area	(fed)	550	780	1,800	3,130
Net irrigated area	(fed)	421	645	1,388	2,454
1. Meska improvement					
- No. of Meskas	(No)	12	12	31	55
- Length of Meskas	(m)	5,625	6,000	18,600	30,225
2. Meska new construction					
- No. of Meskas	(No)	3	9	10	22
- Length of Meskas	(m)	800	3,120	3,910	78,300
3. Meska intake construction					
- No. of intakes	(No)	15	21	41	77
4. Access road improvement					
	(km)	2.3	5.5	1.9	9.7
5. Farm land levelling					
	(fed)	85	130	280	495

Table G-2-6 Proposed Meska Rotation Scheduling at Pilot Areas

(1/2)

Block No.	Area	Total W.R. (15 days)	Pumps	Maximum W.R.	Design Operat. Hour	Meska Pump Operation Scheduling				
						1st day	2nd day	3rd day	4th day	5th day
	(fed)	(m3)		(lps)	(hrs)	6h 22h	6h 22h	6h 22h	6h 22h	6h 22h
1. Kom El Hasel Sub-branch Area										
B-1	20	12,450	φ6 *2	92	37.6			5.6		
B-2	15	9,337	φ8 *1	63	41.2			9.2		
B-3	40	24,900	φ8 *2	126	54.9				6.9	
B-4	46	28,635	φ8 *2	126	63.1			9.7	5.4	
B-5	10	6,225	φ6 *1	46	37.6			5.6		
B-6	30	18,675	φ6 *2	92	56.4				8.4	
B-7	10	6,225	φ6 *1	46	37.6			5.6		
B-8	12	7,470	φ6 *1	46	45.1			13.1		
B-9	12	7,470	φ6 *1	46	45.1			13.1		
B-10	22	13,695	φ6 *2	92	41.3	13	13.5		12.3	
B-11	55	34,237	φ8 *2	126	75.5			14		
B-12	33	20,543	φ6 *2	92	62.0			14		
B-13	10	6,225	φ6 *1	46	37.6			5.6		
Total	315	196,087				39,326	39,186	39,006	39,219	39,340
2. Nazlet Ramadan Sub-branch Area										
B-1	10	6,225	φ6 *1	46	37.6			5.6		
B-2	20	12,450	φ6 *2	92	37.6			5.6		
B-3	30	18,675	φ6 *2	92	56.4				8.4	
B-4	25	15,563	φ6 *2	92	47.0			15		
B-5	22	13,695	φ6 *2	92	41.3			9.3		
B-6	60	37,350	φ8 *3	189	54.9				6.9	
B-7	23	14,317	φ6 *2	92	43.2				11.2	
B-8	20	12,450	φ6 *2	92	37.6				5.6	
B-9	27	16,808	φ6 *2	92	50.7	9.3	9.4			
B-10	25	15,562	φ6 *2	92	47.0			15		
B-11	20	12,450	φ6 *2	92	37.6			5.6		
B-12	17	10,583	φ8 *1	63	46.7			14.7		
B-13	29	18,052	φ6 *2	92	54.4					6.5
B-14	10	6,225	φ6 *1	46	37.6			5.6		
B-15	8	4,980	φ6 *1	46	30.1				14.1	
Total	346	215,385				43,112	43,145	43,111	42,851	43,164

Note: 1. Irrigation time is 16 hours per day.
2. Assuming that pump capacity is 46 lps (165.6 m3/h) for φ6" pump, and 63 lps (226.8 m3/h) for φ8" pump.

(2/2)

Block No.	Area	Total W.R. (15 days)	Pumps	Maximum W.R.	Design Opera. Hour	Meska Pump Operation Scheduling				
						1st day	2nd day	3rd day	4th day	5th day
	(fed)	(m3)		(lps)	(hrs)	6h 22h	6h 22h	6h 22h	6h 22h	6h 22h
3. El Baghour Sub-branch Area										
B-1	19	11,828	φ6 *2	92	35.7			3.7		
B-2	35	21,787	φ8 *2	126	48.0				6.9	
B-3	60	37,350	φ8 *3	189	54.9					
B-4	56	34,860	φ8 *2	126	76.9			12.9		
B-5	31	19,298	φ6 *2	92	58.3				10.3	
B-6	17	10,582	φ8 *1	63	46.7			14.7		
B-7	40	24,900	φ8 *2	126	54.9					6.9
B-8	20	12,450	φ6 *2	92	37.6		5.6			
B-9	16	9,960	φ8 *1	63	43.9			11.9		
B-10	10	6,225	φ6 *1	46	37.6			5.6		
B-11	16	9,960	φ8 *1	63	43.9			11.9		
B-12	10	6,225	φ6 *1	46	37.6	5.6				
B-13	30	18,675	φ6 *2	92	56.4		8.4			
B-14	20	12,450	φ6 *2	92	37.6			5.6		
B-15	25	15,562	φ6 *2	92	47.0			15		
B-16	10	6,225	φ6 *1	46	37.6			5.6		
B-17	20	12,450	φ6 *2	92	37.6		17.0	5.6		
B-18	120	74,700	φ8 *4	252	82.3					
B-19	20	12,450	φ6 *2	92	37.6			5.6		
B-20	45	28,013	φ8 *2	126	61.8				13.8	
B-21	35	21,787	φ8 *2	126	48.0					
B-22	55	34,238	φ8 *2	126	75.5				11.5	
B-23	12	7,470	φ6 *1	46	45.1			13.1		
B-24	25	15,562	φ6 *2	92	47.0			15		
B-25	33	20,542	φ8 *2	126	45.3			13.3		
B-26	14	8,715	φ8 *1	63	38.4			6.4		
B-27	10	6,225	φ6 *1	46	37.6			5.6		
B-28	11	6,848	φ6 *1	46	41.4			9.4		
B-29	37	23,032	φ8 *2	126	50.8				2.8	
B-30	20	12,450	φ6 *2	92	37.6			5.6		
B-31	15	9,338	φ8 *1	63	41.2			9.2		
B-32	25	15,562	φ6 *2	92	47.0			15		
B-33	40	24,900	φ8 *2	126	54.9		6.9			
B-34	55	34,238	φ8 *2	126	75.5	11.5				
Total	1007	626,857				125,318	125,199	125,519	125,626	125,269

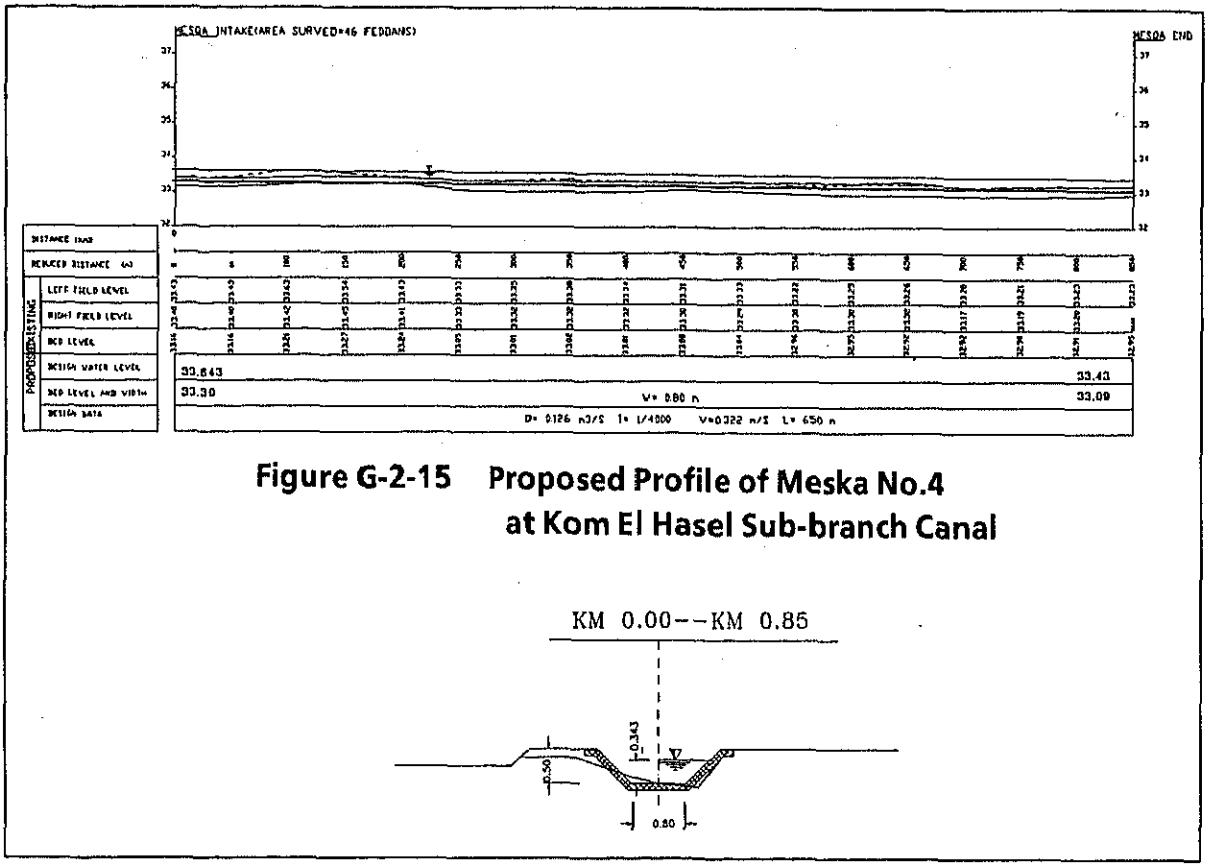


Figure G-2-15 Proposed Profile of Meska No.4 at Kom El Hasel Sub-branch Canal

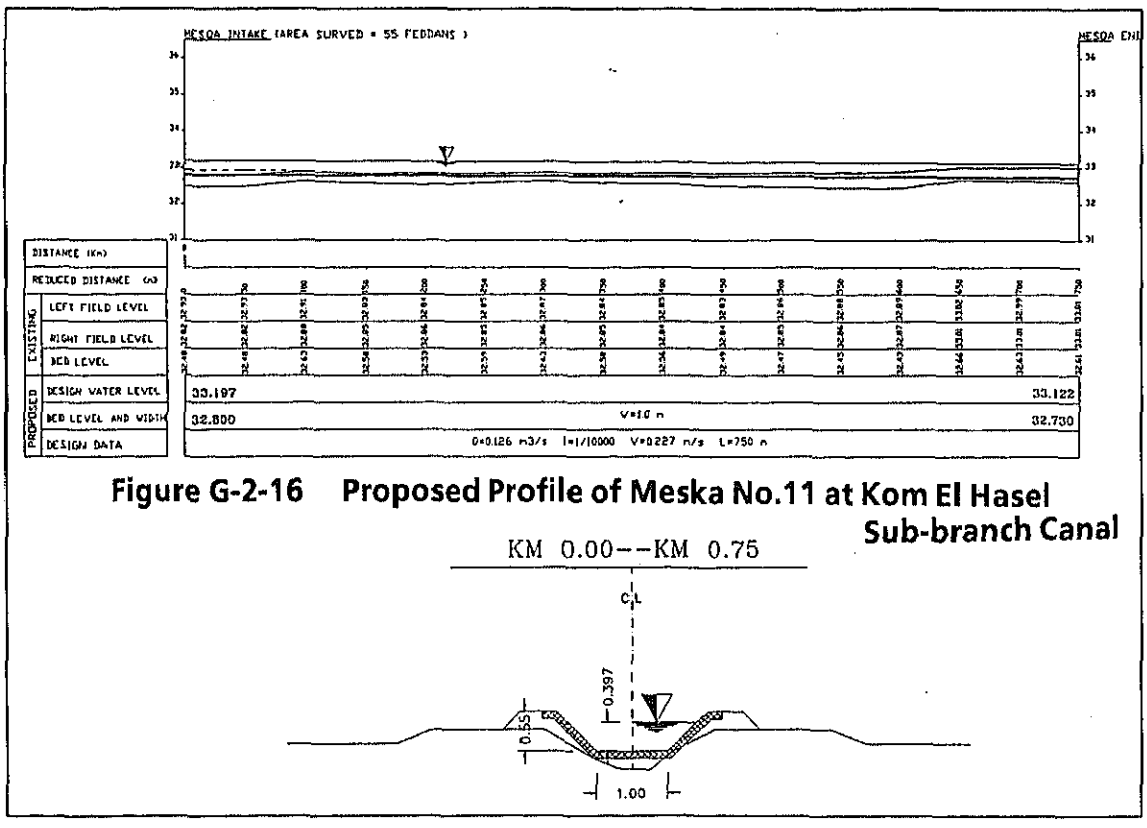


Figure G-2-16 Proposed Profile of Meska No.11 at Kom El Hasel Sub-branch Canal

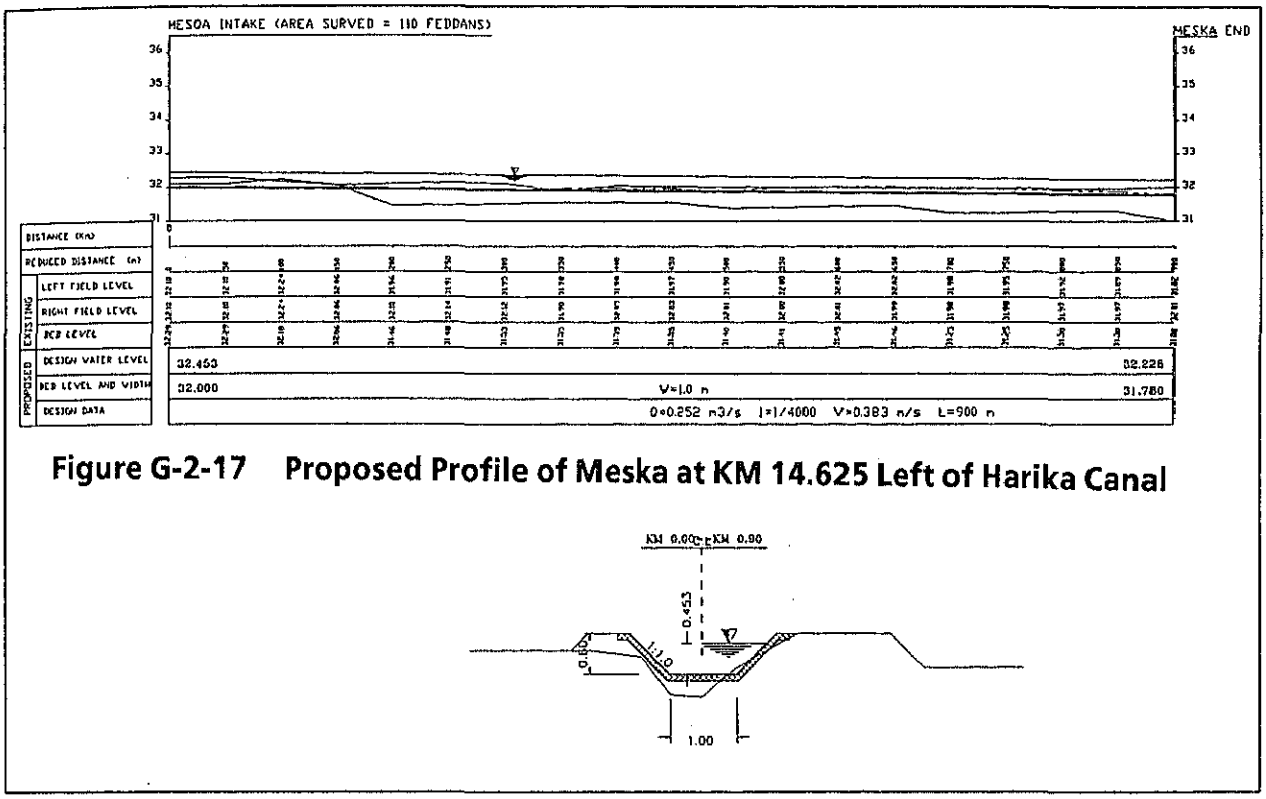


Figure G-2-17 Proposed Profile of Meska at KM 14.625 Left of Harika Canal

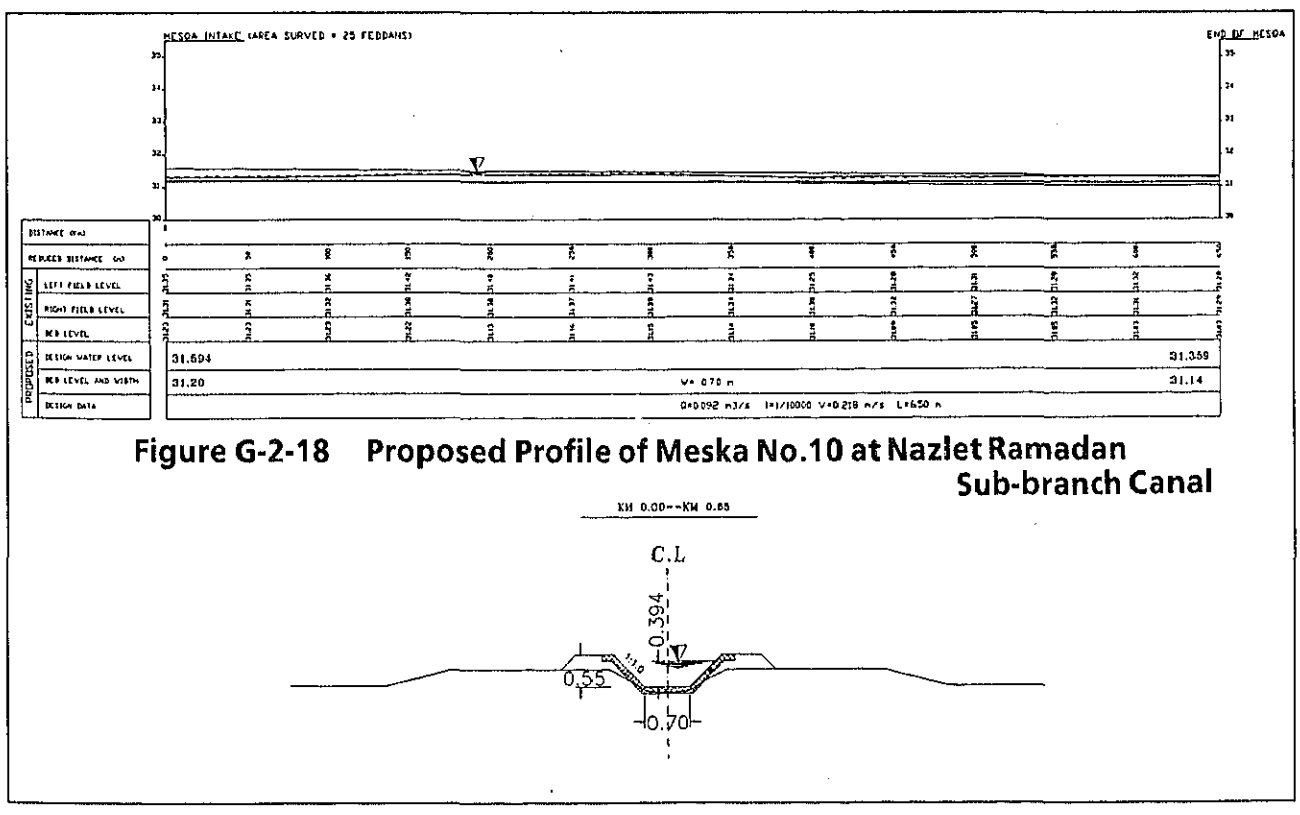


Figure G-2-18 Proposed Profile of Meska No.10 at Nazlet Ramadan Sub-branch Canal

APPENDIX H AGRICULTURE

H - 1 Present Agriculture
H - 2 Agricultural Plan

Table H-1-1 Cultivable Land, Cropped Acreage in Command Area

(unit: 1,000 feddan)

Governorate	Minia	Beni Suef	Faiyum	Giza	Total
Cultivable	121	66	347	117	651
Cropped Area (A)	85	59	313	108	565
(old land)	(65)	(52)	(313)	(108)	(538)
(new land)	(20)	(7)	(0)	(0)	(27)
Annual Crop Acreage (B)					
Total	138	106	559	244	1,047
(old land)	(111)	(96)	(559)	(244)	(1,010)
(new land)	(27)	(10)	(0)	(0)	(37)
Crop Intensity (B/A)					
(old land)	171	186	179	225	188
(new land)	135	142	-	-	137

Source : Calculated from data by related Governorate Offices.

Table H-1-2 Crop Composition in Old Land under Command

(unit: 1,000 feddan)

Crop / Season	Whole Governorates				Bahr Yusef Command Area				
	Minia	B. Suef	Faiyum	Giza	Minia	B. Suef	Faiyum	Giza	Total
Winter Crop	352.8	190.3	263.3	127.8	51.4	44.4	263.3	80.5	439.6
Wheat	134.4	61.5	77.6	12.1	19.0	15.6	77.6	7.6	119.8
Berseem *	98.3	66.9	124.4	57.0	10.0	11.3	124.4	72.8	188.5
Broadbean	78.6	41.4	21.5	2.2	13.4	10.4	21.5	1.4	46.7
Vegetables	5.6	6.8	6.6	39.5	2.0	1.8	6.6	24.9	35.3
Others	35.9	13.7	33.2	17.0	7.0	5.3	33.2	3.8	49.3
Summer Crop	319.8	187.3	178.0	144.7	48.7	32.3	178.0	91.2	350.2
Maize	169.2	59.9	43.1	60.4	23.4	12.0	43.1	38.1	116.6
Cotton	77.8	55.2	39.7	-	16.7	13.2	39.7	-	69.6
Soybean	43.1	11.3	-	(3.6)	1.6	-	-	{17.1}	{18.7}
Sorghum	3.8	-	37.2	1.2	-	-	37.2	0.8	38.0
Vegetables	11.0	37.7	29.3	44.7	1.0	4.2	29.3	28.1	62.6
Others	14.9	23.2	28.7	34.8	6.0	2.9	28.7	7.1	44.7
Nili Crop	57.7	91.9	102.2	88.2	7.7	18.4	102.5	55.6	183.9
Maize	45.2	76.3	51.8	43.4	7.1	14.1	51.8	27.3	100.3
Vegetables	3.1	7.8	37.0	36.9	0.6	2.0	37.0	23.2	62.8
Others	9.4	7.8	13.4	7.9	0.0	2.3	13.1	5.1	20.8
Perennial Crop**	58.7	10.3	19.5	28.4	3.8	1.0	19.5	17.0	41.3
Total	789.4	479.8	563.0	389.1	111.6	96.1	563.0	244.3	1,015.0

Source : MALR

Note. ( ) groundnut, { } fodder but total { } includes it. B Suef : Beni Suef

* berseem includes long and short crops. ** including sugarcane

Table H-1-3 Cropping Acreage in Command Area, Minia Governorate

(unit : feddan)

Crop / Year	1986	1987	1988	1989	1990	Average	C. I.**
Winter Crop							
Wheat	16,650	18,730	20,777	18,568	20,097	18,964	29.2
Broadbean	12,693	12,816	13,090	13,654	14,918	13,435	20.7
Fenugreek	1,255	802	1,707	737	1,222	1,144	1.8
Long Berseem	10,192	10,217	8,847	10,836	10,237	10,065	15.5
Short Berseem	3,218	2,953	4,731	2,660	2,900	3,292	5.1
Onion	15	0	0	0	103	24	-
Garlic	841	623	804	677	732	735	1.1
Potato	12	0	0	11	58	16	-
Medicinal Crop	0	0	9	44	0	11	-
Vegetables	2,332	1,682	1,663	2,168	1,989	1,967	3.0
Gourds/Others	2,514	2,346	2,097	959	666	1,717	2.6
Sub-Total	49,722	50,169	53,725	50,314	52,922	51,370	79.0
Summer Crop							
Cotton	16,593	16,715	16,851	17,020	16,398	16,716	25.7
Maize	22,541	22,904	23,155	23,661	24,695	23,391	36.0
Sugarcane	435	377	438	376	350	395	0.6
Sesame	808	954	921	1,003	1,313	1,000	1.5
Soyabean	2,756	1,428	1,285	1,248	1,340	1,610	2.5
Groundnut	152	463	528	1,278	1,390	763	1.2
Sunflower	0	0	0	0	181	36	-
Vegetables	1,650	1,145	868	615	934	1,042	1.6
Others	5,128	4,823	4,886	3,244	2,320	4,081	6.3
Sub - Total	50,063	48,809	48,932	48,445	48,921	49,034	75.3
Nili Crop							
Maize	6,095	7,564	6,808	7,258	7,537	7,052	10.8
Vegetables	601	368	476	697	841	597	1.0
Others	57	0	29	0	108	38	-
Sub - Total	6,753	7,932	7,313	7,955	8,486	7,687	11.8
Perennial Crop**	3,381	3,537	3,598	3,484	3,371	3,476	5.3
Grand Total	109,919	110,447	113,568	110,208	113,700	111,567	171.4

Source : MALR

Note : *Fruit Garden, ** Cropping Intensity (Total cropped acreage 65,032 feddan) Figures indicating commanded acreages from Bahr Yousef, demarcated by planimetrical measurement on basic maps (scale : 100,000)

Table H-1-4 Cropping Acreage in Command Area, Beni Suef Governorate

(unit : feddan)

Crop / Year	1986	1987	1988	1989	1990	Average	C. I.
Winter Crop							*
Wheat	12,618	15,563	15,271	16,051	18,421	15,585	30.3
Broadbean	8,738	9,760	11,745	11,936	9,956	10,427	20.3
Barley	1,934	1,742	954	821	574	1,205	2.3
Fenugreek	648	416	604	1,380	523	714	1.4
Lupin	74	127	33	40	45	64	-
Long Berseem	13,659	11,551	9,913	10,392	11,036	11,310	22.0
Onion	2,158	2,254	3,394	2,057	2,395	2,452	4.8
Garlic	148	536	575	375	597	446	0.9
Medicinal Crops	221	621	517	406	371	427	0.8
Vegerables	1,930	1,652	1,867	1,606	1,849	1,781	3.5
Others	24	75	32	31	17	36	-
Sub-Total	42,152	44,297	44,905	45,095	45,784	44,447	86.3
Summer Crop							
Cotton	13,006	13,265	13,517	13,876	12,416	13,216	25.7
Maize	7,673	13,038	11,419	14,402	13,367	11,980	23.3
Sugarcane	162	32	37	40	32	60	-
Sesame	610	556	589	475	856	617	1.2
Groundnut	396	300	395	550	274	383	0.8
Sunflower	601	1,942	1,851	1,442	1,661	1,499	2.9
Vegetables	2,877	4,077	4,303	5,651	3,671	4,176	8.1
Others	823	231	191	240	324	362	0.7
Sub - Total	26,148	33,441	32,302	36,673	32,901	32,293	62.7
Nili Crop							
Maize	13,478	14,395	15,455	13,240	14,038	14,121	27.5
Sorghum	5,472	2,009	878	541	2,201	2,220	4.4
Vegetables	1,610	1,536	2,572	1,946	2,465	2,026	3.9
Fodder Crop	153	29	6	11	1	40	-
Others	9	85	0	5	1	20	-
Sub - Total	20,722	18,054	18,911	15,743	18,706	18,427	35.8
Perennial Crop**	897	1,019	959	948	942	953	1.9
Grand Total	89,919	96,811	97,077	98,462	98,333	96,120	186.7

Source : MALR
Note : * Cropping Intensity (Total 51,481 feddan) ** Fruit Garden

Table H-1-5 Cropping Acreage in Command Area, Faiyum Governorate

(unit : feddan)

Crop / Year	1986	1987	1988	1989	1990	Average	C. I.
Winter Crop							*
Wheat	60,163	72,513	77,408	86,490	91,169	77,549	24.8
Broadbean	17,056	20,298	26,766	21,847	21,660	21,525	6.9
Barley	12,824	13,035	12,513	6,373	7,220	10,393	3.3
Fenugreeek	4,107	5,747	3,094	1,863	2,150	3,392	1.1
Lupin	128	73	103	37	68	82	-
Long Berseem	120,083	98,241	81,871	89,019	104,308	98,704	31.6
Short Berseem	27,815	30,559	25,876	23,397	20,970	25,723	8.2
Onion	4,410	2,305	4,542	1,391	1,912	2,912	0.9
Lentil	34	75	137	46	50	68	-
Garlic	95	306	361	159	242	231	0.1
Vegertables	5,470	7,377	7,063	5,441	7,785	6,627	2.1
Flax	577	511	797	933	515	667	0.2
Ohter	10,814	11,525	11,039	12,075	10,935	11,278	3.6
Sub-Total	263,576	262,565	251,570	249,071	268,984	259,151	82.8
Summer Crop							
Cotton	41,405	40,045	41,041	39,759	36,197	39,689	12.7
Maize	29,604	46,206	44,120	46,206	53,151	43,857	14.0
Sorghum	39,868	37,495	43,713	32,764	32,108	37,190	11.9
Sugarcane	309	309	-	240	240	220	-
Sesame	1,448	1,487	1,430	1,487	1,271	1,425	0.5
Groundnut	112	116	168	147	54	119	-
Sunflower	9,325	10,239	10,366	4,633	6,948	8,302	2.7
Oil sunflower	-	1,115	3,000	6,500	10,022	4,127	1.3
Vegetables	35,358	32,590	30,492	28,595	19,531	29,313	9.4
Matsedge	2,988	2,827	2,176	1,184	1,222	2,079	0.7
Rice	12,109	12,784	11,569	12,560	13,703	12,545	4.0
Soyabean	291	273	131	-	-	139	-
Sub - Total	172,817	185,486	188,206	174,075	174,447	179,005	57.2
Nili Crop							
Maize	35,380	47,705	55,946	55,563	64,490	51,817	16.6
Sorghum	5,064	4,161	1,983	3,116	1,908	3,246	1.0
Rice	1,908	1,510	1,004	963	934	1,264	0.4
Vegetables	34,713	34,611	43,321	43,372	29,146	37,033	11.9
Fodder Crop	23,015	5,587	2,783	12,999	-	8,877	2.8
Others	-	-	-	15	10	5	-
Sub - Total	100,080	93,574	105,037	116,028	96,488	102,242	32.7
Perennial Crop**	17,720	18,902	20,110	20,022	19,907	19,332	6.2
Grand Total	554,193	560,527	564,923	559,196	559,826	558,730	178.9

Source : MALR
Note : * Cropping Intensity (Total 312,835 feddan) ** Fruits

Table H-1-6 Cropping Acreage in Command Area, Giza Governorate

(unit : feddan)

Crop / Year	1986	1987	1988	1989	1990	Average	C. I.
Winter Crop							*
Wheat	6,602	7,651	7,220	6,815	9,752	7,608	7.0
Broadbean	1,427	1,535	1,898	1,362	777	1,399	1.3
Barley	485	488	423	503	396	459	0.4
Fenugreek	566	466	435	601	331	479	0.4
Lupin	560	471	423	444	293	438	0.4
Long Berseem	37,330	31,095	32,670	32,253	46,321	35,934	33.1
Short Berseem	4,353	3,823	7,171	7,260	8,822	6,886	6.4
Onion	1,000	1,002	852	1,676	1,195	1,145	1.1
Garlic	199	331	289	239	472	306	0.3
Berseem Seed	-	-	-	2,814	1,769	917	0.8
Vegerables	27,794	26,408	24,744	22,524	23,174	24,929	23.0
Sub-Total	80,316	76,270	76,125	76,491	93,302	80,500	74.2
Summer Crop							
Maize	30,754	37,768	39,446	40,954	41,481	38,082	35.1
Sorghum	1,252	945	742	394	544	775	0.7
Sugarcane	733	770	913	956	956	866	0.8
Sesame	242	266	254	226	587	315	0.3
Groundnut	1,794	1,672	2,579	2,806	2,354	2,241	2.1
Sunflower	127	239	262	241	223	219	0.2
Onion	3,003	2,005	2,557	4,639	4,665	3,374	3.1
Vegetables	30,415	28,070	27,197	27,675	27,372	28,146	26.0
Fodder Crops	21,053	19,255	18,534	16,471	10,399	17,142	15.8
Others	66	59	0	3	9	27	-
Sub - Total	89,439	91,049	92,487	94,370	88,590	91,187	84.1
Nili Crop							
Maize	21,114	25,930	27,084	31,523	31,029	27,336	25.2
Sorghum	1,183	1,001	786	418	456	769	0.7
Vegetables	27,334	21,894	18,542	23,748	24,592	23,222	21.4
Fodder Crop	5,263	4,814	4,634	4,118	2,599	4,286	4.0
Others	-	-	-	-	23	4	-
Sub - Total	54,894	53,639	51,046	59,807	58,699	55,617	51.3
Perennial Crop**	12,175	16,762	17,537	19,046	19,582	17,020	15.7
Grand Total	236,824	237,720	237,195	249,714	260,173	244,324	225.3

Source : MALR
Note : * Cropping Intensity (Total 108,405 feddan) ** Fruit Garden

Table H-1-7 Cropping Area, Yield and Production in New Land Command

(unit : feddan, ton/feddan, ton and % for C. I.)

