Table F.8.2 Major Problems and Suggested Solutions given by Water District Engineers

Methodology: Questionnaire asking following relevant problems and probable solutions
1. Water Management
2. Environment
3. Administration
4. Executing irrigation related laws
5. Social and others

Questionees: Relevant 17 Water Districts' Engineers

Bahary Zifta (Gharbia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Submerged weeds • Some cross sections do not have the designed sessions	• Remove the weeds • Redesign and rehabilitate the sections
Environment	• Sewerage delivered into canals passing through residential areas • Domestic solid waste from residents inhabiting along canals	• Cover the reaches passing through the residential areas
Administration	• No trained gate keepers, workers, and field agents • No assistant to the district engineer	
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	
Social	• Illiteracy among the farmers • No cooperation from the farmers and ignorance of irrigation law	

Samanoud (Gharbia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Dilapidated Rahbeen regulator	• Rehabilitate the regulator
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Cover the reaches passing through the residential areas
Administration	• Few number of workers and gate keepers • Transportation for gate keepers • No assistant or alternatives to the district engineer • No cooperation from other governmental authorities	• Appoint more workers and gate keepers with enough training • Supply them with motor cycle • Appoint one more engineer • Strengthen the coordination among concerning authorities

Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation • Law suits concerning farmer's violation take long time at court	• Apply firm penalties • Arrange special sessions at the court for irrigation conflict
Social	• Ignorance and illiteracy among the farmers • No cooperation from the farmers and ignorance of irrigation law	• Enhance media role

Bithbeeth (Gharbia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation leading to water shortage during peak period	• Firm penalties to restrict the illegal rice cultivation
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Utilize media role and cove the reaches
Administration	• No trained gate keepers and workers	• Undertake training course for them
Irrigation law	• Law suits concerning farmer's violation take long time at court	• Arrange special courts for irrigation conflicts
Social	• Ignorance and illiteracy among the farmers • No cooperation from the farmers and ignorance of irrigation law	• Utilize media role

East El Mahallah (Gharbia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Violation for farmers concerning the date of a crop decided by agricultural authority, leading to water shortage	• Execute firm penalties
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes • Factories' wastes	• Cover the reaches • Apply firm penalties
Administration	• No trained gate keepers and workers • Not enough transportation and shortage of fuel	• Undertake training course • Arrange transportation and fuel
Irrigation law	• Law suits concerning farmer's violation take long time at court	• Fast the process
Social	• Ignorance and illiteracy among the farmers • No cooperation from the farmers and ignorance of irrigation law	• Enhance the media role

West El Mahallah (Gharbia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation leading to water shortage during peak period	• Firm penalties to restrict the illegal rice cultivation
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Cover the reaches • Apply firm penalties
Administration	• No trained gate keepers and workers	• Undertake training course
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Apply firm penalties

Social	• No cooperation from the farmers	• Enhance media role

Balteem (Kafr El Sheikh)

Category	Problems	Suggested Solutions
Water Management	• No water equity specially among directorate basis	• Form a committee from each directorate to decide sound water allocation
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Enhance the media role and appoint irrigation police
Administration	• Un-uniform distribution of workers and gate keepers among districts • No task force to undertake demolishing illegal construction	• Redistribute workers and gate keepers an increase salaries for workers in far district • Form task force and irrigation police under MPWWR
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Introduce firm penalties by law
Social	• No cooperation from the farmers	• Enhance media role

El Mansour (Kafr El Sheikh)

Category	Problems	Suggested Solutions
Water Management	• No equity for water distribution • Illegal rice cultivation	• Form committee to monitor water allocation form relevant directorates • Get agricultural authority monitor the cultivation
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage stations and cover the reaches
Administration	• No lawyer in the district to follow the law suits • No good communication between the engineer and gate keepers	• Appoint lawyer in every district • Supply the district with wireless phone
Irrigation law	• No defense from MPWWR to the district office when facing problems or law suits by farmers • No police under MPWWR to implement penalties	• Give the support from MPWWR • Form irrigation police
Social	• Illiteracy among farmers	• Enhance media role

El Hamoul (Kafr El Sheikh)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation, leading to water shortage • Congestion of day time irrigation and no night irrigation	• Coordinate between agricultural authority and irrigation authority • Enhance media role

Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage station
Administration	• No lawyer to monitor the law suits	• Appoint lawyer
Irrigation law	• No cooperation between police and district engineer	• Arrange irrigation police under MPWWR
Social	• No cooperation from the farmers	• Enhance media role

Beila (Kafr El Sheikh)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation, giving water shortage • Violation concerning the date of a crop cultivation decided by agricultural authority • Balteem and El Mansour are often compensated for the water shortage from this district • Congestion of day time irrigation and no night irrigation	• Modify the marketing strategy for rice • Let the farmers notify the actual cultivation to the agricultural authority • Increase Tera water allocation to compensate the shortage during low water level in Gharbia drain • Use Avia and Avio gate for night strage
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Cover the reaches passing through the residential areas
Administration	• No actual cropping pattern given by agricultural authority and poor cooperation among the agricultural and irrigation authority	• Merge the two ministries into one
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Apply firm penalties
Social		

El Hafir (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation, giving water shortage • Congestion of day time irrigation and no night irrigation	• Control illegal rice cultivation • Enhance media role
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage stations
Administration	• No task force to demolish illegal structures	• Appoint irrigation police under MPWWR
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Apply firm penalties
Social		

Basandila (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Congestion of day time irrigation and no night irrigation • No equity concerning water distribution • High bed level of irrigation structures (specially intake) • Illegal direct pumping • Poor control of gates • Unstable side slope	• Enhance media role • Arrange good rotation among canals • Replace the structures • Increase farmers' awareness for save water • Introduce automatic gates • Line the reaches
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage stations
Administration	• No trained gate keepers and workers • No task force to demolish illegal structures	• Undertake training course and rise the salaries
Irrigation law	• Law suits concerning farmer's violation take long time at court	• Arrange irrigation police under MPWWR
Social	• No cooperation from farmers	• Enhance media role

Bilqas (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Shortage water at downstream canals specially during summer • Illegal rice cultivation • Direct irrigation and many lifting points • Poor maintenance of private Meskas • Cultivated area scattered, requiring high level water management • Dilapidated regulator km9.0 on Shawamy canal	• Apply firm penalties • • Involve agricultural authorities • Rehabilitate the regulator
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes • No actual cropping pattern available, requiring coordination between agricultural and irrigation authorities	
Administration	• No trained gate keepers and workers	• Undertake training course
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation • Ignorance of law for the farmers	
Social	• Illiteracy among farmers • No cooperation from farmers	

El Maasara (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Shortage of water for downstream canals specially during summer • Violation concerning the date of a crop cultivation decided by agricultural authority • Congestion of day time irrigation and no night irrigation	• Undertake suitable irrigation schedule or improve the irrigation system • Apply firm penalties
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Cover the reaches passing through the residential areas
Administration	• No task force to demolish the illegal structures • No trained gate keepers and workers	• Form irrigation police under MPWWR • Arrange training course
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Apply firm penalties
Social		

Zahraa (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Illegal rice cultivation, leading to water shortage during summer season • Congestion of day time irrigation and no night irrigation practiced	• Apply firm penalties to the farmers • Involve media for carrying out night time irrigation
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage station and cover the reaches
Administration	• No task force to demolish illegal structures	• Form irrigation police under MPWWR
Irrigation law	• Weak penalties applied to the farmers practicing illegal opening, cultivation on banks, illegal direct irrigation	• Introduce firm penalties
Social		

Talkha (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Shortage of downstream canals specially during summer season • Direct irrigation and many lifting points • High bed elevation of intakes and some gates' malfunction • Some sections differ from designed ones • inequitable water distribution between canals and Meskas	• Rectify the irrigation schedule and maintenance the canals • Apply firm penalties to the farmers • Rehabilitate the intakes • Rehabilitate and line the sections • Redesign and improve the system
Environment	• Domestic solid wastes specially for Nasha and Taiba canals • Factories' wastes	• Cover the reaches • Apply Firm penalties

Administration	• Poor transportation • No trained gate keepers and workers	• Supply the district office with car and motorcycle • Undertake training course
Irrigation law	• No task force to demolish the illegal structures	• Appoint special police under MPWWR
Social	• No cooperation from farmers	• Involve media role

Sherbin (West Dakahlia Directorate)

Category	Problems	Suggested Solutions
Water Management	• Water shortage for downstream of Ras El Kjaleeg, Abou Galal, El Bank and Side Saleh • Violation for farmers concerning the date of a crop decided by agricultural authority, leading to water shortage • Illegal rice cultivation, giving load to water shortage	• Increase water allocated to Balamoun and coordinate with Damietta directorate to deliver water from Reg. 12 and Reg. 18 • Enhance media role • Enhance media role
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Cover the reaches
Administration	• No task force to follow the illegal rice cultivation	• Form a team to follow the illegal rice cultivation
Irrigation law	• No task force to demolish the illegal structures	• Form irrigation police under MPWWR
Social	• Illiteracy of farmers • No cooperation from farmers	• Enhance media role