Crop / Year	Total			Minia			Beni Suef		
	Area	Yield	Production	Area	Yield	Production	Area	Yield	Production
Winter Crop									
Wheat	5,008	1.47	7,351	4,646	1.50	6,960	362	1.08	391
Broadbean	1,121	0.58	648	1,030	0.58	597	91	0.56	51
Long Berseem	3,028	12.62	38,203	1,546	12.72	19,663	1,482	12.51	18,540
Short Berseem	2,041	9.50	19,390	816	9.80	7,997	1,225	9.30	11,393
Barley	627	0.93	585	434	0.96	417	193	0.87	168
Onion	839	7.85	6,582	655	8.00	5,240	184	7.29	1,342
Seed Onion	94	3.07	289	94	3.07	289	0	0	0
Garlic	2,042	6.50	13,273	527	5.35	2,819	1,515	6.90	10,454
Tomato	3,155	18.32	57,787	2,958	18.40	54,428	197	17.05	3,359
Lupin	77	0.49	38	71	0.49	35	6	0.50	3
Sub-Total	18,032		(CI = 66.7%)	12,777		(CI = 65.1%)	5,255		(CI = 70.9%)
Summer Crop									
Maize	1,681	1.51	2,530	1,250	1.53	1,913	431	1.43	617
Sorghum	1,496	1.37	2,054	1,198	1.34	1,605	298	1.51	449
Groundnut	2,237	0.51	1,140	1,915	0.52	995	322	0.45	145
Sesame	2,307	0.40	912	2,243	0.40	897	64	0.23	15
Sunflower	166	0.52	86	86	0.63	54	80	0.40	32
Soyabean	30	0.60	18	30	0.60	18	0	0	0
Cucumber etc.	548	5.23	2,866	475	5.20	2,479	73	5.43	396
Cantaloup	100	10.00	1,000	100	10.00	1,000	0	0	0
Watermelon	3,226	4.43	14,303	1,943	4.72	9,171	1,283	4.00	5,132
Tomato	650	15.38	10,000	620	15.40	9,548	30	15.07	452
Fodder	5,100	14.10	71,900	2,760	13.75	37,455	2,340	14.72	34,445
Sub - Total	17,541		(CI = 64.9%)	12,620		(CI = 64.3%)	4,921		(CI = 66.4%)
Garden Crops	1,317	3.50	4,610	970			347		
			(CI = 4.9%)			(CI = 4.9%)			(CI = 4.9%)
Total	36,890		(CI = 136.5%)	26,367		(CI = 134.3%)	10,523		(CI = 142.2%)
Total Area	27,025		(100%)	19,615		(100%)	7,410		(100%)

Source : Agricultural offices concerned, Upper Egypt Development Company.
Note : No nili crop is separately classified for new expansion land.
(CI) : Cropping intensity as per cent of total reclaimed crop acreage.

Table H-1-8 Area under Horticultural and Fodder Crop Production

(unit: 1000 feddan, ( ) % of total crop acreage)

Crop / Season	Minia		Beni Suef		Faiyum	Giza		Total	
	Total G.	Com. A.	Total G.	Com. A.	Total G.	Total G.	Com. A.	Total G.	Com. A.
Vegetables	(4.3)	(5.6)	(20.2)	(15.5)	(23.4)	(70.4)	(70.4)	(35.8)	(29.8)
Summer Crop	11.0	2.0	37.7	1.8	6.6	44.7	28.1	100.0	38.5
	(2.4)	(3.0)	(14.6)	(3.5)	(2.1)	(26.0)	(26.0)	(13.5)	(7.1)
Nile Crop	3.1	0.6	7.8	2.0	37.0	36.9	23.2	84.8	62.8
	(0.7)	(1.0)	(3.0)	(3.9)	(11.9)	(21.4)	(21.4)	(11.4)	(11.7)
Winter Crop	5.6	1.0	6.8	4.2	29.3	39.6	24.9	81.3	59.4
	(1.2)	(1.6)	(2.6)	(8.1)	(9.4)	(23.0)	(23.0)	(10.9)	(11.0)
Fruit Trees	23.9	3.5	7.1	1.0	19.3	27.0	17.0	77.3	40.8
	(5.2)	(5.3)	(2.7)	(1.9)	(6.2)	(15.7)	(15.7)	(10.4)	(7.6)
Other Crops*	6.0	-	2.3	0.4	3.7	7.2	4.5	19.2	8.6
	(1.3)	(-)	(0.9)	(0.8)	(1.2)	(4.2)	(4.2)	(2.6)	(1.6)
Fodder Crops**	1.0	0.0	2.5	0.0	8.9	34.0	21.4	46.4	30.3
	(0.2)	(-)	(1.0)	(-)	(2.8)	(19.8)	(19.8)	(6.2)	(5.6)
Total Area	50.6	7.1	64.2	9.4	104.8	189.4	119.1	409.0	240.4
Total %	(10.8)	(10.9)	(24.8)	(17.8)	(33.6)	(110.1)	(110.1)	(55.0)	(44.6)

Source: MALR

Note : G; governorate, Com. A.; command area *; medicinal crops etc. **; berseem excluded

Table H-1-9 Comparison of Summer Crop Composition between Wet and Dry Areas (Al Ghork Command Area, Faiyum in 1989/90)

(unit: % in brackets, 1,000 feddan)

Crop	Cotton	Maize	Sunflower	Rice	Peanut	Sesame	Vegetables	Maize	Tomato	Garden	Forage
Wet Zone	1.7	3.6	0.5	4.7	0	0.03	0.3	1.7	1.3	0.02	2.2
(%)	(50)	(29)	(16)	(91)	(0)	(4)	(6)	(31)	(16)	(8)	(46)
Dry Zone	1.7	6.8	2.8	0.4	0.04	0.6	4.9	3.8	6.5	0.2	2.5
(%)	(50)	(71)	(84)	(9)	(100)	(96)	(94)	(69)	(84)	(29)	(54)

Source: MPWWR Faiyum Office

Note : Both summer and nili rice are included in "Rice".

Table H-1-10 Growth Characteristics of Major Crops in Command Area

(unit: given for each item)

Crop	Suitable Texture	Dept of Root Zone	Capillary Water *	Maximum** Requirement	Critical*** Wilting Day	Soil Salt Tolerance
unit adopted		cm	mm/100 cm	mm/day	day	ECmmho/cm#
Summer Crop		P Q	R S	T	PR./T QS/T	Desired Max.
Cotton	H Caly	100 - 170	130 - 90	5.9/jul.	22.0 - 25.9	7.7 - 27
Maize	CL - C	100 - 170	120 - 80	9.9Jul.	12.1 - 13.7	1.6 - 12
Sorghum	CL - C	100 - 200	110 - 75	6.9/Aug.	15.9 - 21.7	4.0 - 18
Sugarcane	L - CL	120 - 220	130 - 90	10.6/Aug.	13.2 - 18.7	2.0 - 10
Soybean	SL - CL	60 - 130	100 - 75	9.7/Jul.	6.2 - 10.0	5.0 - 10
Sunflower	SL - L	80 - 150	90 - 60	6.0/Aug.	12.0 - 15.0	5.3 - 15
Groundnut	S - SL	50 - 100	80 - 55	4.4/Jul.	9.1 - 12.5	3.2 - 7
Tomato	L - CL	70 - 150	180 - 60	5.7/Jun.	22.1 - 15.8	2.5 - 13
Melon	SL - CL	100 - 150	70 - 50	5.5/Jul.	12.7 - 13.6	2.2 - 16
Fodder	S - HC	50 - 150	100 - 70	9.0/Aug.	5.6 - 11.7	2.8 - 26
Rice	L - C	40 - 100	500 - 300	11.1/Jul.	18.0 - 27.0	3.0 - 12
Winter Crop						
Wheat	SL - C	100 - 150	105 - 70	3.4/Mar.	30.9 - 30.9	6.0 - 20
Broadbean	L - HC	50 - 70	90 - 65	4.0/Feb.	11.3 - 114.	1.6 - 12
Berseem	CL - HC	60 - 90	70 - 50	6.0/Apr.	7.0 - 7.5	1.59 - 19
Barley	S - CL	100 - 150	110 - 75	3.2/Feb.	34.4 - 35.2	8.0 - 28
Cabbage	L - CL	40 - 50	70 - 50	5.5/Mar.	5.1 - 4.5	1.8 - 1.2
Onion	S - CL	30 - 50	50 - 35	4.4/Feb.	3.4 - 4.0	1.2 - 8
Fruit Tree						
Grape	L - HC	100 - 200	70 - 50	3.7/Jul.	18.9 - 27.0	1.5 - 12
Citrus	SL - C	120 - 150	100 - 70	4.1/Jul.	29.3 - 25.6	1.7 - 8
Olive	S - SL	120 - 170	130 - 95	3.2/Jul.	48.8 - 50.5	2.7 - 14

Note: Root zone measured from soil surface, * capillary water indicating water available to plant in 100 cm soil layer, left (CL - C) - right (S - SL), ** maximum requirement presenting likely ET-crop value during peak month, *** critical wilting day calculated from left three columns indicating how many days elapse after sufficient irrigation until permanent wilting begins. Practical irrigation interval may be set shorter than these days. # As to salt tolerance, left figures give 100% yield level, right ones giving critical soil-water EC value for crop survival.

Source: FAO irrigation manual

Table H-1-11 Field Crop Yields in Bahr Yusef Command Area in Minia

(unit: ton/feddan)

Season	Crop	1986	1987	1988	1989	1990	Average
Winter	Wheat	1.90	2.14	2.07	2.19	2.49	2.17
	Broadbean	1.00	1.13	1.15	1.19	1.14	1.12
	Fenugreek	0.85	0.95	0.92	1.03	0.94	0.95
	Long Berseem	28.14	28.71	29.14	27.87	30.08	28.72
	Short Berseem	6.42	6.24	6.51	6.66	6.26	6.45
	Garlic	12.04	10.77	11.49	11.49	12.81	11.94
Summer	Cotton	0.87	0.85	0.73	0.69	0.68	0.76
	Maize	2.30	1.82	2.27	2.47	2.43	2.35
	Soybean	0.79	1.01	1.05	1.12	1.05	0.97
	Sesame	0.46	0.45	0.46	0.51	0.38	0.48
	Groundnut	0.80	0.77	0.77	0.75	0.75	0.76
	Sunflower	0.87	0.86	0.86	0.86	0.88	0.87
	Sugarcane	40.94	40.52	41.08	41.43	44.39	41.61
Nili	Maize	1.78	1.84	1.90	1.64	1.70	1.76

Source : MALR
Note : Yields of other field crops and vegetables are only available on the basis for the total Minia Governorate

Table H-1-12 Field Crop Yields in Bahr Yusef Command Area, Beni Suef

(unit: ton/feddan)

Season	Crop	1986	1987	1988	1989	1990	Average
Winter	Wheat	1.91	2.57	2.70	2.72	2.78	2.57
	Broadbean	1.14	1.15	1.16	1.12	1.14	1.14
	Fenugreek	0.72	0.77	0.73	0.74	0.72	0.74
	Long Berseem	27.16	26.97	27.06	27.15	27.88	27.16
	Barley	1.37	1.39	1.42	1.42	1.46	1.40
	Lupin	0.82	0.88	0.75	0.83	0.65	0.81
	Garlic	7.74	8.16	8.15	8.10	8.10	8.09
	Onion	6.84	7.46	7.29	7.37	7.50	7.29
Summer	Cotton	0.70	0.69	0.60	0.64	0.70	0.66
	Maize	1.98	2.09	2.08	2.9	2.12	2.08
	Soybean	1.00	0.82	0.56	0.93	0.85	0.86
	Sesame	0.32	0.36	0.37	0.41	0.41	0.38
	Groundnut	0.79	0.81	0.83	0.83	0.84	0.82
	Sunflower	1.09	1.07	1.09	1.11	1.14	1.10
	Sugarcane	23.87	28.18	28.46	29.56	30.27	28.97
Nili	Maize	1.46	1.66	1.55	1.74	1.85	1.67
	Sorghum	1.50	1.56	1.48	1.55	1.72	1.55
	Onion	6.75	6.86	7.15	7.19	7.50	6.96

Source : MALR
Note : Yields of other field crops and vegetables are only available on the basis for the total Beni Suef Governorate

Table H-1-13 Field Crop Yields in the Governorates Concerned

(unit: ton/feddan)

Season	Crop Name	1986	1987	1988	1989	1990	Average
Minia Governorate							
Winter	Wheat	1.66	2.02	2.11	2.02	2.44	2.07
	Broadbean	1.09	1.24	1.08	1.17	0.94	1.10
	Barley	1.51	1.55	1.55	1.57	1.47	1.53
	Fenugreek	0.82	0.83	0.87	0.93	0.88	0.88
	Lupin	0.69	0.71	0.72	0.77	0.72	0.72
	Long Berseem	29.12	28.98	31.22	28.76	29.78	29.60
	Short Berseem	6.51	6.48	6.98	6.74	6.14	6.60
	Onion	4.43	5.49	6.70	12.07	7.28	9.50
	Garlic	9.02	9.47	11.61	7.11	12.03	10.83
	Soybean	0.69	0.93	0.91	0.82	0.89	0.85
	Potato	7.61	6.58	7.10	4.87	7.80	6.88
Summer	Cotton	0.89	0.87	0.74	0.78	0.77	0.81
	Maize	2.56	2.45	2.62	2.64	2.68	2.62
	Sorghum	1.90	2.01	1.94	1.96	2.01	1.96
	Sesame	0.52	0.53	0.55	0.54	0.55	0.54
	Groundnut	0.87	0.88	0.98	0.95	0.97	0.94
	Sunflower	0.87	0.86	0.86	0.86	0.88	0.87
	Sugarcane	40.59	38.26	41.25	40.08	43.19	40.87
Nili	Maize	2.06	2.09	2.17	1.80	1.89	2.05
	Sorghum	1.77	1.44	1.77	1.61	1.86	1.72
Beni Suef Governorate							
Winter							
	Wheat	2.07	2.67	2.80	2.88	2.93	2.67
	Broadbean	1.18	1.19	1.20	1.18	1.18	1.19
	Barley	1.51	1.45	1.46	1.45	1.48	1.47
	Fenugreek	0.78	0.79	0.79	0.78	0.78	0.78
	Lupin	0.96	0.97	0.97	1.00	1.01	0.98
	Long Berseem	30.28	30.97	30.48	29.75	29.75	30.45
	Short Berseem	7.81	7.79	7.76	7.95	7.95	7.81
	Onion	7.90	7.93	7.91	8.01	8.01	7.81
	Garlic	8.63	8.63	8.70	8.71	8.71	8.68
	Soybean	1.08	1.19	1.20	1.12	1.12	1.09
Summer	Cotton	0.76	0.68	0.69	0.77	0.77	0.72
	Maize	2.11	2.12	2.19	2.31	2.31	2.17
	Sorghum	1.60	1.66	1.80	1.82	1.82	1.74
	Sesame	0.35	0.35	0.37	1.82	0.41	0.39
	Groundnut	0.78	0.81	0.82	0.41	0.83	0.81
	Sunflower	1.14	1.17	1.14	0.83	1.23	1.17
	Rice	1.00	1.00	1.10	1.29	1.29	1.10
	Sugarcane	26.38	25.98	26.01	26.47	26.47	26.26
Nili	Maize	1.70	1.75	1.81	2.00	2.00	1.84
	Sorghum	1.49	1.56	1.65	1.69	1.69	1.56
	Onion	6.72	6.98	7.24	7.25	7.25	7.08

Source : MALR

Table H-1-14 Yields of Field Crops in Bahr Yusef Command / Governorates

(unit : ton/feddan)

Season	Crop Name	1986	1987	1988	1989	1990	Average
Faiyum Governorate							
Winter	Wheat	2.51	2.86	2.28	2.31	2.52	2.49
	Broadbean	1.28	1.30	1.31	1.43	1.22	1.31
	Barley	1.25	1.26	1.26	1.21	1.40	1.28
	Fenugreek	0.85	0.94	0.93	0.95	0.96	0.93
	Lupin	0.36	0.32	0.34	0.44	0.36	0.36
	Long Berseem	18.40	20.97	18.00	19.10	19.50	19.20
	Short Berseem	4.90	4.80	4.90	8.20	5.30	5.00
	Onion	13.20	12.74	13.24	13.17	13.25	13.12
	Garlic	6.53	6.31	6.53	6.62	6.54	6.51
	Soybean	0.25	0.48	0.38	-	-	0.37
Summer	Cotton	1.04	0.67	0.58	0.70	0.86	0.77
	Maize	1.81	1.88	2.13	2.32	2.45	2.12
	Sorghum	1.61	1.62	1.61	1.75	1.78	1.67
	Sesame	0.53	0.53	0.54	0.53	0.56	0.54
	Groundnut	0.48	0.48	0.48	0.49	0.49	0.48
	Sunflower	0.73	0.75	0.73	0.73	0.76	0.74
	Sugarcane	32.80	31.70	-	-	32.00	32.23
	Rice	2.23	2.46	2.47	2.60	2.81	2.51
Nili	Maize	0.94	1.03	1.06	1.09	1.12	1.05
	Sorghum	1.15	1.15	1.17	1.14	1.14	1.15
Giza Governorate							
Winter	Whear	2.10	2.42	2.36	2.58	2.54	2.41
	Broadbean	0.93	1.03	1.04	1.00	1.00	0.99
	Barley	1.59	1.62	1.62	1.57	1.66	1.60
	Fenugreek	0.74	0.79	0.91	0.82	0.86	0.82
	Lupin	0.88	0.92	0.92	0.95	0.94	0.92
	Long Berseem	32.29	32.63	32.32	31.04	28.54	31.72
	Short Berseem	-	-	-	5.22	9.83	6.99
	Onion	7.10	7.21	7.60	7.70	4.73	6.84
	Garlic	5.88	5.83	5.60	5.78	5.97	5.85
	Soyabean	1.00	0.56	-	0.87	1.21	0.91
Summer	Cotton	-	-	-	-	-	-
	Maize	2.06	2.18	2.38	2.60	2.79	2.42
	Sorghum	1.55	1.55	1.43	1.48	-	1.51
	Sesame	0.49	0.48	0.51	0.51	0.53	0.51
	Groundnut	0.96	0.89	1.05	1.06	1.05	1.02
	Sunflower	1.49	1.36	1.33	1.29	1.56	1.39
	Sugarcane	35.52	35.07	35.31	-	34.00	34.98
	Onion	-	-	-	7.07	7.40	7.30
Nili	Maize	-	-	-	2.02	2.24	2.13
	Sorghum	-	-	-	1.48	-	1.48
	Onion	6.72	6.98	7.24	7.23	7.25	7.08
	Rice	-	-	-	1.08	1.19	1.14

Source : MALR

Table H-1-15 5 - Year Average Yields of Vegetable in Related Governorates (1986-1990)

(unit : ton/feddan, feddan)

Governorate	Minia		Beni Suef		Faiyum		Giza	
	yield	area	yield	area	yield	area	yield	area
Winter Vegetables								
Tomato	11.06	4,611	11.35	2.491	15.38	21,895	15.99	18,145
Eggplant	8.45	121	9.26	1.579	7.29	45	9.22	2,006
Green pepper	5.06	37	6.95	54	7.00	27	8.98	3,515
Spinach	5.27	50	6.74	82	5.49	1,235	10.33	1,053
Cauliflower	8.52	77	-	-	9.70	304	12.59	953
Cabbage	7.58	203	13.69	357	16.83	1,641	14.81	2,165
Green peas	5.87	4	3.90	89	-	-	4.74	1,552
Green kindney	5.50	3	3.89	4	-	-	4.13	4,331
Cucumber	-	-	-	-	-	-	6.70	1,912
Squash	8.42	82	8.11	59	8.11	644	8.30	2,731
Summer Vegetables								
Potato	8.09	3,076	12.03	440	8.149	42	10.58	6,498
Tomato	13.33	3,458	12.01	3.454	13.33	1,228	19.18	11,655
Eggplant	8.45	123	10.98	629	7.95	210	9.64	3,357
Green pepper	5.97	209	8.59	155	6.31	364	10.33	5,029
Watermelon	4.66	17,528	10.29	3.685	10.63	4,347	13.32	753
Egyptian marrow	-	-	11.89	148	5.83	244	12.22	2,079
Okra	6.82	194	5.71	168	4.55	267	7.81	2,600
Green kidney	6.66	64	3.86	520	-	-	4.30	5,021
Cucumber	-	-	6.85	1,764	4.40	1,164	7.20	2,399
Squash	6.79	163	10.54	189	8.39	462	8.28	1,489
Cantaloup, melon	7.15	2,067	13.28	12,925	6.23	1,514	11.35	1,549
Nili Begetables								
Potato	8.06	6,758	10.58	1,078	7.27	11	9.82	15,753
Tomato	11.66	1,465	10.73	8,521	15.15	35,304	10.86	8,288
Eggplant	8.80	65	9.90	91	8.21	104	1.73	823
Green pepper	6.30	75	6.30	95	7.62	108	7.39	1,149
Cabbage	7.63	172	13.54	142	19.10	488	9.04	1,887
Green kidney	5.01	27	3.38	128	-	-	3.87	2,906
Cucumber	-	-	7.11	139	4.60	304	5.92	2,996
Squash	7.66	73	9.99	94	8.29	299	8.73	1,569

Source : MALR

Table H-1-16 5-Year Average Yields of Fruit in Related Governorates

(unit : ton/feddan, feddan)

Governorate	Minia		Beni Suef		Faiyum		Giza	
	yield	area	yield	area	yield	area	yield	area
Orange	4.99	1,317	6.37	2,873	6.71	1,887	5.93	5,350
Mandarin	5.64	826	5.93	759	5.74	268	6.82	3,586
Lime	5.16	272	7.37	91	5.54	7,191	7.26	1,058
Grapefruit	5.00	1	4.33	15	-	-	3.54	41
Grapes	5.50	19,889	9.56	2,714	9.29	2,593	6.84	4,893
Mango	6.53	217	8.09	90	8.87	932	4.29	4,799
Banana	1.55	507	10.23	251	9.59	22	11.64	2,54
Fig	9.54	263	2.02	9	15.72	157	6.11	36
Guava	6.60	05	5.81	204	5.57	237	5.85	838
Pomegranate	6.61	141	4.43	6	3.62	24	10.12	21
Apricot	3.48	0	1.00	0	4.74	2,686	6.50	17
Apple	5.00	29	2.45	4	4.27	133	5.96	172
Pear	4.85	13	2.67	6	3.98	214	3.77	65
Plum	4.38	16	5.13	27	4.80	3	6.46	3,211
Olive	2.26	0	4.39	6	6.26	1,780	4.94	27

Source : MALR

Table H-1-17 Land Productivity by The land Classification

(unit : 100 feddan, ( ) % share)

Land Class	Minia G.	Minia G.	Beni Suef G.	Beni Suef G.	Faiyum G.	Giza G.	{Egypt}
I	49.7 (9.4)	2.2 (1.7)	26.1 (13.7)	0 (-)	0.6 (0.2)	14.0 (9.0)	{ 5}
II	271.4 (51.3)	47.6 (36.6)	21.1 (11.1)	9.2 (17.5)	84.2 (18.0)	79.0 (51.0)	{60}
II	92.0 (17.4)	31.4 (24.3)	90.8 (47.6)	30.5 (57.9)	180.3 (38.6)	22.0 (14.2)	{22}
IV	27.5 (5.2)	13.5 (10.5)	18.0 (9.4)	5.3 (10.1)	77.6 (16.6)	4.9 (3.1)	{ 5}
V-f	35.3 (6.7)	25.7 (19.9)	1.2 (0.6)	0.3 (0.5)	64.4 (13.8)	5.0 (3.2)	
V-n	1.3 (0.2)	0.4 (0.3)	1.1 (0.6)	2.7 (5.0)	- (-)	30.1 (19.5)	{ 0}
VI-f	49.8 (9.4)	8.7 (6.7)	2.9 (1.5)	0.7 (1.3)	- (-)	- (-)	{ 0}
VI-n	1.8 (0.3)	0.2 (0.0)	29.7 (15.5)	4.0 (7.7)	59.7 (12.8)	- (-)	{ 0}
Total1	528.8 (100)	129.7 (100)	190.9 (100)	52.7 (100)	466.8 (100)	155.0 (100)	{100}

Note : G ; Total Governorate, C ; Bahr Yusef Command Area, B. Suef ; Beni Suef where Ehenesia District Data area taken for its Command Area. I ; no hazard, II ; one hazard, III ; fairly restriction but rectifiable, IV ; severely limiting but manageable, f ; flooded, n ; non agricultural, V ; Highly hazardous affecting growth / yield, VI ; not suitable for farming.

Source : MALR original source Soil and Water Research Institute 1976 - 1981

Table H-1-18 Achievement of Land Improvement by MALR

(unit : feddan, ( ) % of total cropping area)

Governorate	Subsoiling		Gypsum Mising		Channel Cleaning		Project Period
Minia	115,052	(25.1)	170,574	(37.2)	31,536	(6.9)	1980 - 1990
Beni Suef	204,783	(79.1)	60,688	(23.4)	6,601	(2.5)	1980 - 1990
Faiyum	83.240	(26.6)	122,761	(39.2)	21,921	(7.0)	1985 - 1990
Giza	17,201	(10.0)	25,690	(14.9)	75,939	(44.1)	1984 - 1990

Source : MOA, EALIP (Egyptian Agricultural Land Improvement Programme)

Table H-1-19 Crop Yield Response to Land Improvement in Beni Suef

(unit : ton/feddan and %)

Crop Variety	Applied Improvement	Average Yield Increment in%	First Yeat		Second Year		Third Year	
			Yi	(Yo)	Yi	(Yo)	Yi	(Yo)
Subsoiling only (1985)								
Wheat (Sakha 69)	d.o.	8.7	2.22	(1.95)	2.18	(2.07)	2.25	(2.10)
Broadbean	d.o.	22.6	1.32	(1.01)	1.21	(1.01)	1.09	(0.93)
Barley	d.o.	29.3	1.26	(0.96)	1.38	(1.02)	1.02	(0.84)
Cotton (Giza 75)	d.o.	38.3	0.63	(0.55)	10.71	(0.39)	0.55	(0.39)
Mili Maize	d.o.	18.4	1.22	(0.98)	1.19	(0.98)	1.09	(0.91)
Gypsum (1985) - Subsoiling (1986)								
Wheat (Sakha 69)	d.o.	5.9	-	(-)	3.65	(3.30)	3.60	(3.30)
Wheat (Giza 157)	d.o.	15.0	2.10	(1.80)	2.33	(2.05)	2.25	(1.98)
Broadbean	d.o.	20.3	1.32	(1.09)	1.32	(1.09)	1.32	(1.12)
Barley	d.o.	21.2	1.74	(1.56)	1.86	91.32)	1.80	(1.62)
Cotton	d.o.	32.1	0.95	(0.71)	0.74	(0.55)	0.71	(0.55)
Maize (Giza 2)	d.o.	35.5	2.10	(1.82)	2.45	(1.61)	2.24	(1.61)
Nili Maize	d.o.	29.0	1.19	(1.05)	1.44	(0.94)	1.33	(0.98)
Subsoiling (1985) - Gypsum (1986)								
Wheat (Sakha 69)	d.o.	10.6	-	(-)	-	(-)	3.45	(3.12)
Wheat (Giza 157)	d.o.	15.7	1.91	(1.43)	3.30	(3.08)	2.55	(2.06)
Broadbean	d.o.	14.2	1.19	(1.16)	1.32	(1.16)	1.32	(1.16)
Cotton (Giza 75)	d.o.	23.2	1.31	(1.09)	0.93	(0.74)	0.96	(0.79)
Sunflower	d.o.	35.0	0.70	(0.50)	0.70	(0.50)	0.50	(0.40)
NiliMaize	d.o.	42.2	1.78	(0.94)	1.40	(1.05)	1.54	(1.09)
Subsoiling - Canal Cleaning (1985)								
Wheat (Sakha 69)	d.o.	5.9	-	(-)	-	(-)	2.70	(2.55)
Wheat (Giza 157)	d.o.	21.4	1.16	(1.22)	2.82	(2.55)	-	(-)
Broadbean	d.o.	19.9	1.12	(0.90)	1.13	(0.93)	1.01	(0.88)
Cotton (Giza 75)	d.o.	20.0	5.50	(4.50)	5.50	(4.50)	5.20	(4.50)
Sunflower	d.o.	21.3	0.90	(0.74)	-	(-)	-	(-)
NiliMaize	d.o.	15.5	1.15	(1.05)	1.12	(0.91)	1.36	(1.19)

Source : MALR Giza Governorate Office, Original ; MALR, EALIP (elsewhere cited.)
Note : Figure in brackets (Yo) represent yields of unimproved plots adjacent to improved ones.
d.o. ; ditto, first year etc. ; number of years passed since improvement is implemented, average ; 3-year mean (the first the third year) rate of yield.

Table H-1-20 Crop Composition in Harika Canal Command Area (5-year Average During 1986-1990)

(unit: 1,000 feddan, %)

Winter Crop	Maghaga	Edwa	Fashne	Total	Summer Crop	Maghaga	Edwa	Fashne	Total
Wheat	1.9	6.1	3.1	11.1	Cotton	1.3	5.6	1.9	8.8
Broadbean	0.5	5.0	1.4	6.9	Maize	1.9	5.9	2.9	10.7
S. Berseem	0.3	1.4	-	1.7	Groundmut	-	0.07	-	0.1
L. Berseem	0.7	2.9	0.9	4.5	Sesame	-	0.15	-	0.1
Vegetable	-	1.0	0.1	1.1	Soyabean	-	-	0.06	0.1
Berley	-	-	0.3	0.3	Sunflower	-	0.04	0.03	0.1
Garlic	0.1	0.04	-	0.1	Vegetable	-	0.7	0.3	1.0
Onion Seed	-	-	0.7	0.7	Total Summer	3.3	12.5	5.2	21.0
Aromatic	-	-	0.2	0.2	(C.I.Summer)	(86)	(67)	(75)	(71)
Total Winter*	3.4	16.4	6.7	26.5	Sorghum	-	-	0.1	0.1
(C. I. Winter)	(79) *	(74) *	(97) *	(90) *	Vegetalbes	-	0.7	0.05	0.7
Garden Crop	0.01	0.3	0.9	1.2	Maize	0.2	3.2	0.4	3.8
Total Annual	6.6	30.3	13.4	50.4	Total Nili	0.2	3.9	0.55	4.6
(C. I. Annual)	(170)	(161)	(181)	(175)	(C. I. Nili)	(5)	(20)	(9)	(14)

Source : MALR
Note : L ; long,, Garden Crop ; perennial fruit etc. C.I. ; Cropping Intensity
* including garden crops. Fugures include all villages coveres by Harika Canal, 63 % of acreage inder Harika command. Source : MOA

Table H-1-21 Crop Yields in Harika Canal Command Area (5-year Average During 1986-1990)

(unit: 1,000 feddan)

Winter Crop	Maghaga	Edwa	Fashne	Total	Summer Crop	Maghaga	Edwa	Fashne	Total
Wheat	2.16	2.01	2.25	2.22	Cotton	0.69	0.76	0.70	0.74
Broadbean	1.16	1.10	1.20	1.13	Maize	2.03	1.88	2.10	1.96
S. Berseem	-	-	5.00	5.00	Groundmut	-	-	0.36	0.36
L. Berseem	28.30	28.80	29.80	29.00	Sesame	-	0.28	-	0.28
Berley	-	-	1.38	1.38	Soyabean	-	-	0.91	0.91
Garlic	9.70	11.60	9.70	9.70	Sunflower	-	-	1.00	1.00
Onion	-	-	7.40	7.40	Nili Crop	-	-	7.4	7.4
Seedfenugreek	-	5.10	5.70	5.30	Maize	1.96	1.96	1.96	1.96
					Sorghum	-	-	1.69	1.69

Source : Calculated from Crop Data from two related Governorates

Table H-1-22 Land Class Distribution in Harika Canal Command Area

(unit: percent)

District	Class I	Class II	Class III	Class IV	Class Vf	Class Vn	Class VIf	Class VIn
Maghaga	0	22.0	63.5	2.5	5.6	0	6.3	0
Edwa	0	37.1	46.6	6.2	4.7	0.1	5.3	0
Fachne	3.6	48.1	28.0	5.7	0.3	6.0	0.1	8.2
Total (%)	0.5	35.5	48.0	5.5	4.3	0.2	4.8	1.2

Source : MALR EALIP

Table H-1-23 Chemical Fertilizer Supply by PBDAC, 1990/91

(unit : 1,000 ton 15.5 % N and 15 % P equivalent, component kg N, P_2O_5 / feddan)

Governorate	Summer / Nili Crop						Winter Crop					
	Required		Delivered		Dose / feddan		Required		Delivered		Dose / feddan	
	N	P_2O_5	N	P_2O_5	N	P_2O_5	N	P_2O_5	N	P_2O_5	N	P_2O_5
Minia	278	62	262	73	99	25	117	57	171	72	59	20
(Edwa)	15	3	18	4	83	20	14	5	19	8	77	29
(Samalout)	32	7	32	10	76	18	23	9	44	15	54	21
(Mallawi)	35	12	51	11	132	29	12	6	23	11	55	14
Beni Suef	154	31	126	30	89	18	97	33	112	53	56	19
(Fashne)	22	5	24	4	67	14	14	5	19	9	42	15
(Wasta)	24	5	17	4	76	16	16	5	14	7	52	17
Faiyum	131	20	93	9	63	20	102	44	116	43	49	21
(Itsa)	37	6	20	7	58	9	23	0	28	10	36	15
(Abshwai)	28	15	4	7	48	25	27	11	22	9	46	19
Giza	172	46	123	27	155	40	64	36	114	41	58	75
(Aiyat)	36	22	10	5	198	115	13	8	19	7	69	42
(Saff)	20	14	5	4	163	113	13	8	25	10	107	36

Source : PBDAC, Cairo HQ.
Note : Only a few representative districts are selected for reference.

Table H-1-24 High Yielding Varieties in Command Area

Crop	Variety (HYV)	Recent Trends
Wheat	Giza 164,162, Sakha 69, Beni - Suef 5	For early varieties, high nitrogen
Durum Wheat	Sohag 1, Beni - Suef 1	does applied to.
Broadbean	Giza 402	with potash application.
Berseem	Sakha 3, 4, 6, Giza 7, 15	mainly for long berseem
Maize	Hybrid Zawi 3, Giza 3, 204, 215	exclusively for summer crop
Cotton	Giza 83, 80, 75 Giza 45	early varieties, 83 popular
Soyabean	Fattah 71, Kolosh	mainly in Minia, rhizobium inoculation indispensable
Groundnut	Giza 4, 5	mainly in Giza
Sugarcane	C - 9	exclusively in Minia
Winter Onion	Giza 6	around Sids Experiment Farm

Source : Related Governorate Agricultural Offices

Table H-1-25 Livestock Herd in Command and Related Governorates

(unit : head)

Specy	Cattle		Buffalo		Camel/House	Donkey	Sheep	Goat
	Adult	Calves	Adult	Calves	All ages	d. o.	d. o.	d. o.
Total Governorate *								
Minia	94,988	47,024	84,180	38,771	7,066	129,691	136,872	176,055
Beni Suef	125,969	33,204	82,635	34,130	3,903	82,222	129,538	68,590
Faiyum	101,806	50,399	63,626	29,305	6,953	96,913	130,366	57,011
Giza	54,106	107,790	88,488	131,940	*n. a.*	*n. a.*	187,540	24,866
Total Bahr Yousef Command **								
Mini	10,488	6,677	11,954	5,506	1,003	18,416	19,436	25,000
Beni Suef	25,043	6,601	16,428	6,785	776	16,346	253753	13,636
Faiyum	101,806	50,399	63,626	29,305	6,953	96,193	130,366	57,011
Giza	34,087	67,908	55,717	83,122	0	21,000	118,150	15,666
Total Heads in the Command Area **								111,333
	171,424	131,585	147,755	124,718	8,732	152,675	293,705	

Source : MALR (1989), ** estimated from carrying capacity / acreage coverage
Note : Poultry data are excluded because of little dependency on local feeds.
Herds kept by urban livestock keepers not included.

Table H-1-26 Self-Supplied Feeds in Command Area

(unit : feddan, ton/feddan, 1,000 ton)

Governorate	Minia					Beni Suef					Faiyum					Giza				
	Area	Yld.1	Prod.	TDN	DCP	Area	Yld.1	Prod.	TDN	DCP	Area	Yld.1	Prod.	TDN	DCP	Area	Yld.1	Prod.	TDN	DCP
Berseem																				
Long Crop	10.1	28.7	290	35.0	6.1	11.3	27.2	307	37.2	6.5	98.7	19.2	1,895	229.8	39.8	35.9	31.7	1,138	137.7	23.9
Short Crop	3.3	6.5	21	2.5	0.4	-	-	-	-	-	25.7	5.0	129	15.4	2.7	6.9	6.9	48	5.8	1.0
Fodder																				
Summer	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17.1	21.4	366	70.0	4.0
Nily	-	-	-	-	-	0.2	0.0	0	-	-	8.9	6.5	58	11.1	0.7	4.3	11.7	50	9.5	0.6
Stover																				
Maize	30.5	3.3	101	157	1.2	26.1	2.8	73	11.3	0.9	95.8	2.3	221	34.3	2.7	65.4	3.5	226	35.0	2.7
Sorghum	-	-	-	-	-	2.2	2.8	6	0.7	0.1	40.4	2.9	118	14.3	1.3	1.5	2.8	4	0.5	1.0
Straw																				
Wheat	19.0	2.6	49	18.8	0.5	15.6	3.1	48	18.3	0.5	77.5	3.0	232	88.1	2.3	7.6	2.9	22	8.4	0.2
Rice	-	-	-	-	-	-	-	-	-	-	12.5	2.9	36	5.6	0.4	-	-	-	-	-
Barley	-	-	-	-	-	1.2	1.6	2	0.7	0.0	10.4	1.4	15	5.8	0.1	0.5	1.6	1	0.3	0.0
Residue																				
Legumes	15.1	0.2	3	1.4	0.1	10.8	0.2	2	1.1	0.1	21.6	0.3	6	2.6	0.3	3.6	0.2	1	0.2	0.0
Sugarcane	0.4	4.0	2	0.8	0.0	0.1	2.0	0	0.1	0.0	0.2	3.5	1	0.3	0.0	0.9	3.5	3	1.5	0.2
Total	78.4	-	466	74.2	8.3	67.5	-	438	69.4	8.1	391.7	-	2,711	407.3	50.3	143.7	-	1,859	268.9	32.6
D. O. B (%)			66.7	50.5	78.3			70.0	53.6	80.2			74.7	60.2	84.5			63.8	53.4	76.4

Source : Calculated from data and those from governorate offices

Note : Yld. = yield, Prod. = production, D. O. B. = Nutritional dependency on berseem, * : Sorghum grain is sold away for poultry industry.
Crop : Berseem Fodder MaizeS SorghumS WheatS RiceS BarleyS LegumesR SugarcaneR

Table H-1-27 Livestock Unit, Feed Rate in Command Area

(unit : L. U. ton)

Governorate	Cattle		Buffalo		Other L.L. *		Sheep / Goat		Production **		
	Adult	Calves	Adult	Calves	Adult	Calves	Adult	Calves	Adult	Meat of L.L.	Calves
	in L.U.								in ton		
Minia	8,390	1,669	12,957	1,666	4,910	768	1,111	547	2,200	970	220
Beni Suef	20,034	1,650	17,206	2,053	4,359	682	985	492	3,700	1,710	200
Faiyum	81,445	12,600	70,579	8,865	25,843	4,038	4,834	2,343	16,100	16,200	970
Giza	27,263	14,585	51,458	20,116	8,400	1,315	4,760	4,043	12,100	21,000	980
Total	137,132	30,504	152,200	32,700	43,512	6,800	11,690	7,425	34,100	39,880	2,340

Source : Same as in the foregoing table, and production calculated from MALR data.

Note : * L. L. = other large livestock, ** including goat meat,
1 L. U. (livestock unit) = equivalent to 500 kg. live weight, conversion factor as follows
cattle ; adult = 0.8 L. U. / head, calf = 0.25 L. U. / head, buffalo ; adult = 1.0 L. U., calf = 0.275 L. U.
camel ; same as buffalo, donkey ; equivalent to 1/3 of cattle L. U.,
sheep and goat ; adult = 0.05 L. U. / head, young = 0.025 L. U. / head,
Feed Requirement for providing the following table from figures of this table :

annual maintenance	; 1.15 ton TDN / L. U.,	0.105 ton DCP / L. U. for all species,
annual growth for calves etc.	; 2.34 ton TDN / L. U.,	0.472 ton DCP / L. U. for all species,
milk production	; 0.28 ton TDN / ton,	0.070 ton DCP / ton of milk, all species
meat production	; 3.70 ton TDN / ton,	0.400 ton DCP / ton of all kind of meats.

Table H-1-28 Feed Balance of Livestock Herd in Command Area

(unit : 1,000 ton, 1,000 LU)

Governorate	Minia	Beni Suef	Faiyum	Giza	Total
(adult herd size)	(27.4)	(42.6)	(182.7)	(91.9)	(344.6)
TDN for maintenance	31.5	49.0	210.1	105.7	396.3
DCP for maintenance	2.9	4.5	19.2	9.6	36.2
(young herd size)	(4.6)	(4.9)	(27.8)	(40.1)	(77.4)
TDN for herd growth	10.8	11.5	65.1	93.8	181.2
DCP for herd growth	2.2	2.3	13.1	18.9	36.5
(milk production)	2.2	3.7	16.1	12.1	34.1
TDN for milking	0.6	1.0	4.5	3.4	9.5
DCP for milking	0.2	0.3	1.1	0.8	2.4
(meat production)	1.2	1.9	17.2	22.0	42.3
TDN for fattening	4.5	7.0	63.6	81.4	158.5
DCP for fattening	0.5	0.7	3.9	8.8	16.9
Total TDN demand (a)	47.4	68.5	343.3	284.3	743.5
Total DCP demand (x)	5.8	7.8	40.3	38.1	92.0
Available TDN * (b)	63.1	59.0	346.2	228.6	696.9
Available DCP * (y)	7.1	6.9	42.8	27.7	84.5
Balance of TDN (b - a)	+ 15.7	- 9.5	+ 2.9	- 55.7	(6%) - 46.6
Balance of DCP (y - x)	+ 1.3	- 0.9	+ 2.5	- 10.4	(8%) - 7.5
TDN shortage ** (%)	(60) 16.2	(60) 41.0	(60) 205.5	(62) 177.7	(59) 440.5
DCP shortage ** (%)	(72) 4.2	(82) 6.4	(83) 33.6	(83) 31.6	(80) 75.8

Source : derived from the foregoing table
Note : * from the foregoing table as self suppliable, 15 % deducted as loss of harvesting / feeding.
** in case if berseem is not cropped any more.

Table H- 1-29 Present Crop Production in Command Area

(unit: feddan, Yi = yield in ton/feddan, Pr = production i ton)

Governorate	Minia			Beni Suef			Faiyum			Giza			New Land			Expansion		
Crop/Season	Area	Yi	Pr	Area	Yi	Pr	Area	Yi	Pr	Area	Yi	Pr	Area	Yi	Pr	Area	Yi	Pr
Winter C.	51,370			44,447			259,151			80,500			18,032					
Wheat	18,964	2.17	41,154	15,585	2.57	40,053	77,549	2.49	193,097	7,608	2.41	18,335	5,008	14.7	7,351	0		0
Broadbean	13,435	1.12	15,047	10,427	1.14	11,887	21,525	1.31	28,198	1,399	0.99	1,385	1,121	0.58	648			
L. Berseem	10,065	28.00	289,067	11,310	27.00	307,180	98,704	19.00	1,895,117	35,934	31.00	1,139,826	3,028	12.6	38,203			
S. Berseem	3,292	6.45	21,233	0	-	0	25,723	5.00	128,615	6,886	6.99	48,133	2,041	9.50	19,390			
Barley	0	-	0	1,205	1.40	1,687	10,393	1.28	13,303	459	1.60	734	627	0.93	585			
Fenugreek	1,144	0.95	1,087	714	0.74	528	3,392	0.93	3,155	479	0.82	393	0	-	0			
Onion***	24	9.50	228	2,452	7.29	17,875	2,912	13.1	38,205	1,145	6.84	7,832	933	-	6,871			
Garlic	735	11.9	8,776	446	8.09	3,608	231	6.51	1,504	306	4.85	1,484	2,042	6.50	13,273			
Tomato etc.	1,967	11.1	21,755	1,781	9.99	17,792	6,627	15.4	101,923	24,929	16.00	398,615	3,155	18.3	57,787			
Sugarbeet	0	-	0	0	-	0	11,278	15.5	174,809	0	-	0	0	-	0			
Others	1,744	-	7,845	527	-	401	817	-	1,963	960	-	724	77	-	38			
Summer C.	49,034			32,293			179,005			91,187			17,541			0		0
Cotton	16,716	0.76	12,704	13,216	0.66	8,723	39,689	0.77	30,561	0	-	0	0	-	0			
Maize	23,391	2.35	54,969	11,980	2.08	24,918	43,857	2.12	92,553	38,082	2.42	92,158	1,681	1.51	2,530			
Sorghum	0	-	0	362	1.74	630	37,190	1.67	62,107	775	1.51	1,170	1,496	1.37	2,054			
Rice	0	-	0	0	-	0	12,545	2.51	31,488	0	-	0	0	-	0			
Sugarcane*	395	41.6	16,436	60	28.9	1,738	220	32.2	7,091	866	35.0	30,923	0	-	0			
Groundnut	763	0.76	580	383	0.82	314	119	0.48	57	2,241	1.02	2,286	2,237	0.51	1,140			
Sesame	1,000	0.48	480	617	0.38	234	1,425	0.54	770	315	0.51	161	2,307	0.40	912			
Sunflower**	36	0.87	31	1,499	1.10	1,649	12,429	-	9,651	219	1.39	304	166	0.52	86			
Fodder	0	-	0	0	-	0	0	-	0	17,142	16.8	287,986	5,100	14.1	71,900			
Watermelon	1,042	4.66	4,856	0	-	0	23,313	10.6	311,597	0	-	0	3,226	4.43	14,303			
Tomato etc.	0	-	0	0	-	0	0	-	0	28,146	19.1	539,559	650	15.4	10,000			
Cucumber etc.	4,081	6.79	27,710	0	-	0	0	-	0	0	-	0	548	5.23	2,866			
Others	1,610	-	1,562	4,176	-	17,414	2,218	-	7,328	3,401	-	23,976	130	-	1,018			
Nili Crop	7,687			18,427			102,242			55,617			-		0	0		0
Maize	7,052	1.76	12,412	14,121	1.67	23,582	51,817	1.05	54,408	27,336	2.13	58,226	-	-	-			
Sorghum	38	1.52	58	2,220	1.55	3,441	3,246	1.15	3,733	769	1.48	1,138	-	-	-			
Potato etc.	597	8.06	4,812	0	-	0	0	-	0	23,222	9.82	228,040	-	-	-			
Tomato etc.	0	-	0	2,026	10.7	21,759	37,033	15.1	561,050	0	-	0	-	-	-			
Fodder	0	-	0	40	5.50	220	8,882	5.20	46,188	4,286	5.50	23,573	-	-	-			
Others	0	-	0	20	-	139	1,264	-	1,504	4	-	20	-	-	-			
Perennial	3,476	5.50	19,118	953	6.37	6,071	19,332	5.54	107,099	17,020	5.93	100,929	1,317	3.50	4,610	0		0
Total C.	111,567	(171.5%)		96,120	(186.7%)		558,730	(178.6%)		244,324	(225.3%)		36,890	(136.5%)		0 (0%)		

Source : Derived from foregoing tables

Note : * given as a summer crop, ** including oil-sunflower, *** including seed onion, others specified in Table H-2-15

Fig. H - 1 - 1 Present Cropping Pattern in Command Area in Minia Governorate

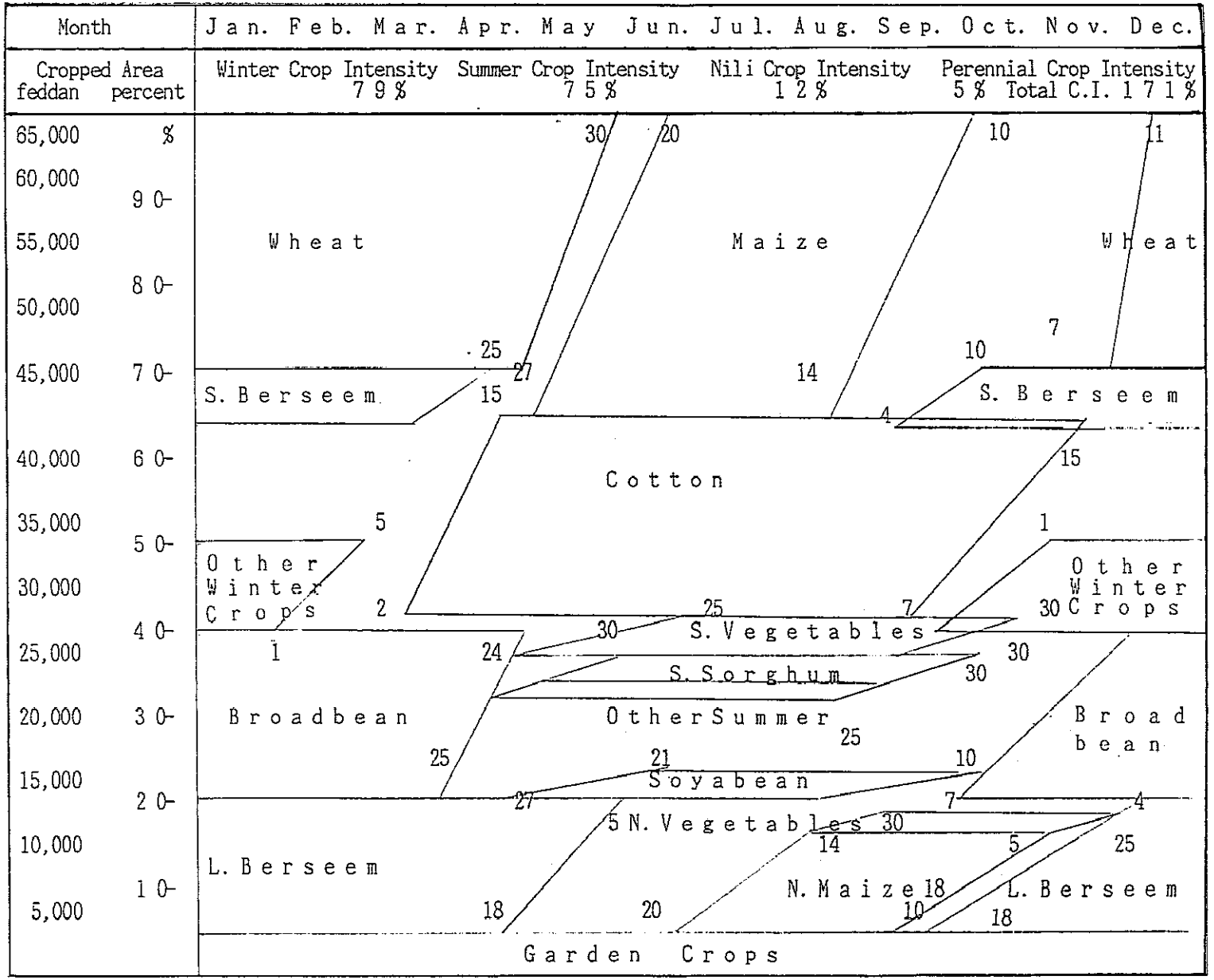


Fig. H - 1 - 2 Present Cropping Pattern in Command Area in Beni Suef Governorate

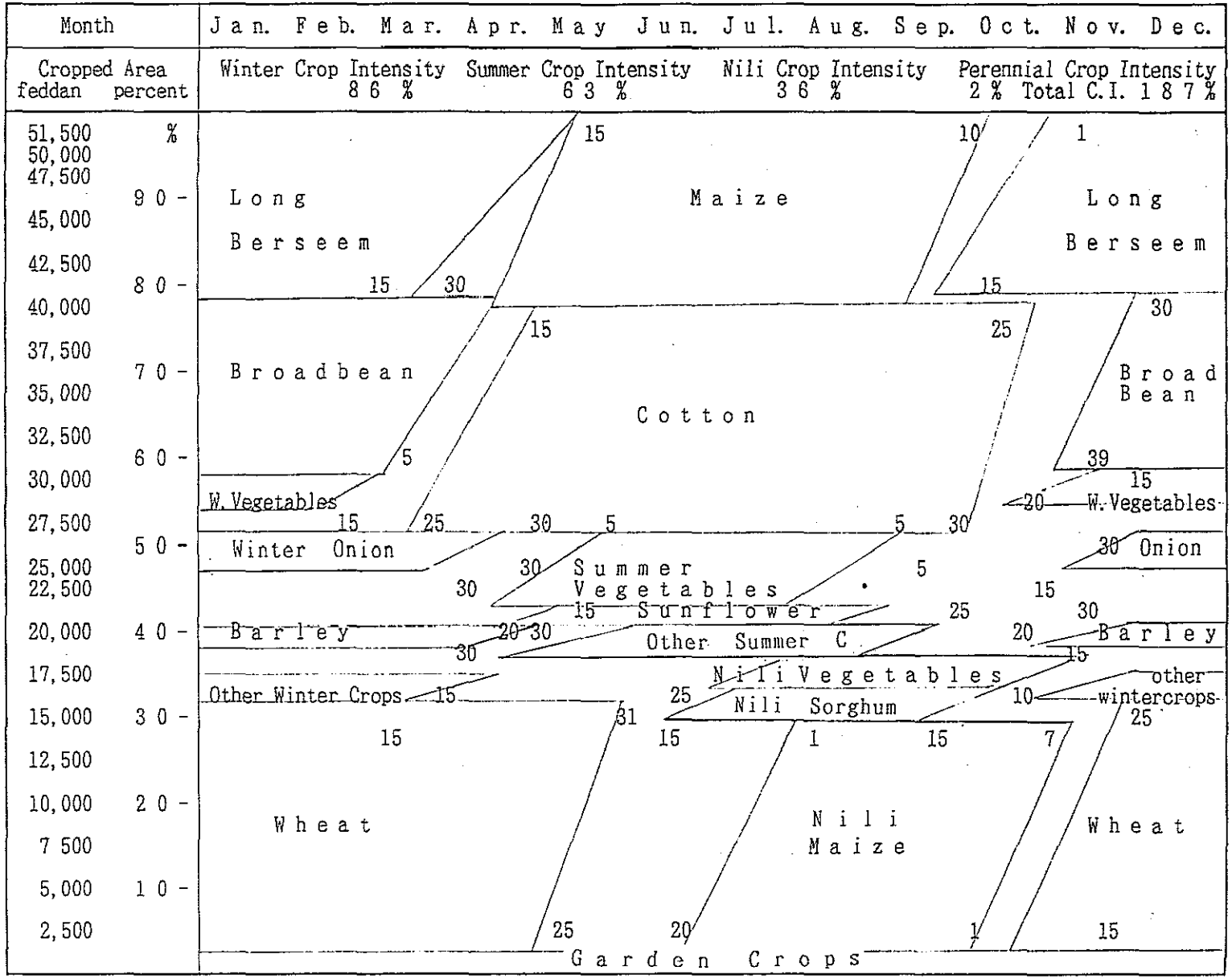


Fig. H - 1 - 3 Present Cropping Pattern in Command Area in Faiyum Governorate

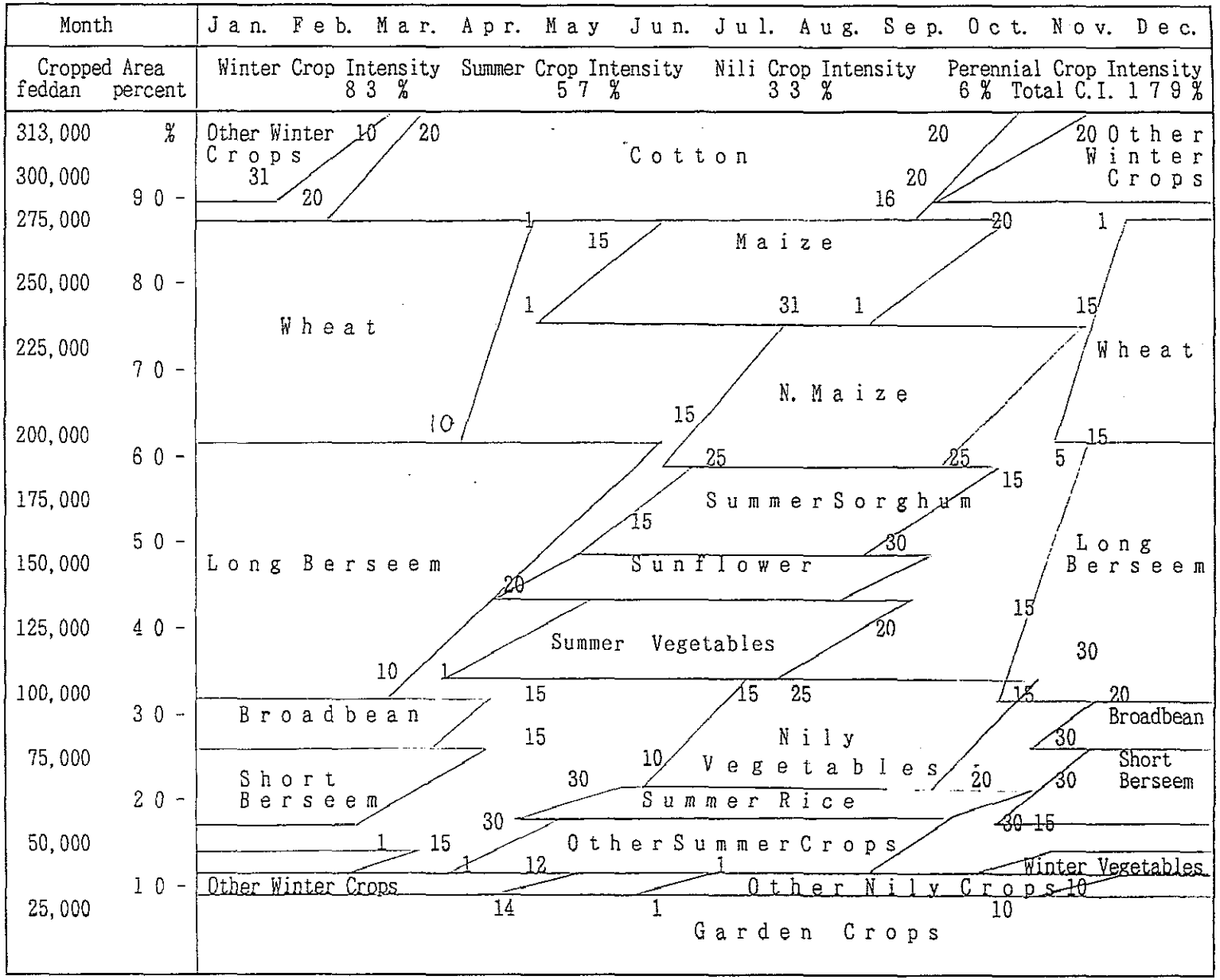


Fig. H - 1 - 4 Present Cropping Pattern in Command Area in Giza Governorate

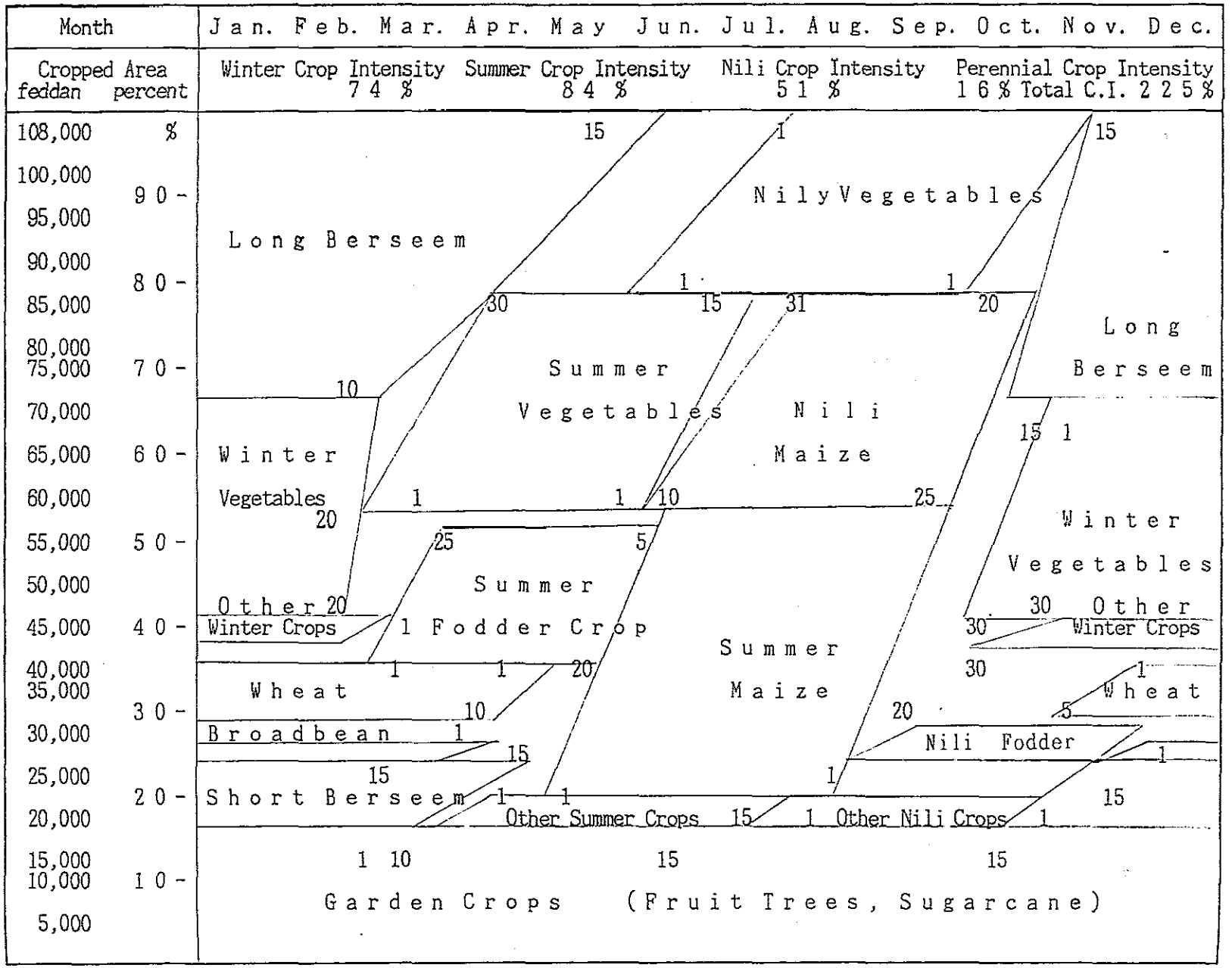


Fig. H - 1 - 5 Present Cropping Pattern in New Land Command (Minia and Beni Suef)