Kafr Saad (Damietta Directorate)

Category	Problems	Suggested Solutions
Water Management	• Shortage of water at downstream of canals • Congestion of day time irrigation and no time irrigation • High bed elevation of intake and no poor gate maintenance • Violation for farmers concerning the date of a crop decided by agricultural authority, leading to water shortage	• Apply sound irrigation schedule • Enhance media role • Replace the intakes
Environment	• Sewerage into the canals passing through residential areas • Domestic solid wastes	• Construct sewerage stations and cover the reaches
Administration	• No trained gate keepers and workers	• Undertake training courses
Irrigation law	• Violation for farmers concerning the date of a crop decided by agricultural authority, leading to water shortage	• Include media role
Others		

Table F.9.1 Water District Based Canal Inventory (Directorate: Gharbia, Inspection: El Mahalla El Kubra, District: Bahary [illegible])

Main Canal	Branch Canal (Delivery)	Location km	Location Lt/Rt	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Siltage Summer	Siltage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Rahm Abbassa		0.0		0		Cont.																
Omar Pasha		0.0		23,626	13.73	Cont.													1	1	2	
	Directly from Omar Pasha			3,680		2&3	17	8,680	100													
	Omar Pasha Ganabia No.1 Left	3.0	L	2,050	3.60	2&3	6	1,630	78	1	1		N	Nil	Nil	2	1	1	1	1	1	
	El Sabaury El Nealy	5.0	L	1,700	5.64	2&3	6	1,700	100	1	1		N	Nil	Nil	2	1	1	2	1	1	
	Omar Pasha Ganabia No.2 Left	6.0	R	800	0.97	2&3	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Meet Badr	8.3	R	3,951	12.31	2&3	15	2,884	74	1	1		N	Nil	Nil	2	1	1	3	2	2	
Meet Badr	Meet Badr Ganabia	3.0	R	1,085	4.60	2&3	5	1,085	100	2	1	Domestic waste and weeds	N	Nil	Nil	2	1	1	1	2	1	
	[illegible] Ganabia	6.0	R	370	1.76	2&3	-		0	2	1	Domestic waste and weeds	N	Nil	Nil	2	1	1	1	2	1	
	Abou Seer	10.0	L	1,500	6.62	2&3	-		0	2	1	Domestic waste and weeds	N	Nil	Nil	2	1	1	1	2	1	
	Abou Seer Ganabia	10.0	R	800	3.78	2&3	-		0	2	1	Domestic waste and weeds	N	Nil	Nil	2	1	1	1	2	1	
Omar Pasha	El Yamany	13.0	End	2,140	10.08	2&3	12	2,140	100	1	1		N	Nil	Nil	2	1	1	3	2	1	
El Yamany	Meet Habeeb	3.0	R	1,300	3.84	2&3	7	900	72	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Manial El Tarmal	6.0	R	1,000	3.00	2&3	5	375	38	1	1		N	Nil	Nil	2	1	1	1	1	1	
	El Yamany Waste	6.6	L	500	1.40	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	2	1	
	Mahallet Tarmal El Mahallah	7.0	L	1,760	5.74	2&3	10	1,640	84	2	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	1	
	El Mahgoury	8.5	L	1,760	2.80	2&3	2	190	11	2	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	1	
Dahtoura Ganabia		0.0		2,000	9.50	2&3	21	2,000		2	1	Domestic waste	N	Nil	Nil	1	1	1	1	3	1	
Bahr Shershaba				7,160	6.50	2&3													1	2		Intakes from upstream of C.A
	Directly from Bahr Shershaba			1,750		2&3	10	1,750	100	1	1		N	Nil	Nil							
	[illegible] Ganabia No.3 R	6.2	L	550	4.75	2&3	-		0	1	1		N	Nil	Nil	2	1	1	No gate	1	1	
	Abou Diab	6.9	R	1,800	4.36	2&3	7	600	33	2	1	Submerged weed	N	Nil	Nil	2	1	1	1	2	1	
	El Sabaury El Sakty	8.9	L	3,000	7.10	2&3	2	300	11	2	1		N	Nil	Nil	2	1	1	3	2	1	
Bahr Shebin				8,970		Cont.																
	Ganabia No.4 Right	14.0	R	200	2.27	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.5 Right	16.0	R	180	1.66	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.6 Right	18.3	R	450	1.75	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.6 Right	18.7	R	400	1.55	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.7 Right	22.0	R	600	2.14	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	[illegible] Ganabia	24.0	R	1,700	4.90	2&3	7	1,173	69	1	1		N	Nil	Nil	2	1	1	3	1	1	
	[illegible] Ganabia	26.0	R	1,000	3.97	2&3	4	880	88	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Ganabia No.9 Right	28.0	R	600	1.39	2&3	-		0	1	1		N	Nil	Nil	2	1	1	2	1	1	
	Kafr Hegazy Ganabia No.1	28.5	R	200	1.17	2&3	1	180	65	1	1		N	Nil	Nil	2	1	1	2	1	1	
	Hawd El Sahara	31.0	R	2,040	4.60	2&3	10	1,800	90	2	1	Illegal rice cultivation	N	Nil	Nil	3 (F)	1	1	2	2	1	
	El Dadamy	32.0	R	1,660	5.79	2&3	9	1,620	98	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	1	2	4	1	
El Badrawy	Kafr Hegazy Ganabia No.2	0.1	L	570	1.98	2&3	1	100	18	1	1		N	Nil	Nil	2	1	1	1	2	1	
Total Area Served				42,996																		43,290 (given by the Directorate)