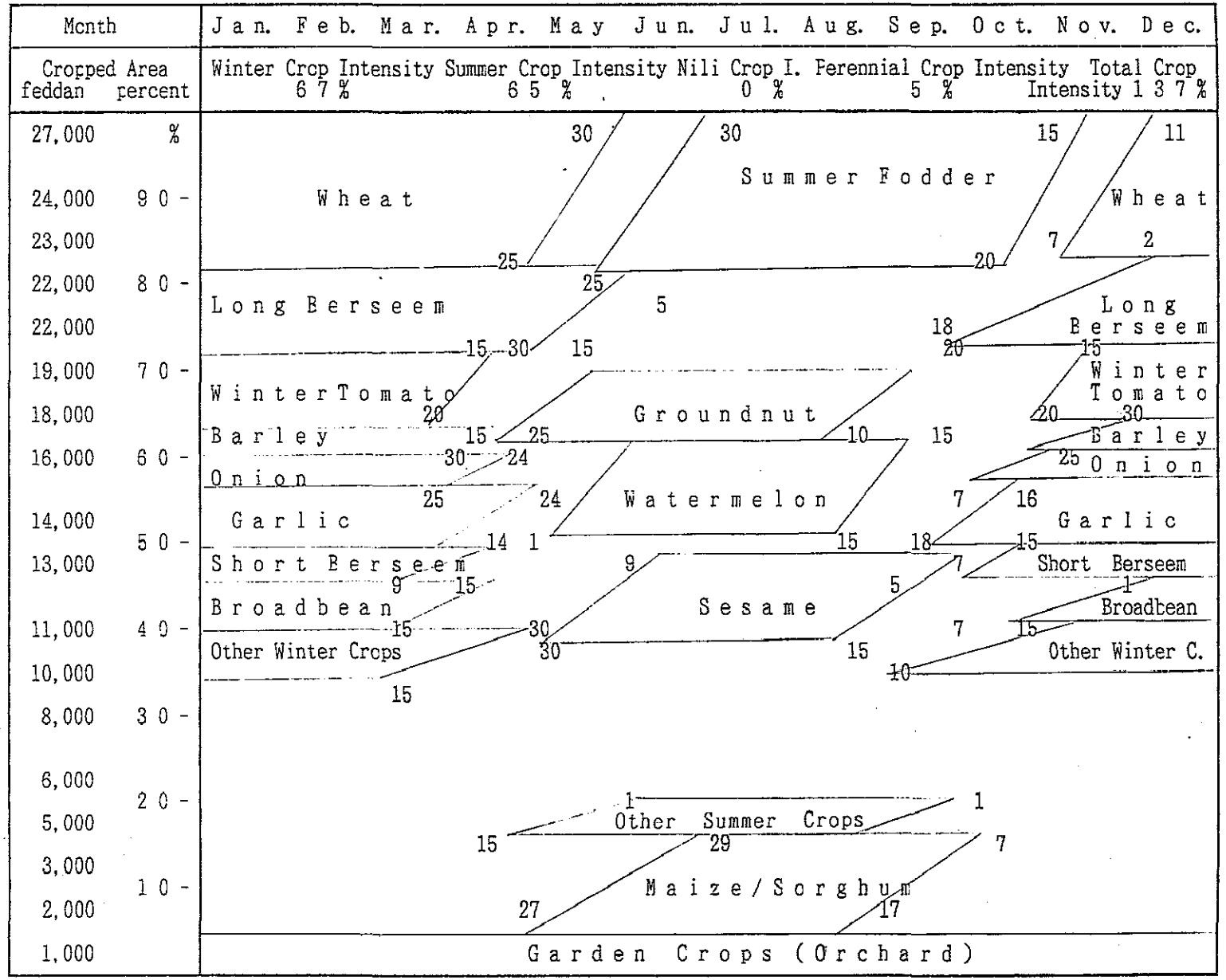
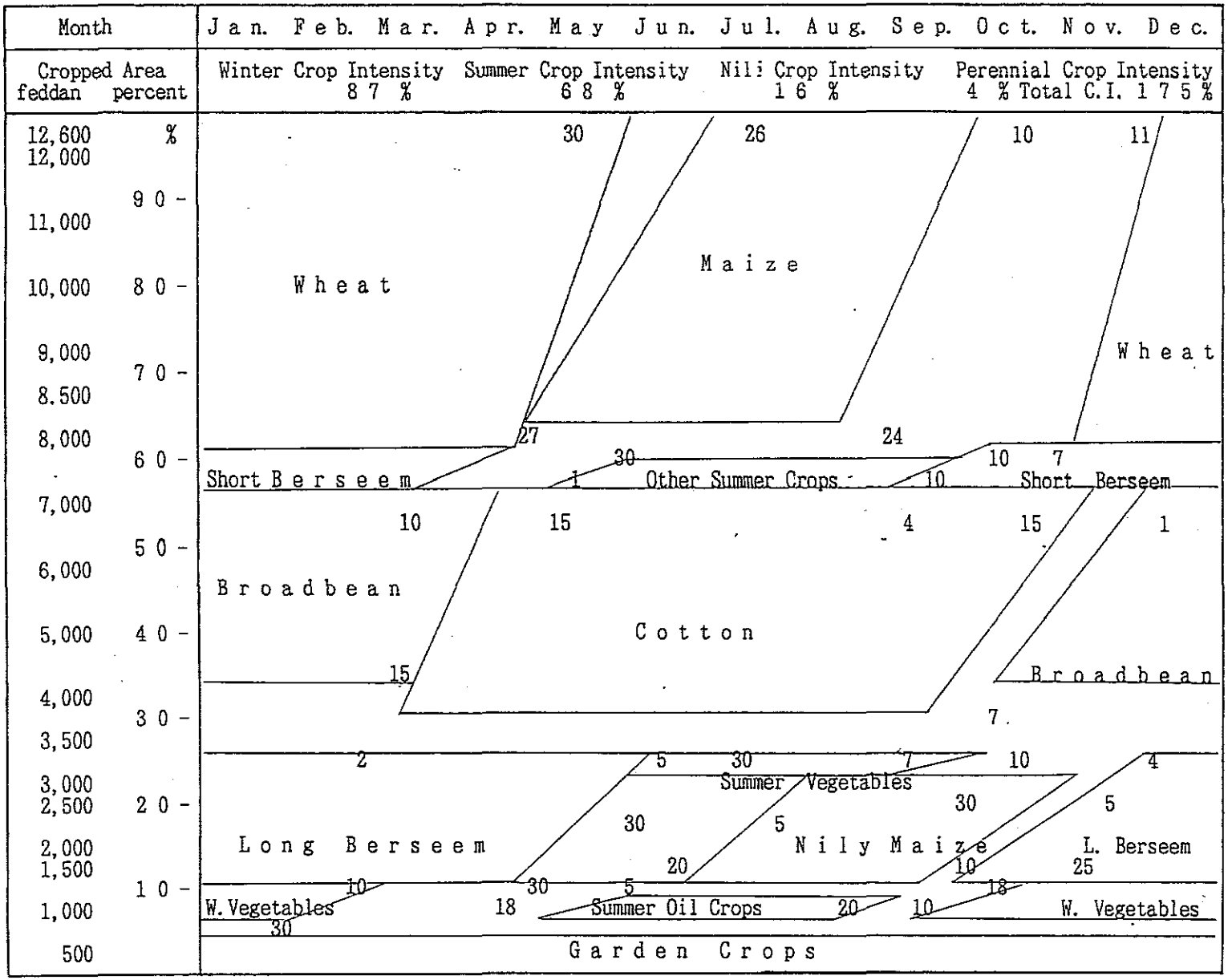


Fig. H - 1 - 6 Present Cropping Pattern in Command Area from Harika Canal



H-2 AGRICULTURAL PLAN

Table H-2-1 Present and Proposed Crop Production in the Command Area in Minia

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 ton)	(fed)	(ton/fed)	(1000 ton)
Wheat	18964	2.17	41.2	23391	2.38	55.7
Broadbean	13435	1.12	15.0	13435	1.23	16.5
Fenugreek	1144	0.95	1.1	1144	1.09	1.2
L.Berseem	10065	28.72	289.1	8065	29.15	235.1
S.Berseem	3292	6.45	21.2	3292	7.83	25.8
Onion	24	9.50	0.2	24	10.74	0.3
Garlic	735	11.94	8.8	735	13.73	10.1
Potato	16	6.88	0.1	16	8.00	0.1
Medicinal crops	11	0.72	0.0	11	0.78	0.0
Tomato	1967	11.06	21.8	1967	13.37	26.3
Squash	1717	4.50	7.7	1717	5.62	9.6
	51370			53797		
Summer						
Cotton	16716	0.76	12.7	16716	0.85	14.2
Maize	23391	2.35	55.0	25391	2.96	75.2
Sugarcane	395	41.61	16.4	395	46.19	18.2
Sesame	1000	0.48	0.5	1000	0.56	0.6
Soybean	1610	0.97	1.6	1610	1.16	1.9
Groundnut	763	0.76	0.6	763	1.09	0.8
Sunflower	36	0.87	0.0	36	1.02	0.0
Watermelon	1042	4.66	4.9	1042	5.82	6.1
Cucumber	4081	6.79	27.7	4081	7.64	31.2
	49034			51034		
Nili						
Maize	7052	1.76	12.4	7052	2.11	14.9
Potato	597	8.06	4.8	597	8.97	5.4
Sorghum	38	1.52	0.1	38	1.70	0.1
Fodder	0	0.00	0.0	25391	25.00	634.8
	7687			33078		
Orchard						
Grape	3476	5.50	19.1	3476	5.90	20.5
Total	111567	-	-	141385	-	-

Table H-2-2 Present and Proposed Crop Production in the Command Area in Beni Suef

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 ton)	(fed)	(ton/fed)	(1000 ton)
Wheat	15585	2.57	40.1	18235	2.82	51.4
Broadbean	10427	1.14	11.9	10427	1.25	13.0
Barley	1205	1.40	1.7	1205	1.65	2.0
Fenugreek	714	0.74	0.5	714	0.84	0.6
Lupin	64	0.81	0.1	64	0.91	0.1
L.Berseem	11310	27.16	307.2	11310	27.70	313.3
Alfalfa	0	0.00	0.0	2106	25.00	52.7
Onion	2452	7.29	17.9	2452	8.47	20.8
Garlic	446	8.09	3.6	446	9.38	4.2
Medicinal crops	427	0.78	0.3	427	0.95	0.4
Tomato	1781	9.99	17.8	1781	11.58	20.6
Lentil	36	0.44	0.0	36	0.50	0.0
	44447			49203		
Summer						
Cotton	13216	0.66	8.7	13216	0.83	11.0
Maize	11980	2.08	24.9	11980	2.62	31.4
Sugarcane	60	28.97	1.7	60	35.14	2.1
Sesame	617	0.38	0.2	617	0.48	0.3
Groundnut	383	0.82	0.3	383	1.03	0.4
Sunflower	1499	1.10	1.6	1499	1.50	2.2
Cantaloup	4176	4.17	17.4	4176	4.85	20.3
Sorghum	362	1.74	0.6	362	2.09	0.8
	32293			32293		
Nili						
Maize	14121	1.67	23.6	14121	2.12	29.9
Sorghum	2220	1.55	3.4	2220	1.89	4.2
Tomato	2026	10.74	21.8	2026	12.35	25.0
Fodder	40	24.00	1.0	40	27.00	1.1
Onion	20	6.96	0.1	20	7.50	0.2
	18427			18427		
Orchard						
Mandarin	953	6.37	6.1	953	6.66	6.3
Total	96120	-	-	100876	-	-

Table H-2-3 Present and Proposed Crop Production in the Command Area in Faiyum

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 ton)	(fed)	(ton/fed)	(1000 ton)
Wheat	77549	2.49	193.1	77549	2.62	203.2
Broadbean	21525	1.31	28.2	31395	1.50	47.1
Barley	10393	1.28	13.3	10393	1.63	16.9
Fenugreek	3392	0.93	3.2	3392	1.01	3.4
Lentil	150	0.81	0.1	150	0.84	0.1
L.Berseem	98704	19.20	1895.1	88834	24.00	2132.0
S.Berseem	25723	5.00	128.6	25723	6.25	160.8
Onion	2912	13.12	38.2	2912	15.10	44.0
Garlic	231	6.51	1.5	231	7.50	1.7
Tomato	6627	15.38	101.9	6627	17.80	118.0
Flax	667	2.76	1.8	667	3.31	2.2
Sugarbeet	11278	15.50	174.8	11278	19.60	221.0
	259151			259151		
Summer						
Cotton	39689	0.77	30.6	39689	1.01	40.1
Maize	43857	2.12	93.0	48243	2.56	123.5
Sorghum	37190	1.67	62.1	20259	1.93	39.1
Sugarcane	220	32.23	7.1	220	35.00	7.7
Sesame	1425	0.54	0.8	1425	0.61	0.9
Groundnut	119	0.48	0.1	119	0.60	0.1
Sunflower	12429	0.74	9.2	12429	0.97	12.1
Watermelon	29313	10.63	311.6	29313	11.22	328.9
Fodder	0	0.00	0.0	49578	25.00	1239.5
Gourd	2079	3.50	7.3	2079	4.06	8.4
Rice	12545	2.51	31.5	12545	2.90	36.4
Soybean	139	0.60	0.1	139	0.80	0.1
	179005			216038		
Nili						
Maize	51817	1.05	54.4	51817	1.17	60.6
Sorghum	3246	1.15	3.7	3246	1.27	4.1
Rice	1264	1.19	1.5	1264	1.46	1.8
Tomato	37033	15.15	561.0	49578	17.42	863.6
Fodder	8882	15.60	138.6	8882	21.00	186.5
	102242			114787		
Orchard						
Lime	19332	5.54		19332	5.98	115.6
Total	559730	-	-	609308	-	-

Table H-2-4 Present and Proposed Crop Production in the Command Area in Giza

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 ton)	(fed)	(ton/fed)	(1000 ton)
Wheat	7608	2.41	18.3	7608	2.65	20.2
Broadbean	1399	0.99	1.4	1399	1.40	2.0
Barley	459	1.60	0.7	459	2.02	0.9
Fenugreek	479	0.82	0.4	479	0.88	0.4
Lupin	438	0.92	0.4	438	0.97	0.4
L. Berseem	35934	31.72	1139.8	35934	32.85	1180.4
S. Berseem	6886	6.99	48.1	6886	8.46	58.3
Onion	1145	6.84	7.8	1145	7.93	9.1
Garlic	306	4.85	1.5	306	5.69	1.7
Beseem seed	917	0.35	0.3	917	0.40	0.4
Tomato	24929	16.00	398.9	24929	19.00	473.7
	80500			80500		
Summer						
Maize	38082	2.42	92.2	38082	3.06	116.5
Sorghum	775	1.51	1.2	775	1.82	1.4
Sugarcane	866	35.00	30.3	866	43.70	37.8
Sesame	315	0.51	0.2	315	0.56	0.2
Groundnut	2241	1.02	2.3	2241	1.22	2.7
Sunflower	219	1.39	0.3	219	1.74	0.4
Onion	3374	7.08	23.9	3374	7.71	26.0
Tomato	28146	19.17	539.6	28146	22.05	620.6
Fodder	17142	16.80	288.0	17142	21.00	360.0
Gourd	27	3.26	0.1	27	4.23	0.1
	91187			91187		
Nili						
Maize	27336	2.13	58.2	27336	2.44	66.7
Sorghum	769	1.48	1.1	769	1.61	1.2
Potato	23222	9.82	228.0	23222	11.39	264.5
Fodder	4286	24.00	102.9	4286	28.00	120.0
Onion	4	4.96	0.0	4	5.80	0.0
	55617			55617		
Orchard						
Orange	17020	6.00	102.1	17020	7.00	119.1
Total	244324	-	-	244324	-	-

Table H-2-5 Present and Proposed Crop Production in New Land in the Command

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 ton)	(fed)	(ton/fed)	(1000 ton)
Wheat	5008	1.47	7.4	7459	1.60	11.9
Broadbean	1121	0.58	0.7	1589	0.80	1.3
Barley	627	0.93	0.6	2145	1.19	2.6
L.Berseem	3028	12.60	38.2	3461	13.70	47.4
Alfalfa/Berseem	2041	11.80	24.1	4051	13.30	53.9
Onion	839	10.47	8.8	3038	11.81	35.9
Garlic	2042	6.50	13.3	2334	6.53	15.2
Lupin	77	0.49	0.0	77	0.57	0.0
Tomato	3155	18.30	57.7	3809	19.00	72.4
Seed onion	94	3.07	0.3	94	3.20	0.3
	18032			28057		
Summer						
Maize	1681	1.50	2.5	2256	1.91	4.3
Sorghum	1496	1.37	2.0	1641	1.67	2.7
Sesame	2307	0.40	0.9	2925	0.49	1.4
Soybean	30	0.60	0.0	30	0.75	0.0
Groundnut	2237	0.51	1.1	2559	0.70	1.8
Sunflower	121	0.52	0.1	442	0.67	0.3
Watermelon	3226	4.43	14.3	4883	5.53	27.0
Cantaloup	100	10.00	1.0	110	10.50	1.2
Cucumber	548	5.23	2.9	971	6.27	6.1
Melon	0	0.00	0.0	356	5.40	1.9
Tomato	650	15.40	10.0	1670	15.70	26.2
Fodder	5100	14.10	71.9	6080	15.35	93.3
	17496			23923		
Orchard						
Olive	1317	3.50	4.6	2116	5.60	11.8
Total	36845			54096		

Table H-2-6 Proposed Crop Production in Expansion Area in the Command

Crops	Present			Proposed		
	Planted Area	Yield	Production	Planted Area	Yield	Production
Winter	(fed)	(ton/fed)	(1000 t6n)	(fed)	(ton/fed)	(1000 ton)
Wheat				5500	1.47	8.1
Broadbean				800	0.58	0.5
L. Beseem				5900	12.60	74.3
S. Berseem				1300	6.45	8.4
Barley				900	0.93	0.8
Onion				2400	10.47	25.1
Seed Onion				50	3.07	0.2
Garlic				2100	6.50	13.7
Tomato				3700	18.30	67.7
Sugarbeet				7600	15.50	117.8
Alfalfa				3000	11.80	35.4
				33250		
Summer						
Maize				2550	1.50	3.8
Sorghum				800	1.37	1.1
Groundnut				1900	0.51	1.0
Sesame				1900	0.40	0.8
Sunflower				3250	0.52	1.7
Squash				900	4.50	4.1
Cantaloup				650	10.00	6.5
Watermelon				3400	4.43	15.1
Tomato				5350	15.40	82.4
Sordan				3800	14.10	53.6
Napiergrass				2500	14.10	35.3
				27000		
Orchard						
Olive				4900	3.50	17.2
Total				65150	-	-

Table H-2-7 Present and Proposed Crop Acreage for Old and New Land

(unit: feddan)

Land Season	Old Land					New Land	
	Minia	Beni Suef	Faiyum	Giza	Sub-Total	Reclaimed	Expansion
Current Pattern (A)							
Winter Crops	51,370	44,447	259,151	80,500		18,032	0
Summer Crops	49,034	32,293	179,005	91,187		17,496	0
Nili Crops	7,688	18,427	102,242	55,617		-*	0
Perennial Crop	3,476	953	19,332	17,020		1,317	0
Total Annual	111,568	96,120	559,730	244,324		36,845	0
Cropped Land	65,032	51,481	312,835	108,405		27,025	0
Cropping Intensity	171.5	186.7	178.9	225.4		136.3	0
Command Area	114,101	57,295	361,589	137,300	670,285		
						28,057	33,250
Proposed Pattern (B)						23,923	27,000
Winter Crops	53,797	49,203	259,151	80,500		-*	-*
Summer Crops	51,034	32,293	216,038	91,187		2,116	4,900
Nili Crops	33,078	18,427	114,787	55,617		54,096	65,150
Perennial Crop	3,476	953	19,332	17,020		37,245	47,600
Total Annual	141,385	100,876	609,308	244,324		145.2	1369
Cropped Land	65,032 (57%)	51,481 (90%)	312,835 (87%)	108,405 (79%)	537,753		
Cr. Intensity	217.4	195.9	194.8	225.4		67 - 75	0 - 70
Changes Between (A) and (B) in Cropping Intensity (%) A - B						64 - 64	0 - 57
Winter Crops	79 - 83	86 - 96	83 - 83	74 - 74		– * –	-*
Summer Crops	75 - 78	63 - 63	57 - 69	84 - 84		5 - 6	0 - 10
Nili Crops	12 - 51	36 - 36	33 - 37	51 - 51		136 - 145	0 137
Perennial Crops	5 - 5	1 - 1	6 - 6	16 - 16			
Cropping Intensity	172 - 217	186 - 196	179 - 195	225 - 225			

Source : Summerized from the foregoing tables

Note : * ; included in summer crop

Total Cropped Land in Old Land
537,753 fed / 670,285 = 80%

Table H-2-8 Proposed Self-Suppliable Feeds in Command Area

(unit: feddan, ton/feddan, 1,000 ton)

Governorate	Minia					Beni Suef					Faiyum					Giza				
	Area	Yld.	Prod.	TDN	DCP	Area	Yld.	Prod.	TDN	DCP	Area	Yld.	Prod.	TDN	DCP	Area	Yld.	Prod.	TDN	DCP
Berseem																				
Long Crop	8.1	32.6	263	31.7	5.5	11.3	32.4	367	44.5	7.8	88.8	30.5	2,709	328.5	56.9	35.9	32.6	1,173	141.9	24.6
Short Crop	3.3	7.4	24	2.9	0.5	-	-	-	-	-	25.7	6.3	161	19.2	3.4	6.9	9.8	68	8.2	1.4
Fodder																				
Summer	-	-	-	-	-	-	-	-	-	-	49.6	13.6	674	128.9	7.4	17.1	20.2	346	66.1	3.8
Nili	-	-	-	-	-	0.2	0.0	0	-	-	8.9	7.9	70	13.4	0.8	4.3	7.5	32	6.1	0.4
Winter	-	-	-	-	-	2.1	25.0	53	6.1	1.4	-	-	-	-	-	-	-	-	-	
Stover																				
Maize	32.5	4.4	143	22.2	1.7	26.1	4.0	105	16.3	1.3	100.0	2.8	278	43.1	3.4	65.4	4.7	307	47.5	3.7
Sorghum*	-	-	-	-	-	2.5	3.4	8	0.9	0.1	23.5	3.2	75	9.1	0.8	1.5	3.1	5	0.6	0.0
Straw																				
Wheat	23.3	3.1	73	28.0	0.7	18.2	3.7	67	25.5	0.7	77.5	3.1	242	91.9	2.4	7.6	3.6	27	10.3	0.2
Rice	-	-	-	-	-	-	-	-	-	-	13.8	3.1	43	6.7	0.5	-	-	-	-	-
Barley	-	-	-	-	-	1.2	2.1	3	1.0	0.0	10.4	1.5	16	6.2	0.1	0.5	2.0	1	0.3	0.0
Residue																				
Legumes	15.1	0.2	3	1.4	0.1	10.8	0.2	2	1.1	0.1	21.6	0.3	6	2.6	0.3	3.6	0.2	1	0.2	0.0
Sugarcane	0.4	4.4	2	0.8	0.0	0.1	2.0	0	0.1	0.0	0.2	3.5	1	0.3	0.0	0.9	3.5	3	1.5	0.2
Total	82.7	-	508	87.0	8.5	72.5	-	605	95.5	11.4	420.0	-	4,275	649.9	76.0	143.7	-	1,963	282.7	34.3
DOB (%)			56.5	39.8	70.6			60.7	46.6	68.4			67.1	53.5	79.3			63.2	53.1	75.8

Source: calcualted from MALR data and those from governorate offices

Note : Yld. = yield, Prod. = production, DOB = Nutritional dependency on berseem, * : sorghum grain is sold away for poultry industry.

Nutrient Contents Crop :	Berseem	Fodder	Maiz	Sorghum	Wheat	Rice S.	Barleys	Legume R.	Sugarcane	Alfalfa
crop etc. TDN content (%) :	12.1	19.1	15.5	11.9	38.0	15.5	39.6	45.8	48.0	11.6
crop etc. DCP content (%) :	2.1	1.1	1.2	1.1	1.0	1.2	0.8	4.6	3.0	2.6

Table H-2-9 Proposed Feed Balance of Livestock Herd in Command Area

(unit: 1,000 ton, 1000 L.U)

Governorate	Minia	Beni Suef	Faiyum	Giza	Total
(adult herd size)	(30.3)	(47.0)	(223.1)	(112.2)	(412.6)
TDN for maintenance	34.8	54.1	256.5	129.1	474.5
DCP for maintenance	3.2	5.0	23.4	11.7	43.3
(young herd size)	(5.1)	(5.4)	(33.9)	(49.0)	(93.4)
TDN for herd growth	11.9	12.7	79.5	114.5	218.6
DCP for herd growth	2.4	2.5	16.0	23.1	44.0
(milk production)	2.9	4.9	23.5	17.7	49.0
TDN for milking	0.8	1.3	6.6	5.0	13.7
DCP for milking	0.2	0.4	1.6	1.2	3.4
(meat production)	1.5	2.3	25.2	32.2	61.2
TDN for fattening	5.5	8.5	93.2	119.3	226.5
DCP for fattening	0.5	0.9	10.1	12.9	24.4
Total TDN demand (c)	53.0	76.6	435.8	367.9	933.3
Total DCP demand (z)	6.3	8.8	51.1	48.9	115.1
Available TDN* (b)	74.0	81.2	552.4	240.3	947.9
Available DCP* (y)	7.2	9.7	64.6	29.1	110.6
Balance of TDN (b - c)	+ 21.0	+ 4.6	+ 116.6	- 127.6	+ 14.6
Balance of DCP (y - z)	+ 0.9	+ 0.9	+ 13.5	- 19.8	- 4.5
TDN shortage** (%)	-	-		34.7	-
DCP shortage** (%)	-	-	-	40.5	3.9
Balance, TDN (b - a) #	+ 26.6	+ 12.7	+ 209.1	- 44.0	+ 204.4
Balance, DCP (y - x) #	+ 0.9	+ 1.9	+ 25.2	- 9.0	+ 18.8

Source : derived from the foregoing table.
Note : * from the foregoing table, ** in case of no acreage under berseem,
as compared with Table H-1-29 (current feed balance).

Fig. H-2-1 Proposed Cropping Pattern in Command Area in Minia Governorate

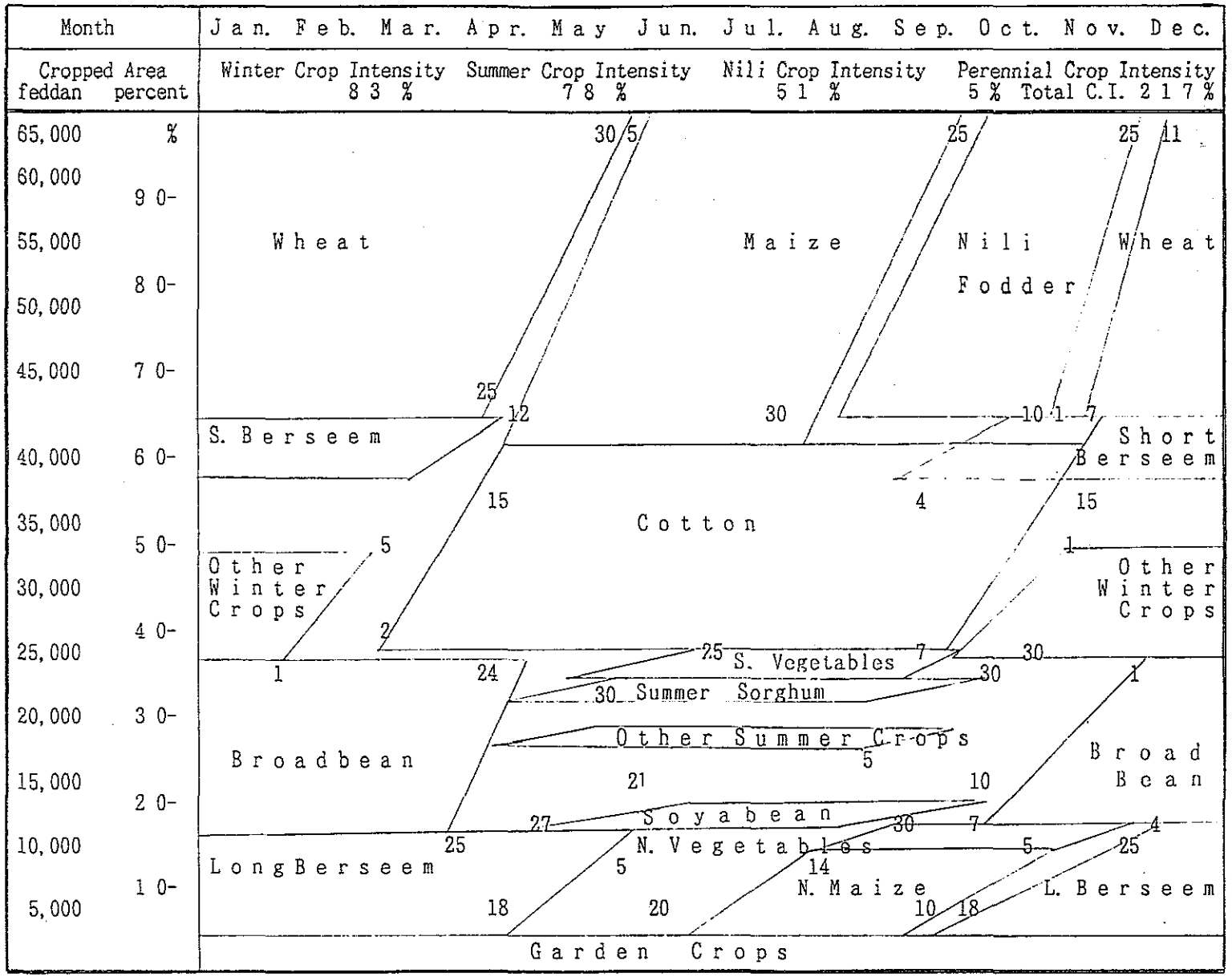


Fig. H-2-2 Proposed Cropping Pattern in Command Area in Beni Suef Governorate

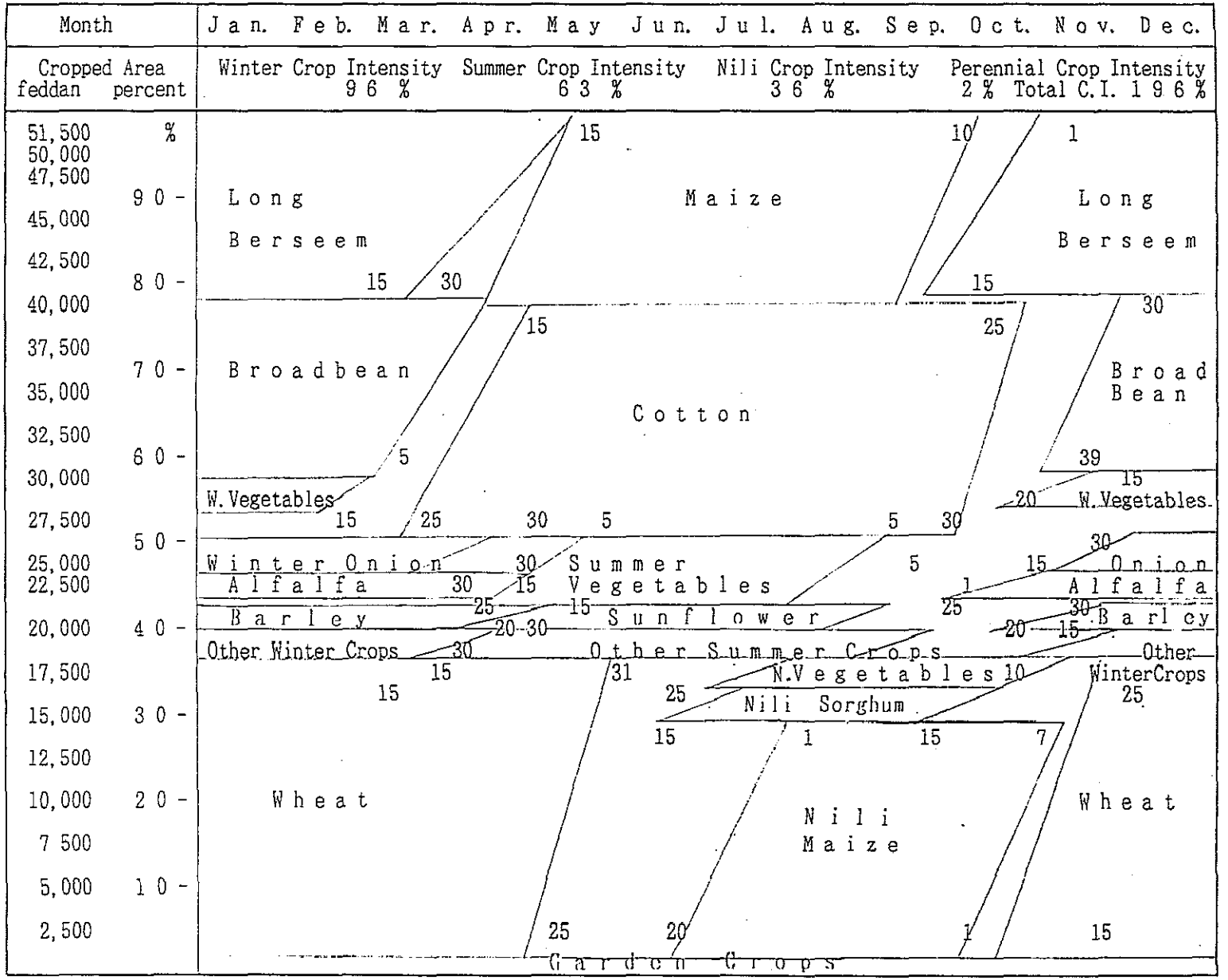


Fig. H-2-3 Proposed Cropping Pattern in Command Area in Faiyum Governorate

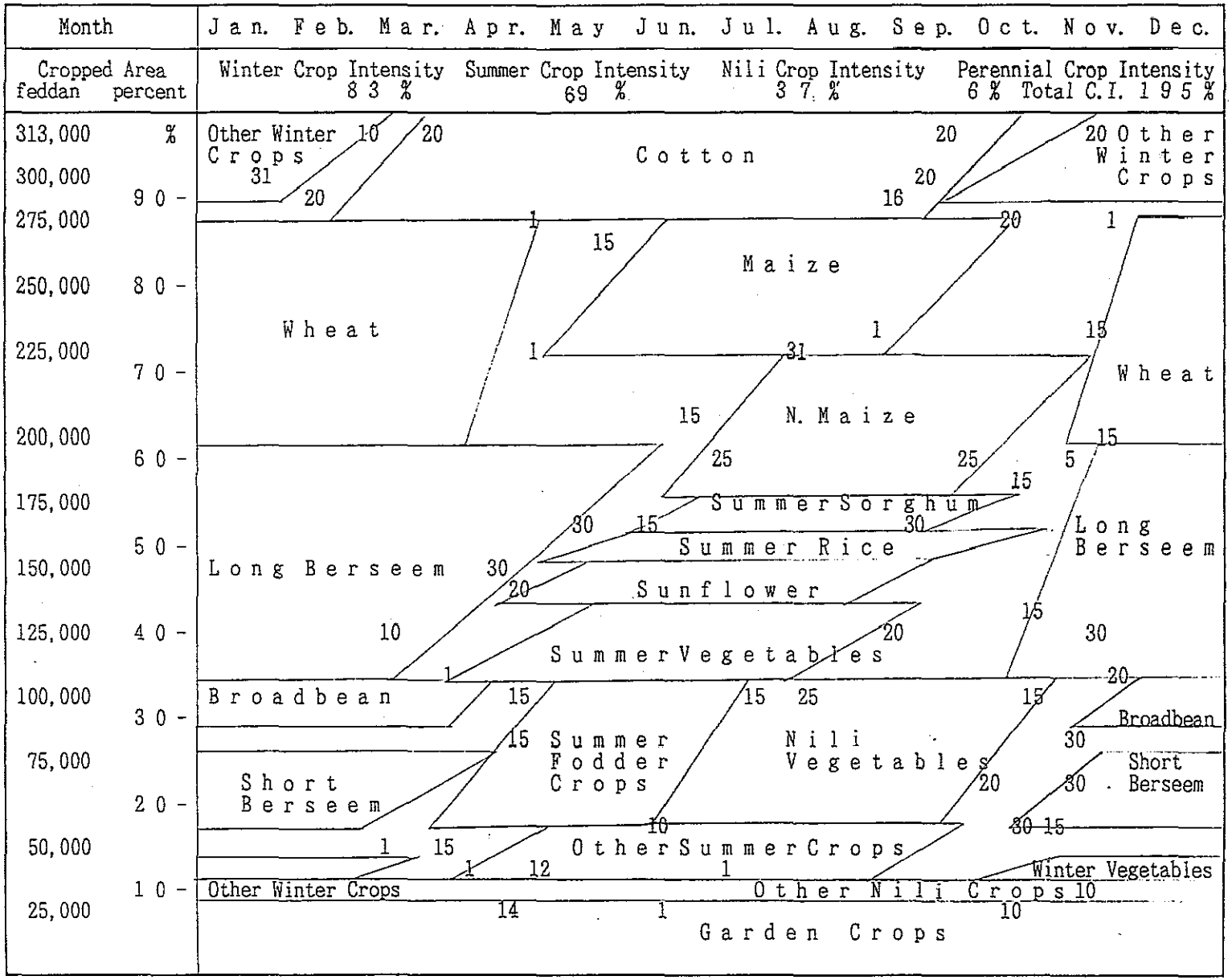


Fig. H-2-4 Proposed Cropping Pattern in Command Area in Giza Governorate

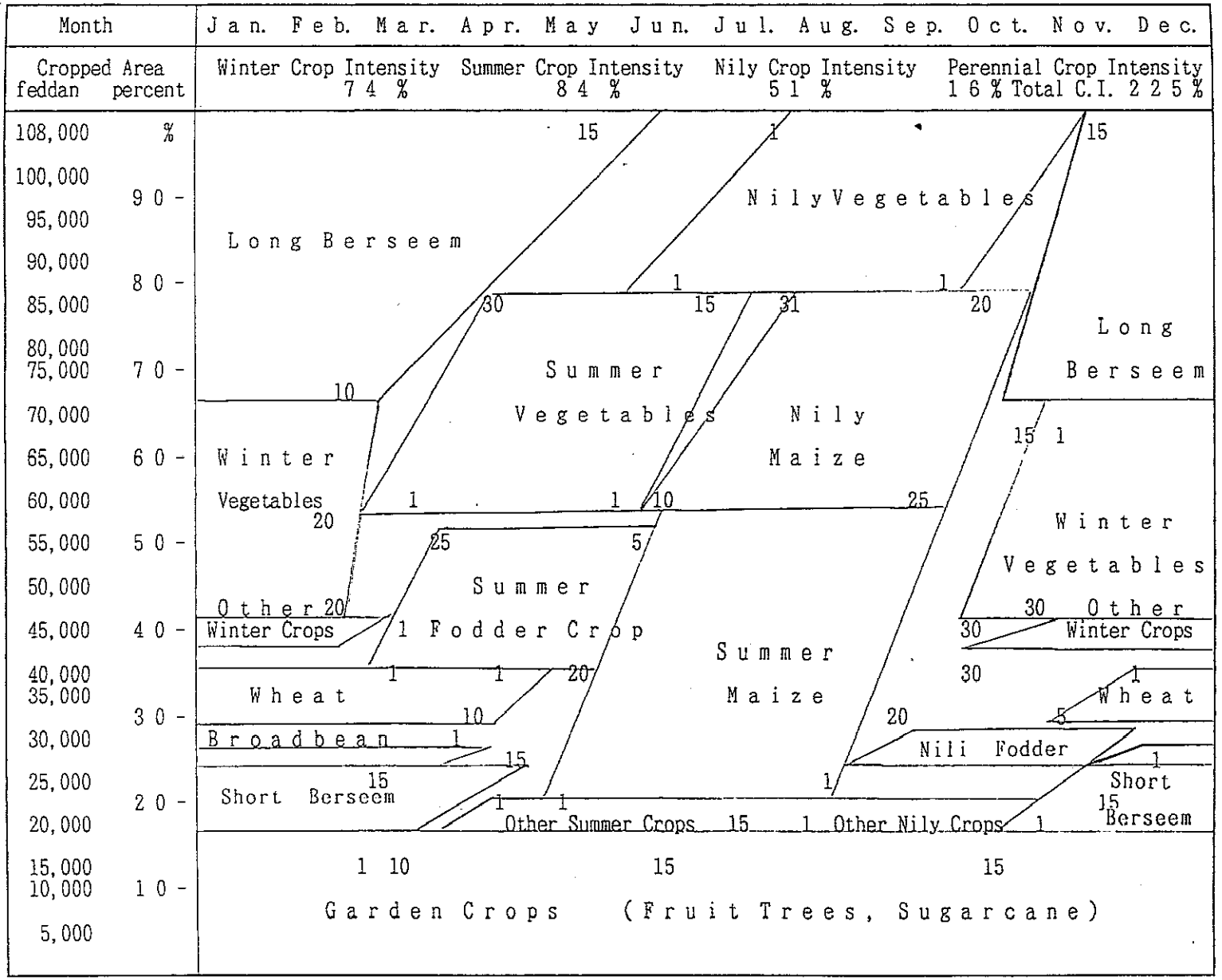


Fig. H-2-5 Proposed Cropping Pattern in New Land Command (Minia and Beni Suef)

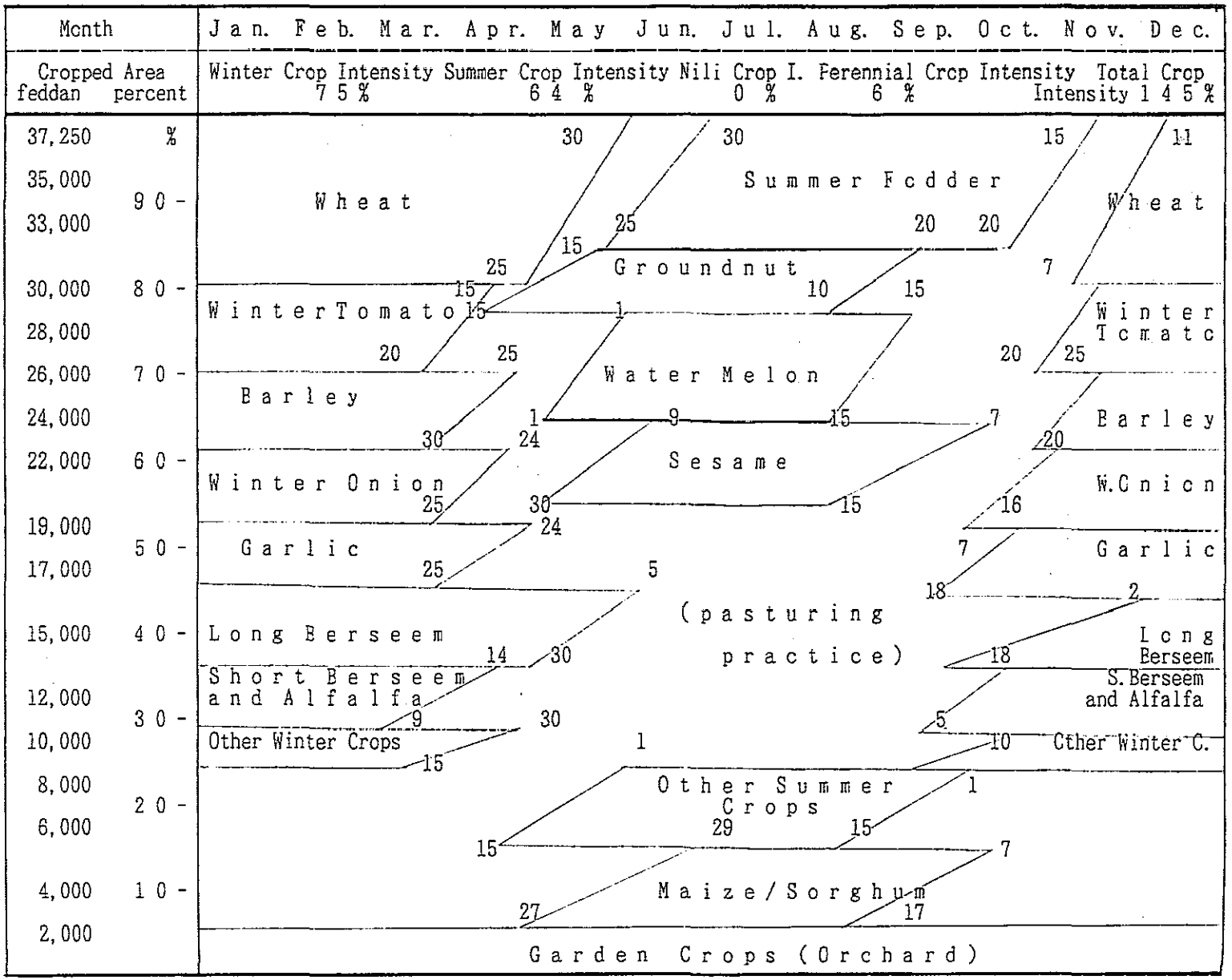


Fig. H-2-6 Proposed Cropping Pattern in the Expansion Land in Three Governorates

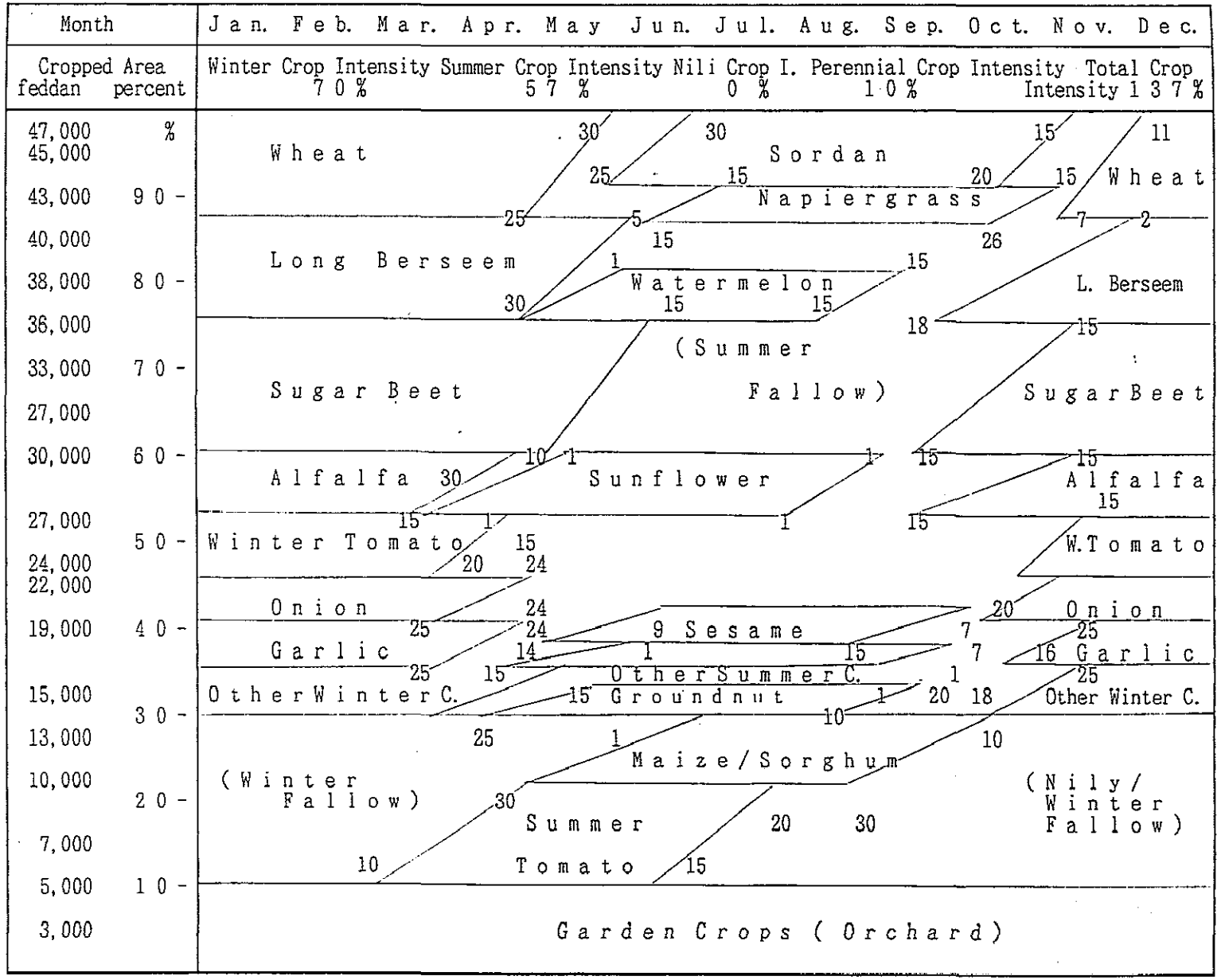
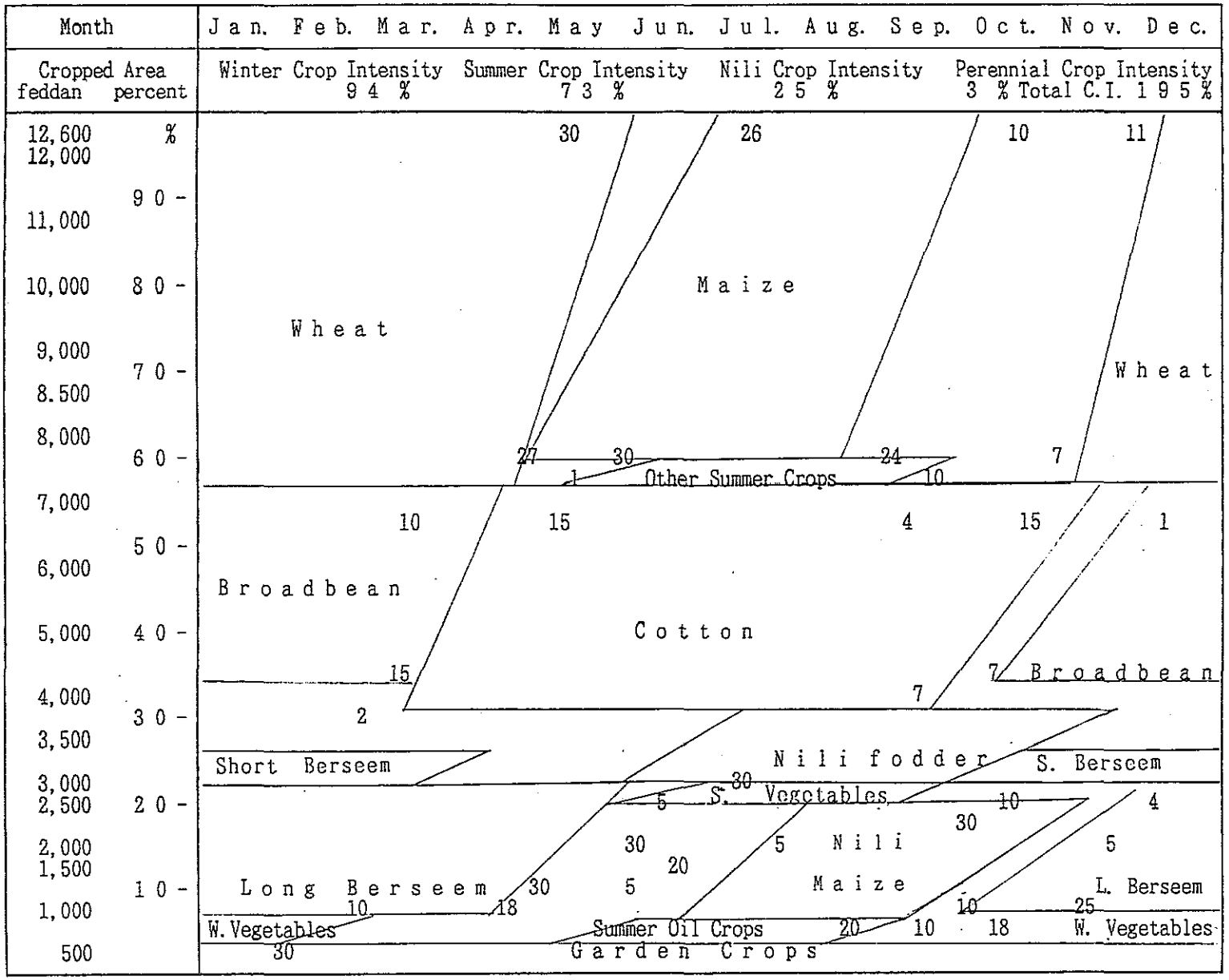


Fig. H - 2 - 7 Proposed Cropping Pattern in Command Area from Harika Canal



APPENDIX J ORGANIZATION

J - 1 GOVERNMENTAL ORGANIZATION

Figure J-1-1 Organization Chart of MPWWR

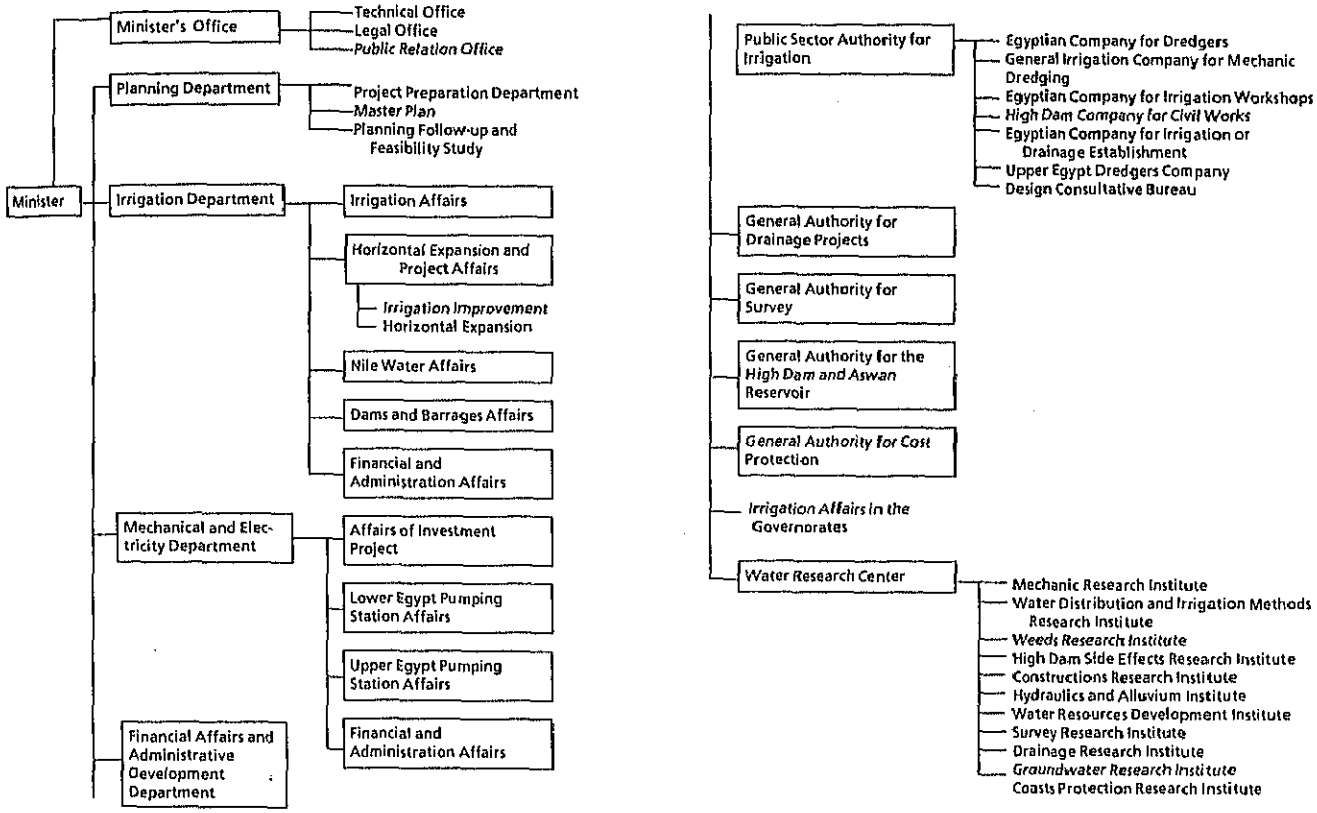


Figure J-1-2 Organization Chart of Minia Directorate, MPWWR

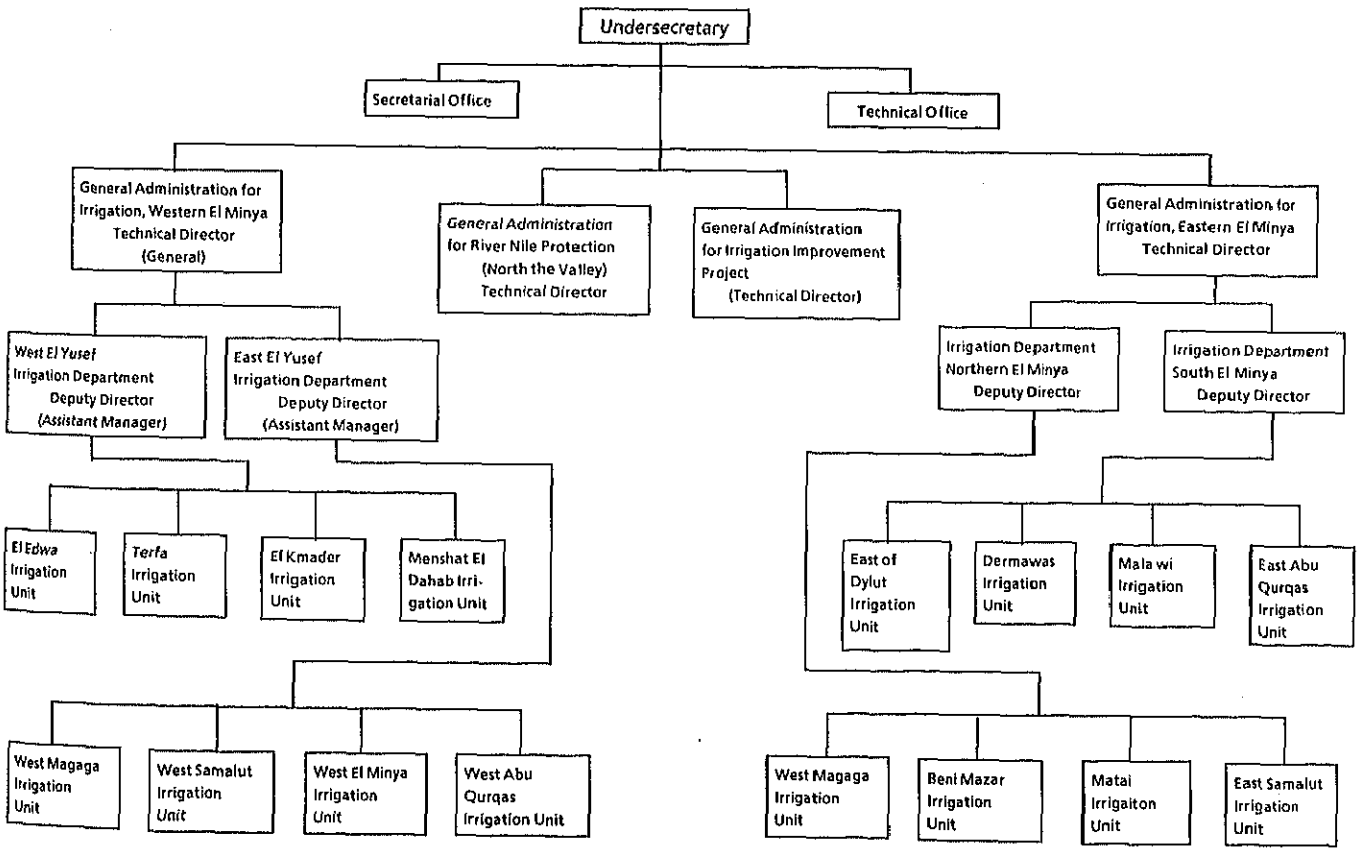


Figure J-1-3 Organization Chart of Ministry of Agriculture and in Land Reclamation