Table F.9.2 Water District Based Canal Inventory (Directorate: Gharbia, Inspection: El Mahallah El Kubra, District: Samanoud)

Main Canal	Branch Canal (Delivery)	Location km	Location Lt/Rt	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Siltage Summer	Siltage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr El Malah	Batra		R	1,300	4.37	2&3	4	650	50	3		Flash bed erosion	N	Nil	Nil	2	1	1	3	2	1	
Bahr Shebin				16,470		Cont.																
	El Kawrieh	37.4	L	4,660	13.80	2&3	17	2,160	44	3	1	Illegal rice cultivation	N	Nil	Nil	2	1	1	1	2	2	
El Kawrieh	Hassan Agha	8.8	L	550	2.40	2&3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
Bahr Shebin	Ganabia No.1 El Gharbia Left	37.4	L	800	4.00	2&3	-		0	1	1		N	Nil	Nil	2 (F)	1	1	1	2	2	
	El Nesha	37.4	R	2,300	6.90	2&3	5	1,200	62	1	1		N	Nil	Nil	2 (F)	1	1	1	1	1	
	Ganabia No.1 El Sharkia Right	37.4	R	1,670	4.60	2&3	1	310	19	1	1		N	Nil	Nil	1	1	1	3	2	2	
	Ganabia No.2 El Gharbia Left	41.3	L	5,200	3.60	2&3	6	600	12	1	1		N	Nil	Nil	2 (F)	1	1	3	1	1	
	Ganabia No.3 El Gharbia Left	42.0	L	2,000	4.00	2&3	-		0	1	1		N	Nil	Nil	1	1	1	3	1	1	
	Ganabia No.2 El Sharkia Right	42.0	R	1,000	4.60	2&3	6	650	65	1	1		N	Nil	Nil	3 (F)	1	1	3	1	1	
El Sahel		36.6		4,020		Cont.																
	Directly from El Sahel			1,460		2&3	6															
	El Trabarta	3.3	R	460	2.60	2&3	-		0	1	1		N	Nil	Nil	1	1	1	1	1	1	
	Meet Assas	6.7	R	1,800	6.80	2&3	4	600	33	1	1		N	Nil	Nil	2	1	1	1	2	2	
	Sahboot	7.7	R	1,530	7.10	2&3	6	1,000	65	3	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	2	
Sahboot	El Nawa	2.1	R	1,760	3.35	2&3	9	1,100	63	1	1		N	Nil	Nil	3 (F)	1	1	1	1	1	
El Sahel	El Mahtas	7.9	R	1,000	1.75	2&3	-		0	1	1		N	Nil	Nil	2 (F)	1	1	No gate	2	1	
Total Area Served				27,790																		25,000 (given by the Directorate)

Note: 1=rare, 2=often, 3=very often, 4=always Y=yes, N=no, N=negligible
Note: Tail Condition [1=Stop or nothing, 2=Tail escape, 3=Aqueduct, F=Feeder], Siltage [1=Negligible, 2=Often, 3=Very often], Intake Condition [1=Good, 2=Repair, 3=Replacement]
Note: Domestic Waste [1=Little, 2=Considerable amount, 3=Much], Washing [1=Rare, 2=Often]

Table F.8.2 Water District Based Canal Inventory (Directorate: Gharbia, Inspection: El Mahallah El Kubra, District: [illegible])