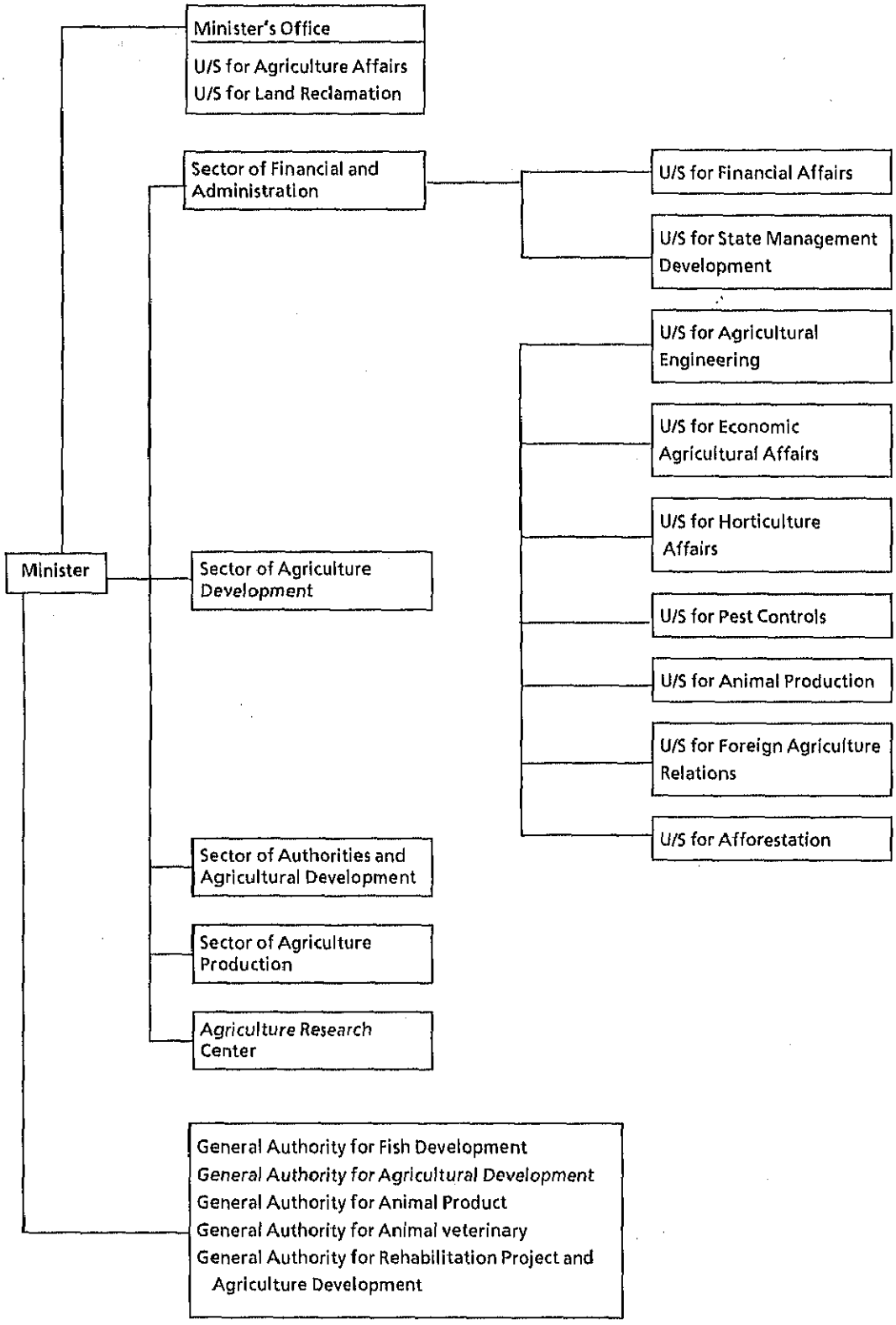


Figure J-1-4 Organization Chart of Agricultural Office in Minia Governorate

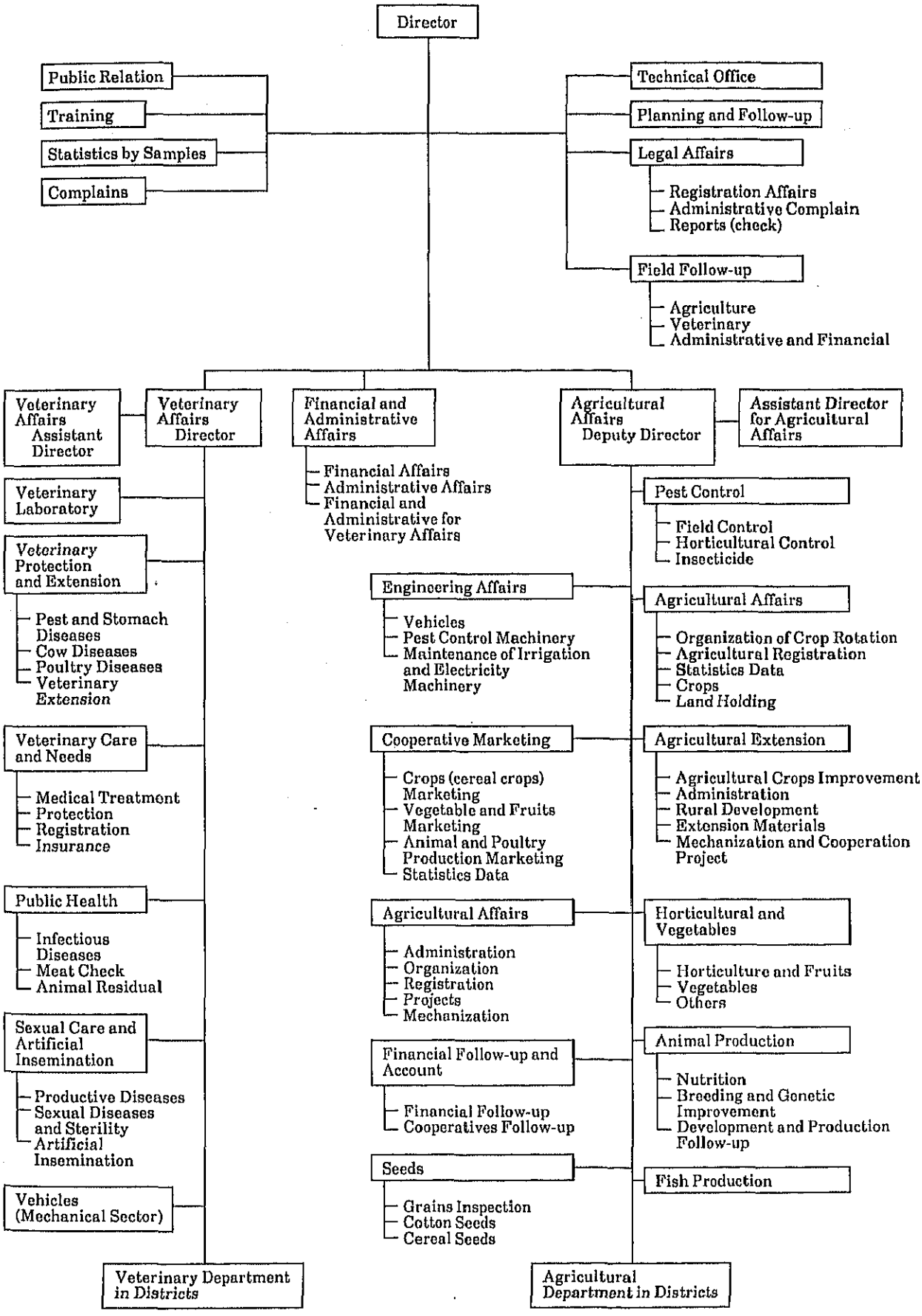


Figure J-1-5 Organization of the Agricultural Office at District Level

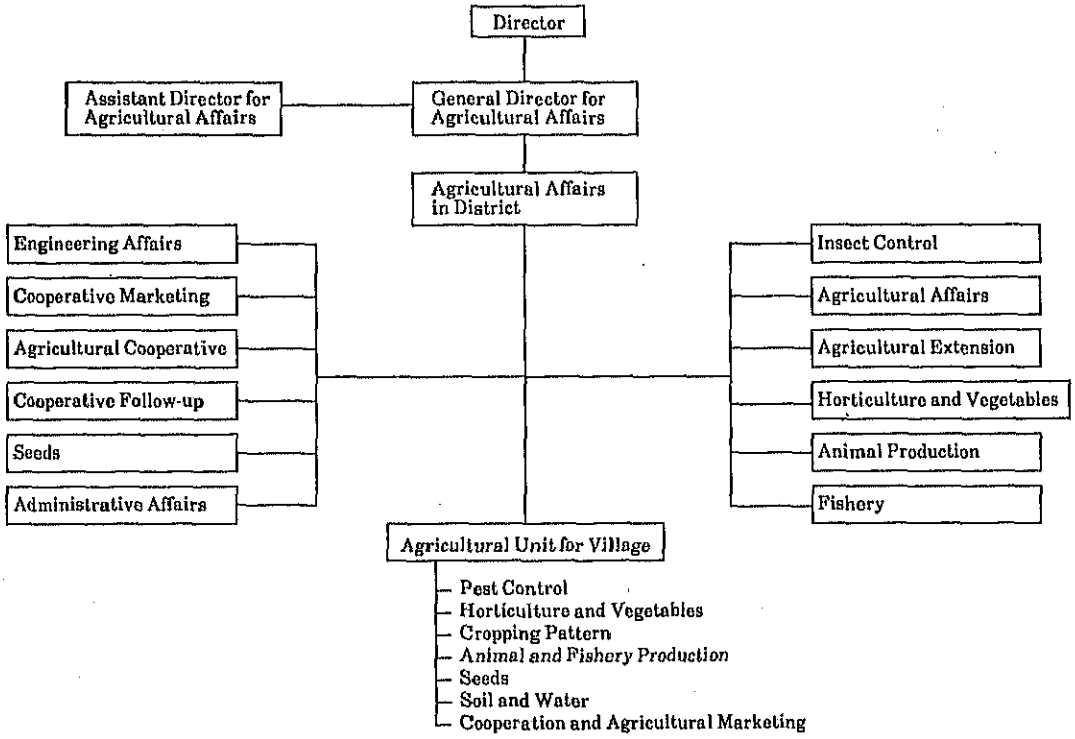
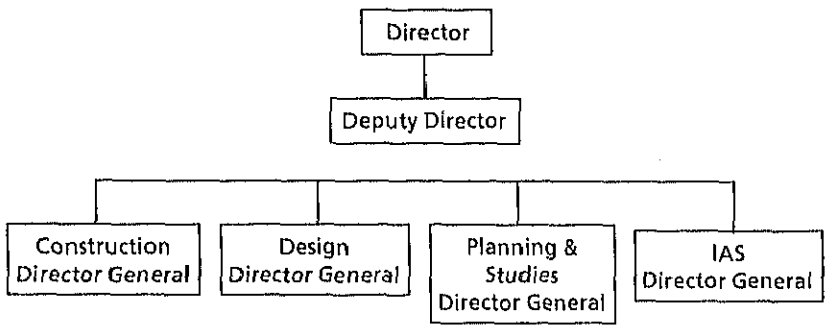


Figure J-1-6 Organization Chart of IIP and IAS

(1) Head Office



(2) Directorate Office

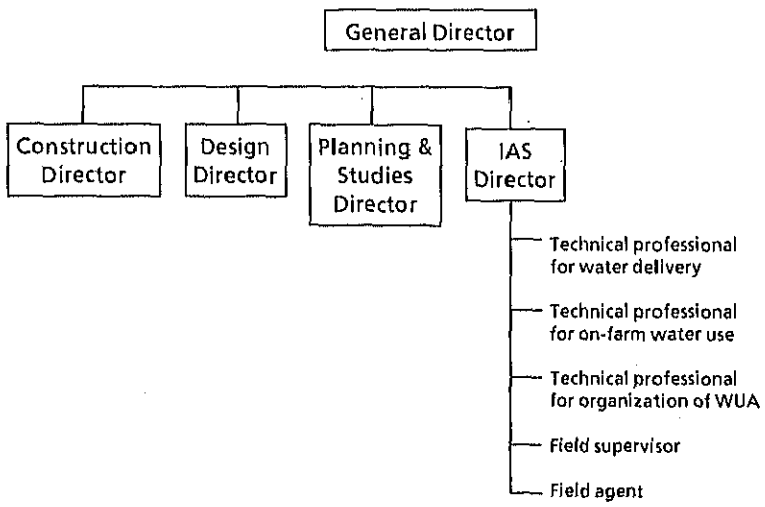


Table J-2-1 IAS Staff Position and Assignment (as of April 1991)

Position	Minia	Faiyum	Esna	Zagazig	Tanta	Damanhur	Main
Directors	1	1	1	1	1	1	-
Water Delivery	1	1	1	1	1	1	(1)
specialist	(1)		(1)				
On-farm Spec.	1	1	1	1	1	-	(1)
	(1)		(1)			(1)	
WUA Spec.	3	2	1	1	1	2	(1)
	(1)						
Field Sup.	5	9	2	2	2	2	-
	(3)			(3)	(2)	(2)	
Field Agents	42	46	12	20	14	17	-
	(27)		(5)	(12)	(6)	(6)	
Main Office							
General Direc.	-	-	-	-	-	-	1
Oper. Dir.	-	-	-	-	-	-	1
Formation Dir.	-	-	-	-	-	-	1
Water Resource							
Farm Manag. Econo.	-	-	-	-	-	-	(1)
Soil-Plant							
Water Spec.	-	-	-	-	-	-	(1)
Trans. Cordi. & Exp.	-	-	-	-	-	-	(1)
Compu. Spec. & Trainer	-	-	-	-	-	-	1
Video/Infor. Spec.	-	-	-	-	-	-	(1)
Graphic Spec.	-	-	-	-	-	-	(1)
Total	53	60	18	26	20	23	4
	(33)		(7)	(15)	(8)	(9)	(8)

Note: Total assigned 204

(not assigned) 80

Table J-2-2 Major Activities of IIP

Major Activities of IIP

1. To develop the institutional capacity of the MPWWR for sustained irrigation improvement activities.

2. To develop a rational interdisciplinary team approach for identifying, testing and implementing solutions to priority system constraints for sustained efforts in irrigation system rehabilitation and betterment.

3. To establish and build-up an irrigation advisory services to provide water delivery and water use services, technologies and information to water users during and beyond the IIP.

4. To establish and strengthen formal water user associations for playing an active role in planning, designing, operating, maintaining and regular monitoring of their micro-systems during and after the IIP.

5. To assist in identifying policy alternatives and procedures for implementing a program of cost sharing for specified improvement cost from water users to be utilized for improving system operations and maintenance performance.

Existing Locations of IIP (Irrigation Improvement Project)

Esna. Minia, Faiyum, Zagazig, Tanta, Damanhur

Role of IAS (Irrigation Advisory Services)

1. Improvement of water delivery

2. Improvement of on-farm water use

3. Building sustainable private organizations around the hydrologic units (meska branch and canal)

Goal of Water User Association

The goal of WUAs is to support and work with National efforts to improve and sustain the efficient delivery and use of water at micro system level for increased agricultural production.

Roles of WUAs

1. Improving micro-system by planning, designing, implementing, operating, maintaining, monitoring their development.
2. Developing and implementing operational plans with irrigation scheduling, purchasing, operating and maintaining WUA pumps.
3. Improving of water delivery and water removal on field drains.
4. Improving of water use through improved scheduling and irrigation practices.
5. Developing roles and responsibilities of WUA leaders, and developing rules and resolving conflicts.
6. Developing close coordination with other organizations for essential inputs such as bank loans, equipment and land leveling.
7. Developing improved communication with each other, other organization and especially with water suppliers.
8. Mobilizing resources for pumps, equipment and system improvements.

Seven Phases for Organizing WUAs

Phase I-Entry Phase

1. Introduction and assistance from local leaders
2. Initial information collection
3. Preliminary meska profile
4. Building trust and friendship
5. Identifying initial meska problems and needs

Phase II-Organizational Phase

1. Introduction of IIP/IAS concepts and WUA benefits
2. WUA requirements and willingness to organize
3. Visit to demonstration sites

4. Election or selection of meska leaders
5. Deciding WUA roles and responsibilities
6. Reviewing alternative meska improvement
7. Conducting detailed meska and marwa improvement
8. Specific training for meska and marwa leaders
9. Establish meska improvement committee
10. Develop initia meska improement strategy
11. Developing the WUA charter or rules
12. Formalizing the WUA organization

Phase III-Preparation for Improvements

1. Developing WUA work plan for meska improvement
2. Rapid appraisal implementation
3. Meska measurement and evaluation
4. Fefining WUA work plan based on new data
5. Decision on alternative improvement
6. Participation in planning and design of meska

Phase IV-Paticipation in Improvements

1. Planning the role of WUAs in implementation
2. Understanding the contractor's work plan
3. Facilitating the work of the contractor
4. Plan for obtaining credit for WUA pump
5. Finalize roles and responsibilities of all WUA leaders and pump operators

6. Training of WUA leaders in meska and pump operations
7. Decision on type and size of pump required
8. Developing and improved meska operation plan
9. Developing an improved meska maintenance plan
10. Working with IIP engineer to assure quality control
11. Inspection of completed works with walk through

Phase V-Regular WUA Operation

1. Selection of committee or individuals for specific activities
2. Special training as required by committee
3. Water delivery: finalize and implement operational plan
4. Water delivery: monitoring operational plan
5. Water delivery: finalize and implement maintenance plan
6. Water delivery: maintenance plan monitoring
7. Water use improvement: training and demonstration
8. Water use improvement: development of a work plan
9. Return flow: maintenance/improvement plan
10. Return flow: implementing field drain maintenance
11. WUA conflict resolution plan
12. WUA communication plan
13. WUA external linkage plan
14. WUA annual or bi-annual meeting for all members
15. WUA special training

Phase VI-WUA Federation along Branch Canal

1. Determine need, purpose and role of federation
2. Developing roles and responsibilities and draft charter
3. Election of Branch WUA Council leaders
4. Meeting of Branch Canal Council leaders
5. Develop a branch canal communication plan
6. Branch Canal Council training needs

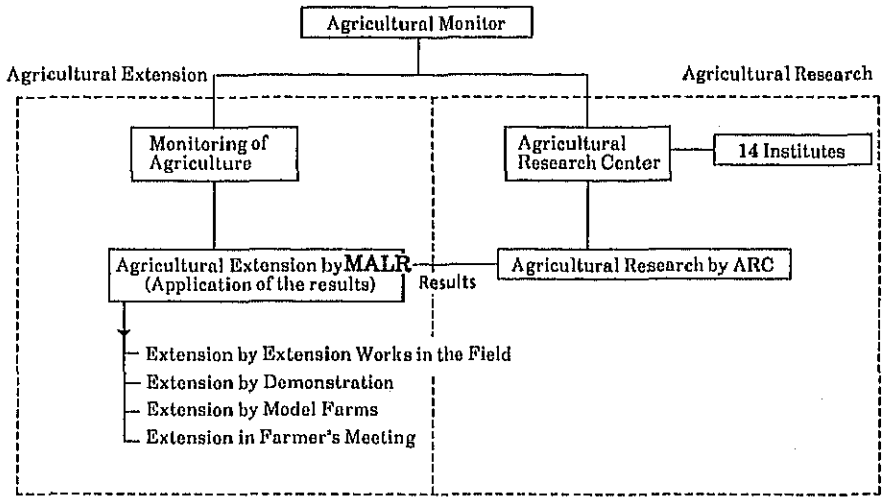
Phase VII-Monitoring and Evaluation Phase

1. Identify monitoring and evaluation needs
2. Review monitoring activities of each phase
3. Develop an internal evaluation plan
4. Conduct periodic external evaluations
5. Reporting results of monitoring and evaluation
6. Feedback of findings to program for improvement
7. Regular IAS monitoring field trips and reporting
8. Regular on-farm water management monitoring

Length Necessary for Establishing WUA

Minimum: 18 to 24 months for the effective completion of seven phases

Figure J-2-1 Procedure of Agricultural Extension



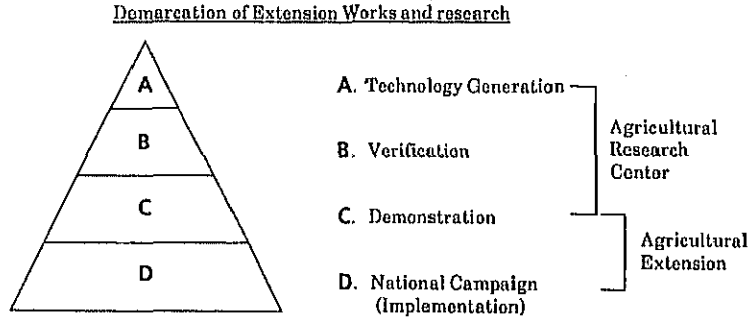


Figure J-2-2 Organization of Agricultural Extension at National Level

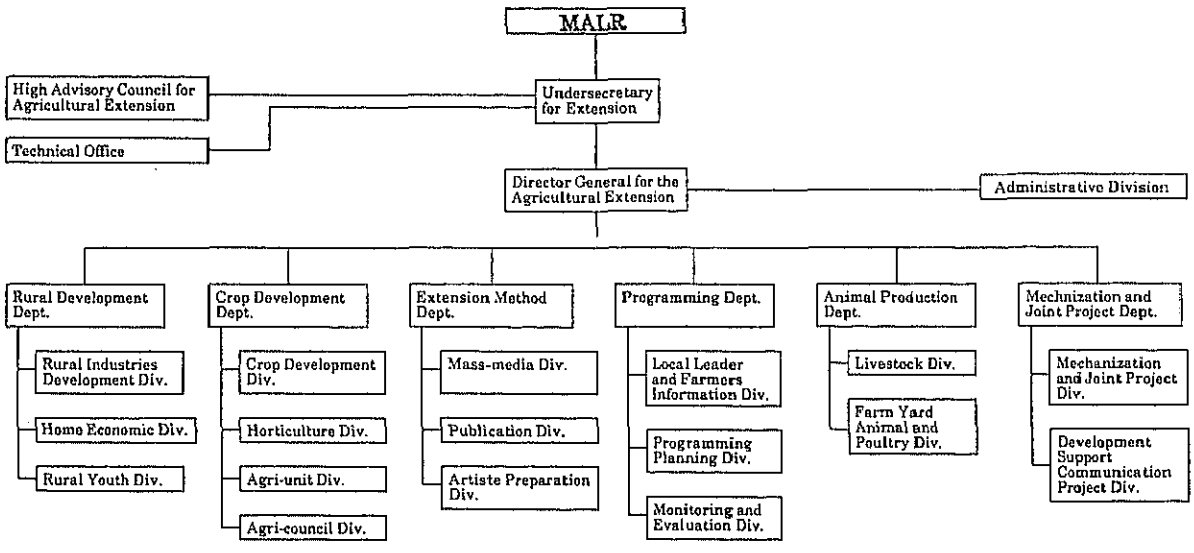


Figure J-2-3 Organization of Agricultural Extension at Local Level

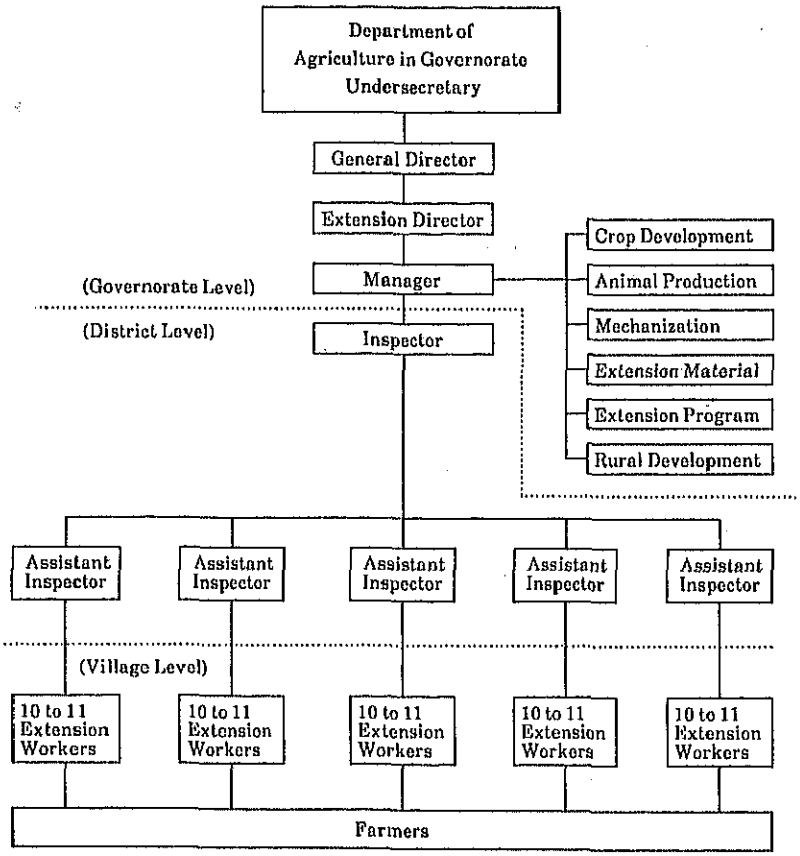


Figure J-2-4 Organization Chart of PBDAC

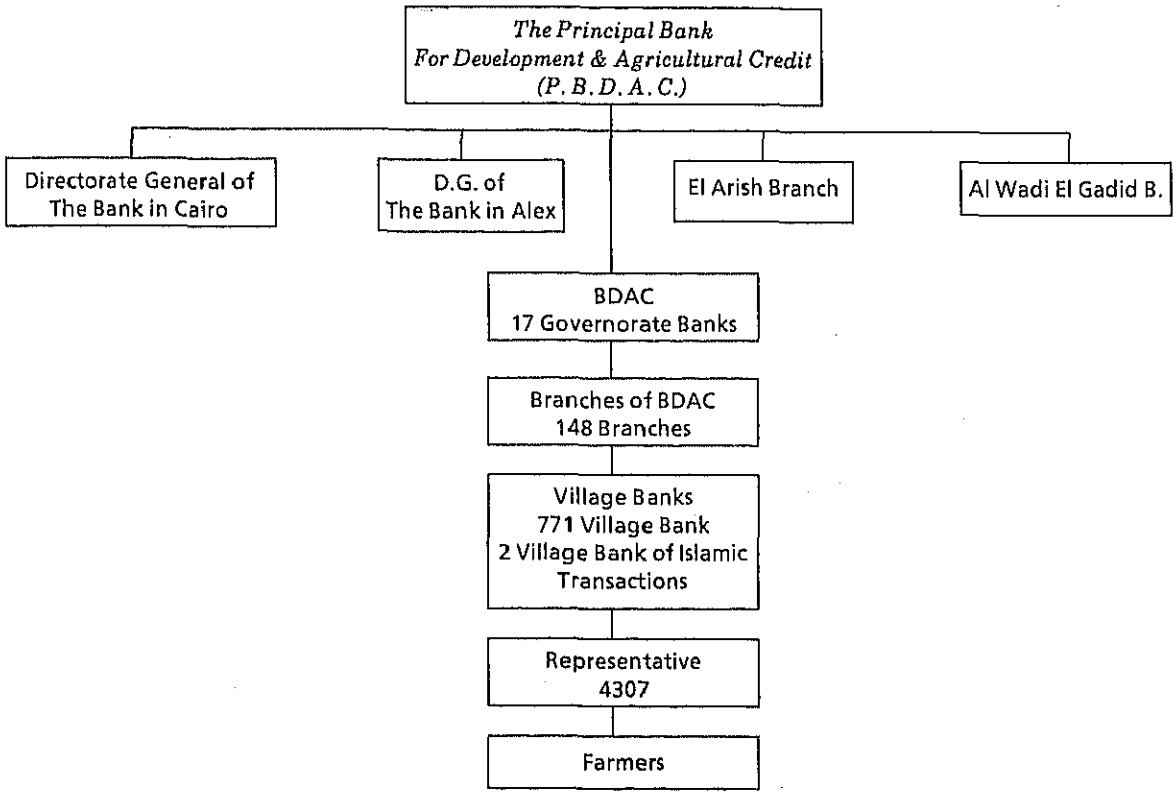


Figure J-2-5 Structure of Cooperative Society (1989)

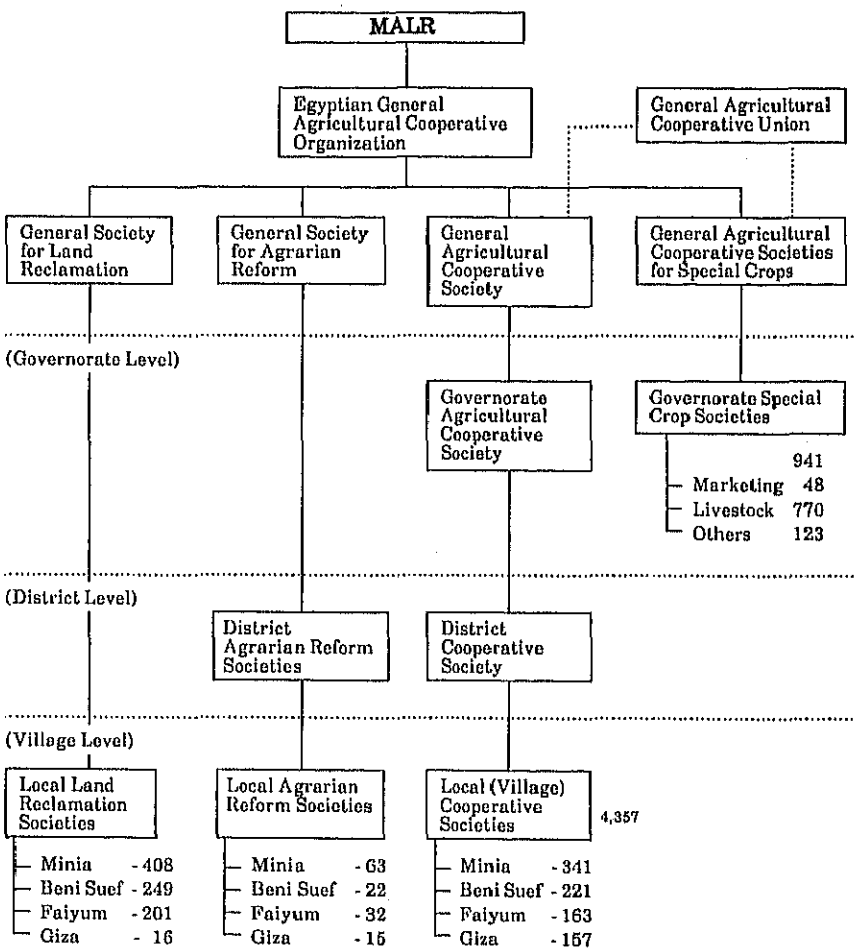


Figure J-2-6 Organization of WUA

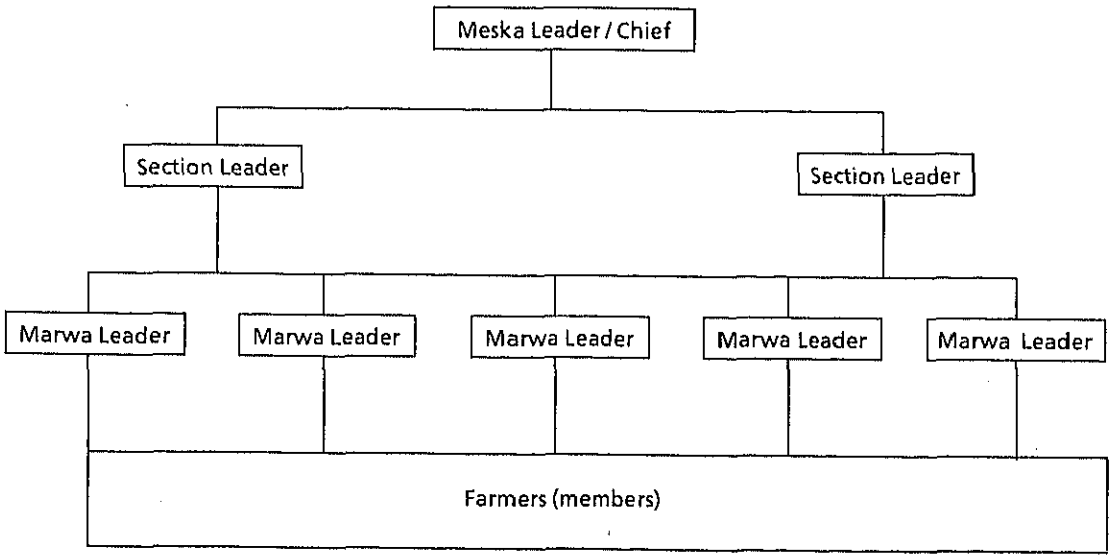
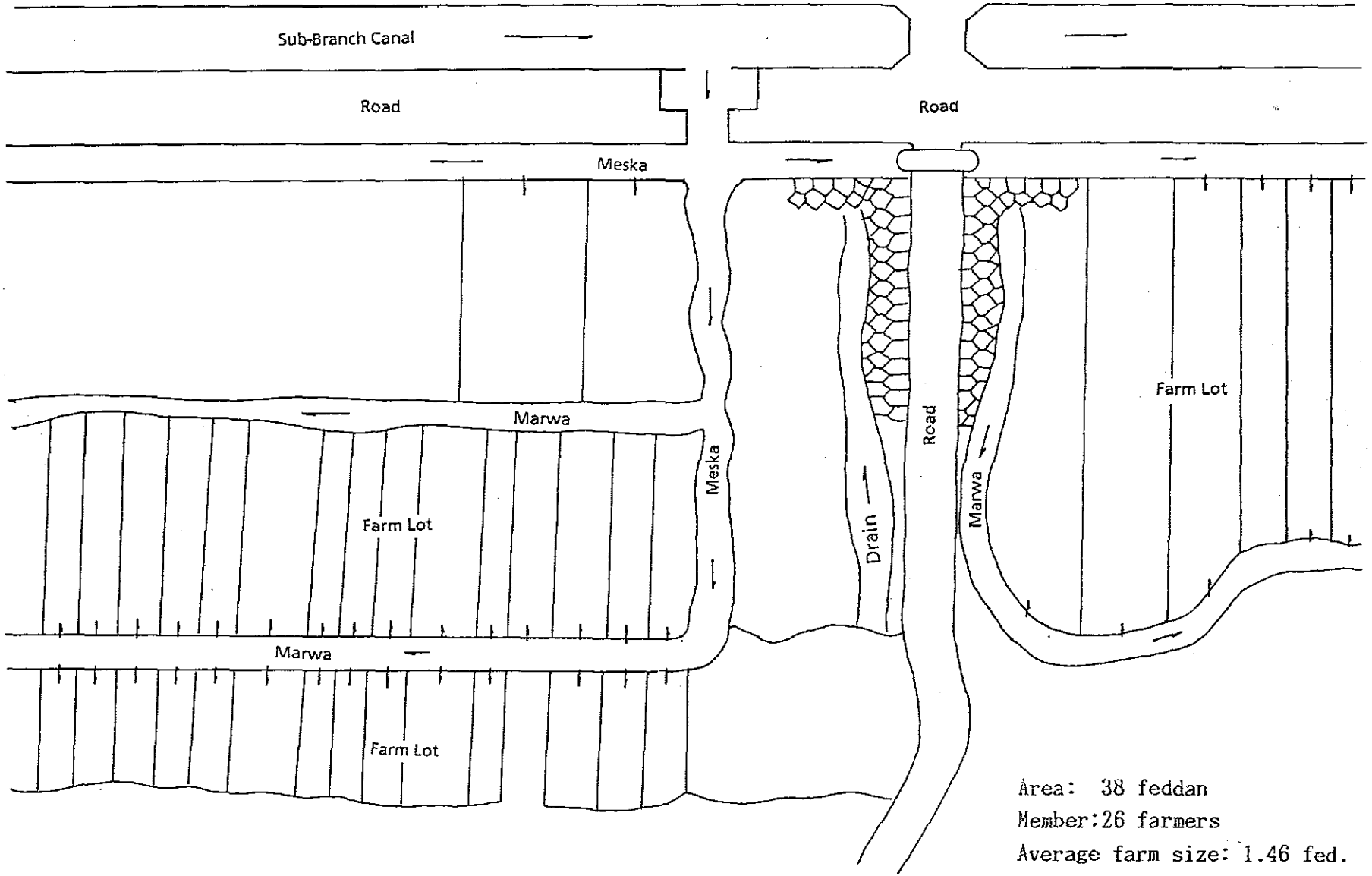


Figure J-2-7 WUA in Faiyum



APPENDIX K COST ESTIMATE

K-1 Unit Price of Construction Works

Table K-1-1 Unit Price of Labourers and Construction Materials

Description	Unit	Price(L.E.)	FC(%)	LC(%)
Common labour	day	10	0	100
Skilled labour	day	20	0	100
Operator	day	30	0	100
Carpentor(common)	day	25	0	100
Mason	day	30	0	100
Steel fixer	day	25	0	100
Surveyor	month	1,500	0	100
Portland cement	tonne	120	50	50
Seawater cement	tonne	150	50	50
Steel bar(round)	tonne	1,000	90	10
Sand	m^3	10	10	90
Graded gravel	m^3	40	10	90
Graded filter	m^3	50	10	90
Stone	m^3	60	10	90
Timber	m^3	1,000	10	90
Cement brick (25X12X6)	1,000pcs	200	20	80
Bitumen	tonne	190	20	80
Gasoline	liter	0.80	10	90
Diesel oil	liter	0.50	10	90

Table K-1-2 Foreign Currency Component

Items of Works	Foreign Currency Component (%)
Delivery System	
Canal structures (Barrage and Regulator)	50
Other canal structures	40
Drain structures	40
Canal earth works including channel remodelling	30
Drain earth works	30
Pump Stations	
Equipment	80
Civil works	35
Land Acquisition	0
On-farm (Meska level) Improvement	
General	40
Communication facilities	85
Engineering and Administration	20
Technical Assistance	80

Table K-1-3 Unit Rates for Civil Works

Works	Unut	Rate(L.E.)	FC Portion %	FC Portion L.E.	LC Portion %	LC Portion L.E.
Base (poor) concrete	m^3	400	48	190	52	210
Plain concrete	m^3	450	48	220	52	230
Reinforced concrete	m^3	730	48	350	52	380
Stone pitching with mortar	m^3	150	40	60	60	90
Concrete block protection thickness 0.70 m	m^2	210	45	100	55	110
Reinforced concrete canal lining thickness 0.20 m	m^2	160	45	70	55	90
Unreinfoeced concrete canal lining thickness 0.10 m	m^2	80	40	30	60	50
Concrete pipe						
Diameter 1.0 m	m	240	45	110	55	130
- do - 0.9 m	m	200	45	90	55	110
- do - 0.7 m	m	120	45	60	55	60
- do - 0.6 m	m	90	45	40	55	50
- do - 0.4 m	m	45	45	20	55	25
- do - 0.3 m	m	30	45	15	55	15
- do - 0.2 m	m	20	45	10	55	15
Demolition of structures (plain concrete or masonry)	m^3	60	40	25	60	35
Excavation for structure	m^3	13	60	8	40	5
Excavation for new channel	m^3	10	60	6	40	4
Excavation	m^3	7	60	4	40	3
Embankment	m^3	6	45	3	55	3
Backfilling	m^3	6	45	3	55	3
Channel remodelling	m^3	8	40	3	60	5
Bank rising with imported fill	m^3	16	45	7	55	9
Regrade access road						
Light	Km	3,000	40	1,200	60	1,800
Heavy	Km	6,000	40	2,400	60	3,600
Construction of access road with imported fill	Km	14,000	45	6,300	55	7,700
Steel gate						
Small size gate(locally mfd)	tonne	25,000	70	18,000	30	7,000
Large size gate(foreign mfd)	tonne	75,000	90	68,000	10	7,000
Pump equipment	LS		90		10	
Building (pump station,etc.)	m^2	3,000	40	1,200	60	1,800
Land acquisition	m^2	12,000	0	0	100	12,000

K-2 Construction Cost of Alternatives on Regulator

Table K-2-1 Construction Cost of Alternative-A of Regulator

Description	Unit Cos (L.E.)	Unit	A - 1 Q'ty	A - 1 Amount (1,000 L.E.)	A - 2 Q'ty	A - 2 Amount (1,000L.E.)	A - 3 Q'ty	A - 3 Amount (1,000 L.E.)
1. Civil Works								
1.1 Earth Works								
Excavation	7	m^3	2,000	14	2,000	14	2,000	14
Embankment	6	m^3	50,000	300	50,000	300	50,000	300
Filling Canal	6	m^3	5,000	30	5,000	30	5,000	30
1.2 Concrete Works								
Apron concrete	450	m^3	1,240	558	1,300	585	1,300	585
Wall concrete	730	m^3	330	241	390	285	390	285
Pier concrete	730	m^3	1,460	1,066	1,650	1,205	1,750	1,278
Pier Supers conc	730	m^3	120	88	320	234	390	285
1.3 Riprap & Revet								
Block Riprap	210	m^2	5,100	1,071	5,100	1,071	5,100	1,071
Revetment	60	m^2	5,700	342	5,700	342	5,700	342
1.4 Demolition of Str	60	m^3	420	26	420	26	420	26
1.5 Miscellaneous 10%				374		409		422
1.6 Other & Mobil 10%				390		399		462
Total of 1.				4,500		4,900		5,100
2. Stregnthen Old Str.								
2.1 Boring	200	m	500	100	400	80	200	40
2.2 Grouting	1,000	m^3	5	5	4	4	2	2
2.3 Miscellaneous 10%				11		8		4
2.4 Other & Mobil 10%				14		8		4
Total of 2.				130		100		50
3. Gates								
3.1 Gate Leaves			3X3.1X2 15 sets	15,000	3X3.1X2 15 sets	15.000	3X3.1X2 15 sets	15,000
3.2 Other & Mobil 10%				1,500		1,500		1,500
Total of 3.				16,500		16,500		16,500
Grand Total (1+2+3)				21,130		21,500		21,650

Table K-2-2 Construction Cost of Alternative-B of Regulator

Description	Unit Cos (L.E.)	Unit	B - 1 Q'ty	B - 1 Amount (1,000 L.E.)	B - 2 Q'ty	B - 2 Amount (1,000L.E.)	Q'ty	Amount (1,000 L.E.)
1. Civil Works								
1.1 Earth Works								
Excavation	7	m^3	3,000	21	3,500	25		
Embankment	6	m^3	50,000	300	50,000	300		
Filling Canal	6	m^3	5,000	30	5,000	30		
1.2 Concrete Works								
Apron concrete	450	m^3	1,960	882	2,240	1,008		
Wall concrete	730	m^3	460	336	460	336		
Pier concrete	730	m^3	1,720	1,256	2,160	1,577		
Pier Supers conc	730	m^3	320	234	390	285		
1.3 Riprap & Revet								
Block Riprap	210	m^2	5,100	1,071	5,100	1,071		
Revetment	60	m^2	5,700	342	5,700	342		
1.4 Demolition of Str	60	m^3	420	25	420	25		
1.5 Miscellaneous 10%				450		500		
1.6 Other & Mobil 10%				453		501		
Total of 1.				5,400		6,000		
2. Stregnthen Old Str.								
2.1 Boring	200	m	400	80	200	40		
2.2 Grouting	1,000	m^3	4	4	2	2		
2.3 Miscellaneous 10%				8		4		
2.4 Other & Mobil 10%				8		4		
Total of 2.				100		50		
3. Gates								
3.1 Gate Leaves			3X3.1X2 3 sets	3,000	3X3.1X2 3 sets	3,000		
			6.5X3.1 X2 6sets	13,200	6.5X3.1 X2 6 sets	13,200		
3.2 Other & Mobil 10%				1,620		1,620		
Total of 3.				17,820		17,820		
Grand Total (1+2+3)				23,320		23,870		

Table K-2-3 Construction Cost of Alternative-C of Regulator

Description	Unit Cos (L.E.)	Unit	C - 1 Q'ty	C - 1 Amount (1,000 L.E.)	C - 2 Q'ty	C - 2 Amount (1,000L.E.)	C - 3 Q'ty	C - 3 Amount (1,000 L.E.)
1. Civil Works								
1.1 Earth Works								
Excavation	7	m^3	200,000	1,400	200,000	1,400	200,000	1,400
Embankment	6	m^3						
Filling Canal	6	m^3	5,000	30	5,000	30	5,000	30
1.2 Concrete Works								
Apron concrete	450	m^3	4,760	2,142	4,810	2,165	4,660	2,097
Wall concrete	730	m^3	560	409	700	511	700	511
Pier concrete	730	m^3	2,050	1,497	1,420	1,037	1,280	935
Pier Supers conc	730	m^3	270	197	280	205	190	139
1.3 Riprap & Revet								
Block Riprap	210	m^2	2,300	483	2,300	483	2,300	483
Revetment	60	m^2	3,320	199	3,320	199	3,320	199
1.4 Demolition of Str	60	m^3						
1.5 Miscellaneous 10%				636		603		580
1.6 Other & Mobil 10%				637		607		586
Total of 1.				7,630		7,240		6,960
2. Stregnthen Old Str.								
2.1 Boring	200	m						
2.2 Grouting	1,000	m^3						
2.3 Miscellaneous 10%								
2.4 Other & Mobil 10%								
Total of 2.								
3. Gates								
3.1 Gate Leaves			6.6X6.0		8.0X3.1X2		13.4X3.1X2	
			6 sets	15,600	5 sets	15,000	3 sets	15,300
3.2 Other & Mobil 10%				1,560		1,500		1,530
Total of 3.				17,160		16,500		16,830
Grand Total (1+2+3)				24,790		23,740		23,790

Table K-3 Project Cost

Table K-3-1 (1) Summary of Project Cost (Sheet 1 of 2)

(Unit : 1,000 L.E.)

Description	Total			Phase-I			Phase-II			Phase-III		
	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total
1. Improvement of Bahr Yusef Canl	224,600	133,100	357,700	88,400	37,200	125,600	79,700	51,200	130,900	56,500	44,700	101,200
1.1 Remodelling & Trimming of Canal	54,000	68,000	122,000	7,000	11,000	18,000	19,000	29,000	48,000	28,000	28,000	56,000
1.1.1 Improvement of Canal Sections	38,000	57,000	95,000	7,000	11,000	18,000	19,000	29,000	48,000	12,000	17,000	29,000
1.1.2 Improvement of Course byShortcut	16,000	11,000	27,000	-	-	-	-	-	-	16,000	11,000	27,000
1.2 Improvement of Barrage/Regulator	126,500	42,500	169,000	53,900	15,100	69,000	47,900	16,100	64,000	24,700	11,300	36,000
1.2.1 Preparatory Works for Constn.	19,000	1,000	20,000	19,000	1,000	20,000	-	-	-	-	-	-
1.2.2 Dairout Barrage	24,700	11,300	36,000	-	-	-	-	-	-	24,700	11,300	36,000
1.2.3 Manshat El Dahab Regulator	25,800	9,200	35,000	-	-	-	25,800	9,200	35,000	-	-	-
1.2.4 Sakoula Regulator	23,000	8,000	31,000	23,000	8,000	31,000	-	-	-	-	-	-
1.2.5 Mazoura Regulator	22,100	6,900	29,000	-	-	-	22,100	6,900	29,000	-	-	-
1.2.6 Lahoun Regulator	11,900	6,100	18,000	11,900	6,100	18,000	-	-	-	-	-	-
1.3 Improvement of Canal Structures	44,100	22,600	66,700	27,500	11,100	38,600	12,800	6,100	18,900	3,800	5,400	9,200
1.3.1 Intake of Manshat El Dahab C.	5,700	1,500	7,200	-	-	-	5,700	1,500	7,200	-	-	-
1.3.2 Intake of Harika C.	2,400	800	3,200	2,400	800	3,200	-	-	-	-	-	-
1.3.3 Intake of Saab C.	2,400	800	3,200	2,400	800	3,200	-	-	-	-	-	-
1.3.4 Intake of Hasan Wasef Branch C.	8,000	3,000	11,000	8,000	3,000	11,000	-	-	-	-	-	-
1.3.5 Intake of Giza Branch C.	10,700	3,300	14,000	10,700	3,300	14,000	-	-	-	-	-	-
1.3.6 Reconstruction of I.S.(3.0mX3)	4,800	1,200	6,000	3,200	800	4,000	1,600	400	2,000	-	-	-
1.3.7 Reconstruction of I.S.(2.5mX3)	4,200	1,800	6,000	-	-	-	4,200	1,800	6,000	-	-	-
1.3.8 Reconstruction of I.S.(2.0mX5)	3,000	1,500	4,500	-	-	-	600	300	900	2,400	1,200	3,600
1.3.9 Rehabilitation of I.S.(1.5mX8)	800	2,400	3,200	100	300	400	100	300	400	600	1,800	2,400
1.3.10 Rehabilitation of I.S.(1.2X21)	2,100	6,300	8,400	700	2,100	2,800	600	1,800	2,400	800	2,400	3,200
2. Improvement of Branch Canals	191,600	164,800	356,400	57,200	49,200	106,400	57,200	49,200	106,400	77,200	66,400	143,600
Branch Canals in 670,000 fed	191,600	164,000	356,400	57,200	49,200	106,400	57,200	49,200	106,400	77,200	66,400	143,600
Improvement of Harika Canalfor Base C	(5,380)	(4,620)	(10,000)	-	-	-	-	-	-	-	-	-
2.1 Remodelling & Trimming of Canal	(450)	(650)	(1,100)	-	-	-	-	-	-	-	-	-
2.2 Improvement of Canal Structures	(2,680)	(1,120)	(3,800)	-	-	-	-	-	-	-	-	-
2.2.1 Improvement of Regulator No.1	(1,100)	(400)	(1,500)	-	-	-	-	-	-	-	-	-
2.2.2 Construction of New Regulators	(920)	(380)	(1,300)	-	-	-	-	-	-	-	-	-
2.2.3 Improvement of Regulators No.4	(560)	(240)	(800)	-	-	-	-	-	-	-	-	-
2.2.4 Construction of Tail Wasteways	(100)	(100)	(200)	-	-	-	-	-	-	-	-	-
2.3 Improvement of Intake St.Sub.C.(14	(1,400)	(1,400)	(2,800)	-	-	-	-	-	-	-	-	-
2.4 Remodelling & Trimming, Sub.C.	(650)	(1,150)	(1,800)	-	-	-	-	-	-	-	-	-
2.5 Improvement of Subbranch Canal	(200)	(300)	(500)	-	-	-	-	-	-	-	-	-

Table K-3-1 (2) Summary of Project Cost (Sheet 2 of 2)

(Unit : 1,000 L.E.)

Description	Total			Phase-I			Phase-II			Phase-III		
	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total	F.C.	L.C.	Total
3. Improvement of Pump Stations (P.S.)	80,000	14,000	94,000	22,000	4,000	26,000	32,000	5,500	37,500	26,000	4,500	30,500
3.1 Drainage Pump Station	16,000	3,000	19,000	12,000	2,000	14,000	2,000	500	2,500	2,000	500	2,500
3.1.1 El Badraman Drainage P.S.	12,000	2,000	14,000	12,000	2,000	14,000	-	-	-	-	-	-
3.1.2 Other 8 Drainage P.S.	4,000	1,000	5,000	-	-	-	2,000	500	2,500	2,000	500	2,500
3.2 Irrigation Pump Station (P.S.)	64,000	11,000	75,000	10,000	2,000	12,000	30,000	5,000	35,000	24,000	4,000	28,000
3.2.1 Arab Beni Khalid Irrigation P.S.	5,000	1,000	6,000	5,000	1,000	6,000	-	-	-	-	-	-
3.2.2 Beni Khalid Irrigation P.S.	5,000	1,000	6,000	5,000	1,000	8,000	-	-	-	-	-	-
3.2.3 Kamadir Irrigation P.S.	12,000	2,000	14,000	-	-	-	12,000	2,000	14,000	-	-	-
3.2.4 Terfa Irrigation P.S.	18,000	3,000	21,000	-	-	-	18,000	3,000	21,000	-	-	-
3.2.5 Sakoula Irrigation P.S.	12,000	2,000	14,000	-	-	-	-	-	-	12,000	2,000	14,000
3.2.6 Mazoura Irrigation P.S.	12,000	2,000	14,000	-	-	-	-	-	-	12,000	2,000	14,000
4. Operation & Maintenance of BahrY.C.	18,200	23,800	42,000	8,200	8,300	16,500	7,000	9,500	16,500	3,000	6,000	9,000
4.1 O/M Facilities	10,000	8,000	18,000	3,000	2,000	5,000	4,000	4,000	8,000	3,000	2,000	5,000
4.1.1 Hydraulic Observation Facilities	5,000	4,000	9,000	1,500	1,000	2,500	2,000	2,000	4,000	1,500	1,000	2,500
4.1.2 Communication Data Processing	5,000	4,000	9,000	1,500	1,000	2,500	2,000	2,000	4,000	1,500	1,000	2,500
4.2 Enhancement of O/M	1,700	300	2,000	1,700	300	2,000	-	-	-	-	-	-
4.3 Water Management	-	12,000	12,000	-	4,000	4,000	-	4,000	4,000	-	4,000	4,000
4.4 Training & Education	6,500	3,500	10,000	3,500	2,000	5,500	3,000	1,500	4,500	-	-	-
Grand Total of Project Cost	514,400	335,700	850,100	175,800	98,700	274,500	175,900	115,400	291,300	162,700	121,600	284,300

5. Improvement of On-farm Irrigation Facilities in Old Land 670,000 fed

F.C.	L.C.	Total
119,000	158,000	277,000

Implementing Schedule for On-farm Irrigation Facilities

Schedule		Programmed Investment F.C.	L.C.	Total
Project Year 3	(20,000fed)	4,000	4,000	8,000
- do - 4	(20,000fed)	4,000	4,000	8,000
- do - 5	(30,000fed)	4,000	8,000	12,000
- do - 6	(30,000fed)	4,000	8,000	12,000
- do - 7	(30,000fed)	4,000	8,000	12,000
- do - 8	(60,000fed)	11,000	14,000	25,000
- do - 9	(60,000fed)	11,000	14,000	25,000

Schedule		Programmed Investment F.C.	L.C.	Total
Project Year 10	(60,000fed)	11,000	14,000	25,000
- do - 11	(60,000fed)	11,000	14,000	25,000
- do - 12	(60,000fed)	11,000	14,000	25,000
- do - 13	(60,000fed)	11,000	14,000	25,000
- do - 14	(60,000fed)	11,000	14,000	25,000
- do - 15	(60,000fed)	11,000	14,000	25,000
- do - 16	(60,000fed)	11,000	14,000	25,000

Table K-3-2 (1) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1. Improvement of Bahr Yusef Canal								
1.1 Remodelling & Trimming of Canal				54,000	68,000	122,000		
1.1.1 Improvement of Canal Sections				38,000	57,000	95,000		
Dairout Barrage to Manshat El Dahab Reg.	m	77,000	300	9,240	13,860	23,100	120	180
Manshat El Dahab Reg. to Sakoula Reg.	m	100,000	300	12,000	18,000	30,000	120	180
Sakoula Reg. to Mazoura Reg.	m	52,000	280	5,720	8,840	14,560	110	170
Mazoura Reg. to Lahoun Reg.	m	58,000	280	6,380	9,860	16,240	110	170
Lahoun Reg. to End of Canal	m	24,000	100	960	1,440	2,400	40	60
Miscellaneous Works		LS		3,700	5,000	8,700		
1.1.2 Improvement of Course by Shortcut				16,000	11,000	27,000		
Dairout Barrage to Manshat El Dahab Reg. (2)	m	2,000	5,200	8,000	4,400	10,400	3,000	2,200
Manshat El Dahab Reg. to Sakoula Reg (1 place)	m	800	5,200	2,400	1,760	4,160	3,000	2,200
Sakoula Reg. to Mazoura Reg. (1 place)	m	2,000	5,100	5,800	4,400	10,200	2,900	2,200
Miscellaneous Works		LS		1,800	440	2,240		
1.2 Improvement of Barrage/Regulators				128,500	42,500	169,000		
1.2.1 Preparatory Works for Construction				19,000	1,000	20,000		
1) Procurement of Construction Equipment				13,300	700	14,000		
Bulldozer, 23 ton class	unit	2	945,000	1,800	90	1,890	900,000	45,000
Backhoe Excavator, Crawler 1.2 m^3	unit	2	651,000	1,240	62	1,302	620,000	31,000
Dragline, w/ Bucket 1.5 m^3, 55 ton class	unit	2	1,470,000	2,800	140	2,940	1,400,000	70,000
Crawler Crane , 45 ton class	unit	2	1,050,000	2,000	100	2,100	1,000,000	50,000
Truck Crane , 16 ton class	unit	2	798,000	1,520	76	1,596	760,000	38,000

Table K-3-2 (2) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Vibrohammer, 80 KW	unit	2	347,000	660	34	694	330,000	17,000
Water Jet Cutter, 45 KW	unit	2	242,000	460	24	484	230,000	12,000
Diesel Generator, 200 KVA	unit	2	242,000	460	24	484	230,000	12,000
Welder	unit	2	46,000	88	4	92	44,000	2,000
Gas Cutter	unit	2	13,000	24	2	26	12,000	1,000
Spare Parts & Others		LS		2,248	144	2,392		
2) Procurement of Construction Materials				5,700	300	6,000		
Steel Sheet pile III-Type 12 m	pcs	500	2,880	1,370	70	1,440	2,740	140
Steel Sheet Pile IV-Type 12 m	pcs	200	4,560	868	44	912	4,340	220
H-Shape Steel H-300 X 300 X 10 X 15, 12 m	pcs	80	3,100	236	12	248	2,950	150
H-Shape Steel H-350 X 350 X 12 X 19, 12 m	pcs	150	4,620	660	33	693	4,400	220
H-Shape Steel H-400 X 400 X 12 X 21, 12 m	pcs	30	5,700	165	9	174	5,510	280
Chamel Steel [-200 X 90 X 8 X 13.5, 12 m	pcs	20	1,090	21	1	22	1,040	50
L Steel L-100 X 100 X 10, 12 m	pcs	50	560	26	2	28	530	30
Steel Foot Plate 2.00 m X 1.00 m	pcs	100	2,140	204	10	214	2,040	100
Steel Foot Plate 3.00 m X 1.00 m	pcs	100	3,180	303	15	318	3,030	150
Steel Sheet Pile Driving Cap	pcs	20	10,500	200	10	210	10,000	500
Steel Stagings	m^3	500	1,050	500	25	525	1,000	50
Tie-rod ϕ 55 X 10 m	pcs	200	2,100	400	20	420	2,000	100
Others				747	48	796		

Table K-3-2 (3) Breakdown of Project Cost

Sheet 3 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.2.2 Dairout Barrage				24,700				
1) Civil Works				6,400	6,900	13,300		
Excavation	m^3	60,000	7	240	630	1,470	4	3
Excavation for Structure	m^3	6,000	13	48	30	78	8	5
Filling Canal	m^3	1,000	6	3	3	6	3	3
Apron & pier concrete	m^3	8,800	730	3,080	3,344	6,424	350	380
Wall concrete	m^3	2,000	730	700	760	1,460	350	380
Pier superstructure concrete	m^3	220	730	77	84	161	350	380
Concrete block riprap w/ stone	m^2	4,800	210	480	528	1,008	100	110
Revetment of stone w/mortar	m^2	3,800	150	228	342	570	60	90
Demolition of structure	m^3	500	60	12	18	30	25	35
Access Roads	K m	1	6,000	2	4	6	2,400	3,600
Miscellaneous Works				730	800	1,530		
Other Works & Mobilization				800	807	1,607		
2) Gates				11,400	1,300	12,700		
Gate Leaves:Rack Wheel Type 7.0 X 3.3 m X 2	sets	4	2,900,000	10,440	1,160	11,600	90%	10%
Appurtenant Works & Mobilization				960	140	1,100		
3) Other Costs				6,900	3,100	10,000		
Engineering & Administration				2,700	1,200	3,900		
Technical Assistance				2,300	1,100	3,400		
Physical Contingency				1,900	800	2,700		

Table K-3-2 (4) Breakdown of Project Cost

Sheet 4 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.2.3 Manshat El Dahab Regulator				25,800	9,200	35,000		
1) Civil Works				4,700	5,100	9,800		
Excavation	m^3	110,000	7	440	330	770	4	3
Excavation for Structure	m^3	7,400	13	59	37	96	8	5
Filling canal	m^3	1,000	6	3	3	6	3	3
Apron & pier concrete	m^3	6,500	730	2,275	2,470	4,745	350	380
Wall concrete	m^3	740	730	259	281	540	350	380
Pier superstructures concrete	m^3	400	730	140	152	292	350	380
Concrete block riprap w/ stone	m^2	2,700	210	270	297	567	100	110
Revetment of stone w/ mortar	m^2	3,100	150	186	279	465	60	90
Demolition of Structures	m^3	500	60	12	18	30	25	35
Access Roads	Km	2	6,000	5	7	12	2,400	3,600
Miscellaneous Works				550	580	1,130		
Other Works & Mobilization				501	646	1,147		
2) Gates				13,700	1,500	15,200		
Gate Leaves:Wire Rope Wheel Type 7.0X3.25mX 2	sets	5	2,800,000	12,600	1,400	14,000	90%	10%
Appurtenant Works & Mobilization				1,100	100	1,200		
3) Others				7,400	2,600	10,000		
Engineering & Administration				3,000	1,000	4,000		
Technical Assistance				2,600	900	3,500		
Physical Contingency				1,800	700	2,500		

Table K-3-2 (5) Breakdown of Project Cost

Sheet 5 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.2.4 Sakoula Regulator				23,000	8,000	31,000		
1) Civil Works				3,900	4,000	7,900		
Excavation	m^3	110,000	7	440	330	770	4	3
Excavation for Structure	m^3	11,000	13	53	33	86	8	5
Filling canal	m^3	1,000	6	3	3	6	3	3
Apron & pier concrete	m^3	4,200	730	1,470	1,596	3,066	350	380
Wall concrete	m^3	740	730	259	281	540	350	380
Pier superstructures concrete	m^3	250	730	88	95	183	350	380
Concrete block riprap w/ stone	m^2	2,500	210	250	275	525	100	110
Revetment of stone w/ mortar	m^3	2,900	150	174	261	435	60	90
Demolition of Structures	m^3	500	60	12	18	30	25	35
Access Roads	Km	2	6,000	5	7	12	2,400	3,600
Miscellaneous Works				520	540	1,060		
Other Works & Mobilization				591	539	1,130		
2) Gates				12,700	1,400	14,100		
Gate leaves:Wire Rope Wheel Type 8.0X3.2mX 2	sets	4	3,200,000	11,500	1,300	12,800		
Appurtenant Works & Mobilization				1,200	100	1,300		
3) Others				6,400	2,600	9,000		
Engineering & Administration				2,600	1,000	3,600		
Technical Assistance				2,200	900	3,100		
Physical Contingency				1,600	700	2,300		

Table K-3-2 (6) Breakdown of Project Cost

Sheet 6 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.2.5 Nazoura egulator				22,100	8,900	29,000		
1) Civil Works				3,600	3,700	7,300		
Excavation	m^3	120,000	7	480	360	840		
Excavation for structures	m^3	11,000	13	88	55	143		
Filling canal	m^3	1,000	6	3	3	6		
Apron & pier concrete	m^3	3,900	730	1,385	1,482	2,847		
Wall concrete	m^3	720	730	252	274	526		
Pier superstructures concrete	m^3	250	730	88	95	183	350	380
Concrete block riprap w/ stone	m^2	2,200	210	220	242	462	100	110
Revetment of stone w/ mortar	m^3	2,900	150	174	261	435	60	90
Demolition of Structures	m^3	1,600	60	40	56	96	25	35
Access Roads	Km	2	6,000	5	7	12	2,400	3,600
Miscellaneous Works				440	440	880		
Other Works & Mobilization				445	425	870		
2) Gates				12,400	1,300	13,700		
Gate Leaves:Wire Rope Wheel Type 8.0X3.05 X 2	sets	4	3,100,000	11,200	1,200	12,400		
Apurtenant Works & Mobilization				1,200	100	1,300		
3) Others				6,100	1,900	8,000		
Engineering & Administration				2,500	700	3,200		
Technical Assistance				2,100	700	2,800		
Physical Contingency				1,500	500	2,000		

Table K-3-2 (7) Breakdown of Project Cost

Sheet 7 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.2.6 Lahoun Regulator				11,900	6,100	18,000		
1) Civil Works				3,800	4,200	8,000		
Excavation	m^3	48,000	7	192	144	336	4	3
Excavation for Structure	m^3	3,200	13	26	16	42	8	5
Filling canal	m^3	2,000	8	6	6	12	3	3
Apron & pier concrete	m^3	2,800	730	980	1,064	2,044	350	380
Wall concrete	m^3	3,000	730	1,050	1,140	2,190	350	380
Pier superstructures concrete	m^3	200	730	70	76	146	350	380
Concrete block riprap w/ stone	m^2	2,000	210	200	220	420	100	110
Revetment of stone w/ mortar	m^2	3,000	150	180	270	450	60	90
Demolition of Structures	m^3	800	60	20	28	48	25	35
Access Roads	Km	2	6,000	5	7	12	2,400	3,600
Miscellaneous Works				540	600	1,140		
Other Works & Mobilization				531	629	1,160		
2) Gates				4,500	500	5,000		
Gate Leaves: Rack Wheel Type 5.5 X 3.15m X 2	sets	2	2,200,000	3,960	440	4,400	90%	10%
Appurtenant Works & Mobilization				540	60	600		
3) Others				3,600	1,400	5,000		
Engineering & Administration				1,500	600	2,100		
Technical Assistance				1,200	500	1,700		
Physical Contingency				900	300	1,200		

Table K-3-2 (8) Breakdown of Project Cost

Sheet 8 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3 Improvement of Canal Structure				44,100	22,600	66,700		
1.3.1 Intake of Manshat El Dahab				5,700	1,500	7,200		
1) Civil Works				700	700	1,400		
Excavation	m^3	700	7	3	2	5	4	3
Excavation for structure	m^3	200	13	2	1	3	8	5
Apron & pier concrete	m^3	1,000	730	350	380	730	350	380
Wall concrete	m^3	100	730	35	38	73	350	380
Pier superstructure concrete	m^3	100	730	35	38	73	350	380
Concrete block riprap w/ stone	m^2	400	210	40	44	84	100	110
Revetment of stone w/ mortar	m^2	400	150	24	36	60	60	90
Demolition of structure	m^3	900	60	23	31	54	25	35
Access roads	Km	1	6,000	3	3	6	2,400	3,600
Miscellaneous works				75	87	162		
Other works & mobilization				110	40	150		
2) Gates				3,400	400	3,800		
Gate Leaves:Rack Wheel Type,5.0 X 2.45 X2	set	2	1,700,000	3,060	340	3,400	90%	10%
Appurtenant works & mobilization				340	60	400		
3) Others				1,600	400	2,000		
Engineering & Administration				600	200	800		
Technical Assistance				600	100	700		
Physical Contingency				400	100	500		

Table K-3-2 (9) Breakdown of Project Cost

Sheet 9 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.2 Intake of Harika				2,400	800	3,200		
1) Civil Works				400	400	800		
Excavation	m^3	1,000	7	4	3	7	4	3
Excavation for structure	m^3	100	13	1	1	2	8	5
Apron & pier concrete	m^3	500	730	175	190	365	350	380
Wall concrete	m^3	100	730	35	38	73	350	380
Pier superstructure concrete	m^3	60	730	21	23	44	350	380
Concrete block riprap w/ stone	m^2	200	210	20	22	42	100	110
Revetment of stone w/ mortar	m^2	300	150	18	27	45	60	90
Demolition of structure	m^3	100	60	3	3	6	25	35
Access roads	Km	1	6,000	3	3	6	2,400	3,600
Miscellaneous works				60	50	110		
Other works & mobilization				60	40	100		
2) Gates				1,300	200	1,500		
Gate Leaves:Rack Wheel Type,5.0 X 1.9m X2	set	1	1,300,000	1,170	130	1,300	90%	10%
Appurtenant works & mobilization				130	70	200		
3) Others				700	200	900		
Engineering & Administration				310	90	400		
Technical Assistance				220	80	300		
Physical Contingency				170	30	200		

Table K-3-2 (10) Breakdown of Project Cost

Sheet 10 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.3 Intake of Saab				2,400	800	3,200		
1) Civil Works				400	400	800		
Excavation	m^3	1,000	7	4	3	7	4	3
Excavation for structure	m^3	100	13	1	1	2	8	5
Apron & pier concrete	m^3	500	730	175	190	365	350	380
Wall concrete	m^3	100	730	35	38	73	350	380
Pier superstructure concrete	m^3	60	730	21	23	44	350	380
Concrete block riprap w/ stone	m^2	200	210	20	22	42	100	110
Revetment of stone w/ mortar	m^2	300	150	18	27	45	60	90
Demolition of structure	m^3	100	60	3	3	6	25	35
Access roads	Km	1	6,000	3	3	6	2,400	3,600
Miscellaneous works				60	50	110		
Other works & mobilization				60	40	100		
2) Gates				1,300	200	1,500		
Gate Leaves:Rack Wheel Type,5.0 X 1.9 X2	set	1	1,300,000	1,170	130	1,300	90%	10%
Appurtenant works & mobilization				130	70	200		
3) Others				700	200	900		
Engineering & Administration				310	90	400		
Technical Assistance				220	80	300		
Physical Contingency				170	30	200		

Table K-3-2 (11) Breakdown of Project Cost

Sheet 11 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.4 Intake of Hassan Wasef Branch Canal				8,000	3,000	11,000		
1) Civil Works				1,200	1,400	2,600		
Excavation	m^3	10,000	7	40	30	70	4	3
Excavation for structure	m^3	500	13	4	3	7	8	5
Apron & pier concretwe	m^3	1,500	730	525	570	1,095	350	380
Wall concrete	m^3	400	730	140	152	292	350	380
Pier superstructure concrete	m^3	150	730	53	57	110	350	380
Concrete block riprap w/ stone	m^2	300	210	30	33	63	100	110
Revetment of stone w/ mortar	m^2	800	150	48	72	120	60	90
Demolition of structures	m^3	1,300	60	32	46	78	25	35
Access Roads	Km	1	6,000	3	3	6	2,400	3,600
Miscellaneous Works				160	220	380		
Other Works & Mobilization				185	214	379		
2) Gates				4,800	600	5,400		
Gate Leaves:Rack Wheel Type, 4.0 X 2.65m X 2	sets	3	1,600,000	4,320	480	4,800	90%	10%
Appurtenant Works & Mobilization				480	120	600		
3) Others				2,000	1,000	3,000		
Engineering & Administration				700	500	1,200		
Technical Assistance				700	400	1,100		
Physical Contingency				600	100	700		

Table K-3-2 (12) Breakdown of Project Cost

Sheet 12 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.5 Intake of Giza Branch Canal				10,700	3,300	14,000		
1) Civil Works				1,500	1,700	3,200		
Excavation	m^3	10,000	7	40	30	70	4	3
Excavation for structure	m^3	500	13	4	3	7	8	5
Apron & pier concrete	m^3	2,000	730	700	760	1,460	350	380
Wall concrete	m^3	400	730	140	152	292	350	380
Pier superstructure concrete	m^3	160	730	58	61	117	350	380
Concrete block riprap w/ stone	m^2	350	210	35	39	74	100	110
Revetment of stone w/ mortar	m^2	900	150	54	81	135	60	90
Demolition of structure	m^3	1,400	60	35	49	84	25	35
Access Roads	Km	1	6,000	3	3	6	2,400	3,600
Miscellaneous Works				220	260	480		
Other Works & Mobilization				213	262	475		
2) Gates				8,100	700	6,800		
Gate leaves:Rack Wheel Type 4.0 X 2.4m X 2	sets	4	1,500,000	5,400	600	6,000	90%	10%
Appurtenant Works & Mobilization				700	100	800		
3) Others				3,100	900	4,000		
Engineering & Administration				1,200	400	1,600		
Technical Assistance				1,000	300	1,300		
Physical Contingency				900	200	1,100		

Table K-3-2 (13) Breakdown of Project Cost

Sheet 13 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.6 Reconstruction of Intake Structure	place	3		4,800	1,200	6,000		
Reconstruction Cost per place (Span 3.0 m)				1,600	400	2,000		
1) Civil Works				200	200	400		
Excavation	m^3	2,700	7	11	8	19	4	3
Excavation for structure	m^3	300	13	3	2	5	8	5
Plain concrete	m^3	80	450	18	18	36	350	380
Reinforced concrete	m^3	250	730	88	95	183	350	380
Concrete block riprap w/ stone	m^2	40	210	4	5	9	100	110
Revetment of stone w/ mortar	m^2	110	150	7	10	17	60	90
Demolition of structure	m^3	160	60	4	6	10	25	35
Access roads	Km	1	6,000	2	4	6	2,400	3,600
Miscellaneous works				50	30	80		
Other works & mobilization				13	22	35		
2) Gates				900	100	1,000		
Gate Leaves:Rack Wheel Type,5.0 X 2.4m X2	set	1	900,000	810	90	900	90%	10%
Appurtenant works & mobilization				90	10	100		
3) Others				500	100	600		
Engineering & Administration				150	50	200		
Technical Assistance				160	40	200		
Physical Contingency				190	10	200		

Table K-3-2 (14) Breakdown of Project Cost

Sheet 14 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.7 Reconstruction of Intake Structures	place	3		4,200	1,800	6,000		
Reconstruction Cost per place (Span 2.50m)				1,400	600	2,000		
1) Civil Works				300	300	600		
Excavation	m^3	5,400	7	22	16	38	4	3
Excavation for structure	m^3	600	13	5	3	8	8	5
Plain concrete	m^3	270	450	60	62	122	220	230
Reinforced concrete	m^3	380	730	137	148	285	350	380
Concrete block riprap w/ stone	m^2	40	210	4	5	9	100	110
Revetment of stone w/ mortar	m^2	110	150	7	10	17	60	90
Demolition of structure	m^3	310	60	8	11	19	25	35
Access roads	Km	1	6,000	2	4	6	2,400	3,600
Miscellaneous works				30	20	50		
Other works & mobilization				25	21	46		
2) Gates				700	100	800		
Gate Leaves:Rack Wheel Type, 3.8 X 2.8 m	set	1	700,000	630	70	700	90%	10%
Appurtenant works & mobilization				70	30	100		
3) Others				400	200	600		
Engineering & Administration				200	100	300		
Technical Assistance				200	-	200		
Physical Contingency				-	100	100		

Table K-3-2 (15) Breakdown of Project Cost

Sheet 15 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.8 Reconstrution of Intake Structures	place	5		3,000	1,500	4,500		
Reconstruction Cost per place (span 2.00m)				600	300	900		
1) Civil Works				100	100	200		
Excavation	m^3	900	7	4	3	7	4	3
Excavation for structure	m^3	100	13	1	1	2	8	5
Plain concrete	m^3	40	450	9	9	18	220	230
Reinforced concrete	m^3	120	730	42	46	88	350	380
Concrete block riprap w/ stone	m^3	20	210	2	2	4	100	110
Revetment of stone w/ mortar	m^2	100	150	6	9	15	60	90
Demolition of structure	m^3	70	60	2	4	6	25	35
Access roads	Km	1	6,000	2	4	6	2,400	3,600
Miscellaneous works				30	10	40		
Other works & mobilization				2	14	16		
2) Gates				300	100	400		
Gate Leaves: wheel type 2.0m X 2.5m	set	1	300,000	270	30	300	90%	10%
Appurtenant Works & Mobilization				30	70	100		
3) Others				200	100	300		
Engineering & Administration				60	40	100		
Technical Assistance				70	30	100		
Physical Contingency				70	30	100		

Table K-3-2 (16) Breakdown of Project Cost

Sheet 16 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
1.3.9 Reconstruction of Intake Structure	place	8		800	2,400	3,200		
Reconstruction Cost per place (span 1.50m)				100	300	400		
1) Civil Works				10	10	20		
Demolition of structure	m^3	5	60	1	1	2	25	35
Reinforced concrete	m^3	10	730	4	4	8	350	380
Miscellaneous works				3	2	5		
Other works & mobilization				2	3	5		
2) Improvement of Gates				90	190	280		
Improvement of gate leaves				1	4	5		
Supporting flame to gate lift				70	150	220		
Other works & mobilization				19	36	55		
3) Engineering, Administration & Others				-	100	100		
1.3.10 Rehabilitation of Intake Structure	place	21		2,100	6,300	8,400		
Rehabilitation Cost per place(span 1.2m below)				100	300	400		
Rehabilitation of civil works & Gates				80	160	240		
Miscellaneous works & Other works				20	40	60		
Engineering,Administration & Others				-	100	100		

Table K-3-2 (17) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
2. Improvement of Branch Canals in Bahr Yusef	1,000 fed	670	532,000	191,600	164,800	356,400	288,000	248,000
Total of 2.1 to 2.5 for Narika Canal in 18,800fed				5,400	4,600	10,000		
2.1 Remodelling & Trimaing of Canal				400	700	1,100		
Remodelling; The Intake to Aklia Regulator	m	11,700	40	187	281	468	40%	60%
Aklia Reg. to Shenri Reg.	m	12,400	30	149	223	372	40%	60%
Shenri Reg. to Salaiba Reg.	m	4,400	20	35	53	88	40%	60%
Salaiba Reg. to the end	m	4,300	10	17	26	43	40%	60%
Miscellaneous Works			LS	12	117	129		
2.2 Improvement of Canal Structures				2,700	1,100	3,800		
2.2.1 Improvement of Regulator No.1				1,100	400	1,500		
Excavation	m^3	100	7	1	1	2	4	3
Excavation for structure	m^3	200	13	2	1	3	8	5
Pier concrete	m^3	355	730	124	135	259	350	380
Reinforced concrete	m^3	270	730	95	103	198	350	380
Revetment of stone w/ mortar	m^2	20	150	1	2	3	60	90
Demolition of structure	m^3	300	60	8	11	19	25	35
Miscellaneous Works				40	30	70		
Other Works & Mobilization				19	27	46		
Gate Leaves;Rack Wheel type 2.5 X 2.3	sets	2	400,000	720	80	800	90%	10%
Appurtenant & Mobilization				90	10	100		
2.2.2 Construction of New Regulator				940	360	1,300		
Excavation	m^3	100	7	1	1	2	4	3
Excavation for structure	m^3	200	13	2	1	3	8	5
Pier concrete	m^3	360	730	128	137	263	350	380

Table K-3-2 (18) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Reinforced concrete	m^3	285	730	100	108	208	350	380
Revetment of stone w/ mortar	m^2	40	150	3	3	6	60	90
Miscellaneous Works				40	30	70		
Other Works & Mobilization				38	10	48		
Gate Leaves;Rack Wheel type 2.0 X 1.85 m	sets	2	300,000	540	60	600	90%	10%
Appurtenant & Mobilization				90	10	100		
2.2.3 Improvement of Regulators No.4				560	240	800		
Excavation	m^3	100	7	1	1	2	4	3
Excavation for structure	m^3	100	13	1	1	2	8	5
Pier concrete	m^3	200	730	70	76	146	350	380
Reinforced concrete	m^3	170	730	60	65	125	350	380
Revetment of stone w/ mortar	m^2	20	150	1	2	3	60	90
Demolition of structure	m^3	200	60	5	7	12	25	35
Miscellaneous & Mobilization				22	18	40		
Other works & mobilization				10	20	30		
Gate Leaves:Rack Wheel Type 2.5 X 2.1 m	set	1	350,000	315	35	350	90%	10%
Appurtenant & mobilization				75	15	90		
2.2.4 Construction of Tail Wasteways				100	100	200		
Excavation	m^3	50	7	1	1	2	4	3
Reinforced concrete	m^3	50	730	18	19	37	350	380
Revetment of stone w/ mortar	m^2	20	150	1	2	3	60	90
Miscellaneous Works				29	31	60		
Other Works & Mobilization				23	35	58		
Gate:Spindle Slide Gate 1.0 X 1.3 m	set	1	40,000	28	12	40	70%	30%

Table K-3-2 (19) Breakdown of Project Cost

Sheet 19 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
2.3 Improvement of Intake Structure to Subbranch C	place	14	200	1,400	1,400	1,400		
Improvement Cost per place				100	100	200		
Excavation	m^3	450	7	2	2	4	4	3
Excavation for structure	m^3	50	13	1	1	2	8	5
Plain concrete	m^3	20	450	5	5	10	220	230
Reinforced concrete	m^3	100	730	35	38	73	350	380
Revetment of stone w/ mortar	m^2	80	150	5	7	12	60	90
Demolition of structure	m^3	50	60	1	2	3	25	35
Miscellaneous works				17	19	36		
Other works & Mobilization				18	19	37		
Gate Leaves: Slide gate 1.0 m X 1.0 m	set	1	20,000	14	6	20	70%	30%
Appurtenant Works				2	1	3		
2.4 Remodelling & Trimming of Subbranch Canal				700	1,100	1,800		
Improvement of Subbranch Canal (14 lines)	m	45,000	30	450	900	1,350	20	30
Improvement of Sub-Subbranch Canal(3 lines)	m	12,000	20	120	120	240	20	20
Miscellaneous Works				110	50	160		
Other Works & Mobilization				20	30	50		

Table K-3-2 (20) Breakdown of Project Cost

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Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
2.5 Improvement of Subbranch Canal				200	300	500		
Construction of Subbranch Canal (2 lines)	m	4,000	100	160	240	400		
Construction of Intake for 2 places	place	2	200	1	1	2		
Miscellaneous Works & Mobilization				39	59	98		
Construction Cost of Subbranch Canal per m				40	60	100		
Excavation	m^3	10	8	30	50	80	3	5
Miscellaneous Works & Mobilization				10	10	20		
Construction Cost of Intakr per place				100	100	200		
Excavation	m^3	360	7	2	1	3	4	3
Excavation for structure	m^3	40	13	1	1	2	8	5
Plain concrete	m^3	30	450	7	7	14	220	230
Reinforced concrete	m^3	100	730	35	38	73	350	380
Revetment of stone w/ mortar	m^2	100	150	6	9	15	60	90
Miscellaneous Works & Mobilization				33	37	70		
Gate: Slide gate 1.0 m X 1.0 m	set	1	20,000	14	6	20	70%	30%
Appurtenant				2	1	3		
Total of 2.1 to 2.5 Harika Canal in 18,800 fed				5,400	4,600	10,000		
Improvement of Branch Canals per 1,000 fed of Command Area				286	246	532	5,400 & 4,600/18.8	

Table K-3-2 (21) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
3. Improvement of Pump Stations				81,000	14,000	95,000		
3.1 Drainage Pump Stations				17,000	3,000	20,000		
3.1.1 El Badraman Drainage Pump Station				12,000	2,000	14,000		
Horizontal Mixed Flow Pump D=1,000 mm X 137 Kw Q= 2.5 m³/sec H= 2.4 m	sets	4		8,100	900	9,000	90%	10%
Civil Works: Reinforced concrete	m³	100	730	35	38	73	350	380
Demolition of structure	m³	50	60	1	2	3	25	35
Improvement & Repair		LS		4	4	8	50%	50%
Miscellaneous works		LS		4	4	8	50%	50%
Improvement of station building		LS		20	20	40	50%	50%
Miscellaneous Works				336	532	868		
Engineering,Administration,Tech Assist,Conti.				3,500	500	4,000		
3.1.2 Other 8 Drainage pump Stations				5,000	1,000	6,000		
Improvement of Pump Equipment for 8 Stations	sets	31	100,000	2,790	310	3,100	90%	10%
Miscellaneous parts			LS	210	90	300		
Civil Works: Reinforced concrete for 8 Sta	m³	100	730	35	38	73	350	380
Demolition of structure	m³	50	60	1	2	3		
Improvement & Repair		LS		4	4	8		
Miscellaneous works		LS		4	4	8		
Improvement of station building		LS		20	20	40		
Miscellaneous Works				236	232	468		
Engineering,Administration,Tech Assist,Conti.				1,700	300	2,000		

Table K-3-2 (22) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
3.2 Irrigation Pump Station				64,000	11,000	75,000		
3.2.1 Arab Beni Khalid Irrigation Pump Station				5,000	1,000	6,000		
Horizontal Mixed Flow Pump D= 600 mm P= 76 Kw Q= 0.8 m³/sec H= 3.0 m	sets	2		3,600	400	4,000	90%	10%
Civil Works: Reinforced concrete	m³	50	730	18	19	37	350	380
Demolition of structure	m³	25	60	1	1	2	25	35
Improvement & Repair		LS		2	2	4		
Miscellaneous works		LS		4	4	8		
Improvement of station building		LS		10	10	20		
Miscellaneous Works				165	264	429		
Engineering,Administration,Tech Assist,Conti.				1,200	300	1,500		
3.2.2 Beni Khalid Irrigation Pump Station				5,000	1,000	6,000		
Horizontal Mixed Flow Pump D= 600 mm P= 76 Kw Q= 0.8 m³/sec H= 3.0 m	sets	2		3,600	400	4,000	90%	10%
Civil Works: Reinforced concrete	m³	50	730	18	19	37	350	380
Demolition of structure	m³	25	60	1	1	2	25	35
Improvement & Repair		LS		2	2	4		
Miscellaneous works		LS		4	4	8		
Improvement of station building		LS		10	10	20		
Miscellaneous Works				265	264	529		
Engineering,Administration,Tech Assist,Conti.				1,100	300	1,400		

Table K-3-2 (23) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
3.2.3 Kanadir Irrigation Pump Station				12,000	2,000	14,000		
Horizontal Mixed Flow Pump D= 800 mm P= 70 Kw Q= 1.34 m³ /sec H= 1.6 m	sets	4		7,920	880	8,800	90%	10%
Civil Works: Reinforced concrete	m³	100	730	35	38	73	350	380
Demolition of structure	m³	50	60	1	2	3	25	35
Improvement & Repair		LS		4	4	8		
Miscellaneous works		LS		8	8	16		
Improvement of station building		LS		20	20	40		
Miacellaneous Works				412	648	1,060		
Engineering,Administration,Tech Assist,Conti.				3,600	400	4,000		
3.2.4 Terfa Irrigation Pump Station				18,000	3,000	21,000		
Horizontal Mixed Flow Pump D= 900 mm P= 73.5 Kw Q= 1.472 m³ /sec H= 2.2 m	sets	6		12,420	1,380	13,800	90%	10%
Civil Works: Reinforced concrete	m³	180	730	63	69	132	350	380
Demolition of structure	m³	90	60	2	4	6	25	35
Improvement & Repair		LS		6	6	12		
Miscellaneous works		LS		12	12	24		
Improvement of station building		LS		30	30	60		
Miscellaneous Works				687	799	1,486		
Engineering,Administration,Tech Assist,Conti.				4,800	700	5,500		

Table K-3-2 (24) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
3.2.5 Sakoula Irrigation Pump Station				12,000	2,000	14,000		
Horizontal Mixed Flow Pump D= 800 mm P= 66 Kw Q= 1.225 m³ /sec H=2.75 m	sets	4		7,920	880	8,800	90%	10%
Civil Works: Reinforced concrete	m³	100	730	35	38	73	350	380
Demolition of structure	m³	50	60	1	2	3	25	35
Improvement & Repair		LS		4	4	8		
Miscellaneous works		LS		8	8	16		
Improvement of station building		LS		20	20	40		
Miacellaneous Works				412	648	1,060		
Engineering,Administration,Tech Assist,Conti.				3,600	400	4,000		
3.2.6 Nazoura Irrigation Pump Station				12,000	2,000	14,000		
Horizontal Mixed Flow Pump D= 900 mm P= 81 Kw Q= 1.47 m³ /sec H= 1.99 m	sets	4		8,280	920	9,200	90%	10%
Civil Works: Reinforced concrete	m³	120	730	42	46	88	350	380
Demolition of structure	m³	60	60	2	2	4	25	35
Improvement & Repair		LS		5	5	10		
Miscellaneous works		LS		10	10	20		
Improvement of station building		LS		10	10	20		
Miscellaneous Works				451	607	1,058		
Engineering,Administration,Tech Assist,Conti.				3,200	400	3,600		

Table K-3-2 (25) Breakdown of Project Cost

Sheet 25 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
4. Operation & Maintenance of Bahr Yusef System				18,200	23,800	42,000		
4.1 O / M Facilities				10,000	8,000	18,000		
4.1.1 Hydraulic Observation Facilities				5,000	4,000	9,000		
Water level Gauge for Bahr Yusef Canal	set	5	40,000	140	60	200	70%	30%
= do - for Intake of Branch Canals	set	45	40,000	1,260	540	1,800	70%	30%
- do - for Major Branch Canals	set	18	40,000	504	216	720	70%	30%
Discharge Calibration for Main Canal	place	5	470,000	1,100	1,250	2,350	220,000	250,000
- do - for Branch Canal	place	18	140,000	1,260	1,260	2,520	70,000	70,000
Other works				736	674	1,410		
4.1.2 Communication & Data Processing				5,000	4,000	9,000		
Operation Center: Center Building	m^2	200	3,000	240	360	600	40%	60%
Processing Equipment & Facilities		LS		400	100	500	80%	20%
Other Works		LS		360	540	900		
Sub-center : Station Building 50 m^2	place	4	150,000	240	360	600	40%	60%
Communication Facilities	LS	4		480	120	600	80%	20%
Processing Equipment & Facilities	LS	4		960	240	1,200	80%	20%
Other Works				320	280	400		
Regulator Station: Building 40 m^2	place	5	120,000	240	360	600	40%	60%
Communication Facilities	LS	5		280	140	400	80%	20%
Remote Station: Building 30 m^2	place	18	90,000	648	972	1,620	40%	60%
Communication Facilities	LS	33	20,000	528	132	660	80%	20%
Other Works				324	396	720		

Table K-3-2 (26) Breakdown of Project Cost

Sheet 26 of 29

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
4.2 Enhancement of O /M				1,700	300	2,000		
O/M Equipment								
Utility Jeep (Center 2 + 4 Dir X 2 =10)	sets	10	70,000	560	140	700	80%	20%
Motorcycle (10 X 2 = 20)	sets	20	4,000	64	16	80	80%	20%
Bycycle (10 X 4 = 40)	sets	40	1,000	32	8	40	80%	20%
Water Management Equipment								
Hydraulic measurement (2 + 4 X 2 = 10)	set	10	13,000	117	13	130	90%	10%
Water Requirement Equipment	set	10	5,000	45	5	50	90%	10%
Weather Equipment & Facilities	set	8	24,000	108	12	120	90%	10%
Other Equipment				774	106	880		
4.3 Water Management				-	12,000	12,000		
Supporting to Marwa Organizing				-	4,000	4,000		
Supporting to WUA Organizing				-	4,000	4,000		
Pilot Irrigation Block Observation in 4 areas				-	4,000	4,000		
4.4 Training & Education				6,500	3,500	10,000		
Training Facilities 300 m^2				1,600	2,400	4,000	40%	60%
Training Equipment				3,200	800	4,000	80%	20%
Training Transportation: Micro Bus & Sedan				900	100	1,000	90%	10%
Others				800	200	1,000		

Table K-3-2 (27) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
5. Improvement of On-farm Irrigation Facilities	1,000 fed	670	414	119,000	158,000	277,000	178	236
5.1 Kom El Hasel Subbranch (CA= 550, IAn=421fed)				75	165	240		
5.1.1 Improvement of Meska (Toal L= 5,825m)				15	15	30		
Excavation	m^3	850	7	3	3	6	4	3
Embankment / Backfill	m^3	1,410	12	8	9	17	6	6
Trimming & Miscellaneous Works				4	3	7		
5.1.2 Construction of Meska (Total L= 800m)				5	10	15		
Excavation	m^3	160	7	1	1	2	4	3
Embankment / Backfill	m^3	340	12	2	2	4	6	6
Trimming & Miscellaneous				2	2	4		
5.1.3 Construction of Meska Intake (15 places)				35	55	90		
Excavation	m^3	560	7	2	2	4	4	3
Backfill	m^3	450	12	3	3	6	6	6
Reinforced Concrete	m^3	40	730	15	15	30	350	380
Brick Wall	m^2	750	50	10	28	38	13	37
Miscellaneous Works				5	7	12		
5.1.4 Other Works				20	85	105		
Access Roads	m	2,300	3	3	4	7	40%	60%
Land Levelling	fed	85	1,000	51	34	85	600	400
Miscellaneous Works & Mobilization				6	2	8		

Table K-3-2 (28) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
5.2 Nazlet Ramadan Subbranch (CA=780,IAn=645fed)				168	167	335		
5.2.1 Improvement of Meska (Total L= 6,000m)				15	15	30		
Excavation	m^3	900	7	3	3	6	4	3
Embankment / Backfill	m^3	1,500	12	9	9	18	6	6
Trimming & Miscellaneous Works				3	3	6		
5.2.2 Construction of Meska (Total L= 3,120 m)				13	15	30		
Excavation	m^3	630	7	3	2	5	4	3
Embankment / Backfill	m^3	1,310	12	8	8	16	6	6
Trimming & Miscellaneous				2	2	4		
5.2.3 Construction of Meska Intake (21 places)				45	75	120		
Excavation	m^3	780	7	3	3	6	4	3
Backfill	m^3	620	12	4	4	8	6	6
Reinforced Concrete	m^3	55	730	20	20	40	350	380
Brick Wall	m^2	1,050	50	14	39	53	13	37
Miscellaneous Works				4	9	13		
5.2.4 Other Works				85	65	160		
Access Roads	m	5,500	3	7	10	17	40%	60%
Land Levelling	fed	130	1,000	78	52	130	600	400
Miscellaneous Works & Mobilization				15	8	23		

Table K-3-2 (29) Breakdown of Project Cost

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
5.3 El Baghour Subbranch (CA=1,800,IAn=1,388fed)				315	405	720		
5.3.1 Improvement of Meska (Toal L= 18,600 m)				50	50	100		
Excavation	m^3	2,600	7	11	9	20	4	3
Embankment / Backfill	m^3	4,650	12	28	28	56	6	6
Trimming & Miscellaneous Works				11	13	24		
5.3.2 Construction of Meska (Total L= 3,910 m)				20	20	40		
Excavation	m^3	790	7	3	3	6	4	3
Embankment / Backfill	m^3	1,650	12	10	10	20	6	6
Trimming & Miscellaneous				7	7	14		
5.3.3 Construction of Meska Intake (41 places)				90	140	230		
Excavation	m^3	1,510	7	6	5	11	4	3
Backfill	m^3	1,210	12	8	7	15	6	6
Reinforced Concrete	m^3	110	730	39	42	81	350	380
Brick Wall	m^2	2,050	50	27	76	103	13	37
Miscellaneous Works				10	10	20		
5.3.4 Other Works				155	195	350		
Access Roads	m	1,900	3	2	4	6	40%	60%
Land Levelling	fed	280	1,000	138	112	250		
Miscellaneous Works & Mobilization				15	79	94		
Grand Total Cost of 4. for 3,130 fed				558	737	1,295		
Average Cost of On-farm Improvement per 1,000 fed				178	236	414		
On-farm Improvement Cost for Bahr Yusef Canal in 670,000 fed				119,000	158,000	277,000		

Table K-3-3 (1) Breakdown of Unit Construction Cost

Sheet 1 of 5

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Remodelling & Trimming of Bahr Yusef Canal per m								
(1) Dairout Barrage to Manshat El Dahab Reg.per m				120	180	300	CB= 46m	
Remodelling	m^3	16	8	48	80	128	H = 4.9m	
Trimming	m^2	32	2	32	32	64	L = 62m	
Miscellanious & Others				10	18	28		
Engineering & Administration				13	20	33		
Technical Assistance				12	17	29		
Physical Contingency				5	13	18		
(2) Manshat El Dahab Reg. to Sakoula Reg. per m				120	180	300	CB= 46m	
Remodelling	m^3	16	8	48	80	128	H = 4.85m	
Trimming	m^2	32	2	32	32	64	L = 64m	
Miscellaneous & Others				10	18	28		
Engineering & Administration				13	20	33		
Technical Assistance				12	17	29		
Physical Contingency				5	13	18		
(3) Sakoula Reg. to Mazoura Reg. per m				110	170	280	CB= 44m	
Remodelling	m^3	15	8	45	75	120	H = 4.55m	
Trimming	m^2	30	2	30	30	60	L = 60m	
Miscellaneous & Others				5	15	20		
Engineering & Administration				12	18	30		
Technical Assistance				10	16	26		
Physical Contingency				8	16	24		

Table K-3-3 (2) Breakdown of Unit Construction Cost

Sheet 2 of 5

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
(4) Mazoura Reg. to Lahoun Reg. per m				110	170	280	CB= 44m	
Remodelling	m^3	15	8	45	75	120	H = 4.82m	
Trimming	m^2	30	2	30	30	60	L = 82m	
Miscellaneous & Others				5	15	20		
Engineering & Administration				12	18	30		
Technical Assistance				10	16	26		
Physical Contingency				8	16	24		
(5) Lahoun Regulator to The End per m				40	60	100		
Remodelling	m^3	5	8	15	25	40		
Trimming	m^2	10	2	10	10	20		
Miscellaneous & Others				5	5	10		
Engineering & Administration				2	8	10		
Technical Assistance				3	7	10		
Physical Contingency				5	5	10		

Table K-3-3 (3) Breakdown of Unit Construction Cost

Sheet 3 of 5

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Improvement of Bahr Yusef Canal by Shortcut per m								
(1) Dairout Barrage to Manshat El Dahab Reg.per m				3,000	2,200	5,200		
Excavation	m^3	330	10	1,980	1,320	3,300		
Trimming	m^2	65	2	65	65	130		
Other Works				155	215	370		
Engineering & Administration				330	240	570		
Technical Assistance				290	200	490		
Physical Contingency				180	160	340		
(2) Manshat El Dahab Reg. to Sakoula reg. per m				3,000	2,200	5,200		
Excavation	m^3	330	10	1,980	1,320	3,300		
Trimming	m^2	64	2	64	64	128		
Other Works				156	216	372		
Engineering & Administration				330	240	570		
Technical Assistance				290	200	490		
Physical Contingency				180	160	340		
(3) Sakoula Reg. to Nazoura Reg. per m				2,900	2,200	5,100		
Excavation	m^3	320	10	1,920	1,280	3,200		
Trimming	m^2	60	2	60	60	120		
Other Works				120	260	380		
Engineering & Administration				310	240	550		
Technical Assistance				280	200	480		
Physical Contingency				210	160	370		

Table K-3-3 (4) Breakdown of Unit Construction Cost

Sheet 4 of 5

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (1,000 L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Construction of O/H Facilities								
(1)Discharge Calibration for Bahr Yusef per place				220,000	250,000	470,000		
Concrete lining 8m^3 X 50m	m^3	400	730	140,000	152,000	292,000		
Miscellaneous				10,000	18,000	28,000		
Other Works				10,000	10,000	20,000		
Engineering & Administration				24,000	27,000	51,000		
Technical Assistance				21,000	23,000	44,000		
Physical Contingency				15,000	20,000	35,000		
(2)Discharge Calibration for Branch Canal per m				70,000	70,000	140,000		
Concrete lining 7m^3 X 50 m	m^3	100	730	35,000	38,000	73,000		
Miscellaneous				5,000	2,000	7,000		
Other Works				10,000	10,000	20,000		
Engineering & Administration				7,000	8,000	15,000		
Technical Assistance				6,000	7,000	13,000		
Physical Assistance				7,000	5,000	12,000		

Table K-3-3 (5) Breakdown of Unit Construction Cost

Sheet 5 of 5

Description	Unit	Q'ty	Unit Cost(L.E.)	Amount (L.E.) F.C.	L.C.	Total	Remarks F.C.	L.C.
Remodelling & Trimming of Subbranch Canal per m								
(1) Improvement of Subbranch Canal per m				20	30	50		
Remodelling		3	8	9	15	24	3	5
Trimming	m^3	5	2	5	5	10		
Other Works				6	10	16		
(2) Improvement of Sub-Subbranch Canal per m				20	20	40		
Remodelling		2	8	8	10	16	3	5
Trimming	m^3	4	2	4	4	8		
Other Works				10	8	16		
Brick Wall per m^3				13	37	50		
Concrete block 25 X 12 X 6	pcs	33	200/1,000	2	5	7	20%	80%
Mortar		0.04		8	11	20	45%	55%
Mason	head	0.5		0	15	15		
Others				2	6	8		
Land Levelling per fed				600	400	1,000		
Land levelling per fed	m^3	70	13	560	350	910	8	5
Miscellaneous & Other Works				40	50	90		