3/27

Main Canal	Branch Canal (Delivery)	Location km	Location L/R/Wtr	Area Ser. feddan	Length km	Relation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Garbage Summer	Garbage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr El Mallah				38,190	13.90	Cont.															2	
	Directly from Bahr El Mallah	33.3	L	6,770		2&3	15															Location of the intake
	West El Sorus	10.8	R	3,570	11.57	2&3	14	2,301	65	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	2	1	1	2	
West El Sorus	El Sanadw El Kebir	3.5	L	750	2.30	2&3	3	400	53	2	1	Illegal rice cultivation & waste	N	Nil	Nil	3 (F)	1	1	1	2	2	
	Hoteh El Gamal	3.5	L	850	2.70	2&3	2	220	26	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	1	1	2	2	
	Lamama	6.0	L	1,780	4.37	2&3	8	1,460	82	2	1	Illegal rice cultivation & waste	N	Nil	Nil	3 (F)	1	1	1	1	2	
Bahr El Mallah	El Sangary	12.0	R	1,360	3.66	2&3	5	830	61	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	1	1	1	2	
	El Rasa	17.6	L	1,300	2.96	2&3	6	595	46	2	1	Illegal rice cultivation & waste	N	Nil	Nil	3 (F)	1	1	1	3	2	
	Barbasah	21.4	R	2,800	6.27	2&3	6	1,080	39	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	1	1	1	2	
	Santawra	21.4	R	950	3.17	2&3	2	300	32	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	1	1	2	2	
	Shatty	23.0	R	2,850	5.30	2&3	8	1,290	45	2	1	Illegal rice cultivation & waste	N	Nil	Nil	2	1	2	1	1	2	
	Tantawra El Gadida	24.2	L	1,650	8.00	2&3	5	210	13	2	1	Illegal rice cultivation & waste	N	Nil	Nil	3 (F)	1	1	1	1	2	
	East Tantawra Q. El Gharbia	24.5	R	4,180	11.43	2&3	10	2,180	52	3	1	Illegal rice cultivation & waste	N	5%	Nil	2	1	1	1	2	2	
	West Tantawra Q. El Gharbia	24.5	L	6,880	11.60	2&3	8	2,800	38	3	1	Illegal rice cultivation & waste	N	5%	Nil	2	1	1	1	2	2	
West Tantawra Q. El Gharbia	Dakhmeas	2.9	L	1,650	4.20	2&3	4	372	20	3	1	Illegal rice cultivation & waste	N	5%	Nil	2	1	1	1	1	2	
	Shabshy	3.8	L	1,900	4.10	2&3	5	594	31	3	1	Illegal rice cultivation & waste	N	3%	Nil	2	1	1	1	1	2	
	Damarah	6.7	L	1,200	3.85	2&3	-		0	3	1	Illegal rice cultivation & waste	N	5%	Nil	2	1	1	1	1	2	
Total Area Served				38,190																		38,190 (given by the Directorate)

Table F.8.2 Water District Based Canal Inventory (Directorate: Gharbia, Inspection: El Mahallah El Kubra, District: East El Mahallah)

4/27

Main Canal	Branch Canal (Delivery)	Location km	Location L/R/Wtr	Area Ser. feddan	Length km	Relation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Garbage Summer	Garbage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Shebin						Cont.																
El Mahallah		30.2	L	4,880	6.32	2&3	2	200	4							2	1	1	1	1	1	from Bahr Shebin
	Directly from El Mahallah			1,100		2&3				1	1		N	Nil	Nil					2		
El Mahallah	Belet	1.6	R	460	1.54	2&3	-		0	1	1		N	Nil	Nil	1	1	1	1	1	1	
	El Amarieh	2.8	R	3,000	10.20	2&3	18	1,620	46	1	1		N	Nil	Nil	2	1	1	1		1	
Bahr Shebin				2,776		Cont.																
	Ganabia No.3 Left (A)	31.5	L	276	1.46	2&3	3	230	84	1	1		N	Nil	Nil	1	1	1	1	1	1	
	El Mallah Ganabia Left	33.2	L	1,300	4.28	2&3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
El Mallah Ganabia Left	El Barg	8.0	L	1,100	5.40	2&3	4	100	9	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
El Barg	West El Laith El Kadim	9.4	L	60	3.00	2&3	1	60	100	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
West El Laith Kadim	Bahr El Masah El Kadim	3.0	Ext.	60	3.00	2&3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
Bahr El Mallah		33.2	L	24,590	10.20	2&3	3	1,050	4										1	1	1	from Bahr Shebin
	Directly from Bahr El Mallah			4,520																		
Bahr El Mallah	Bahr El Masah El Gadid	5.8	L	655	4.60	2&3	6	655	100	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
Bahr El Masah El Gadid	West Laith El Gadid	2.4	R	3,600	5.88	2&3	20	3,600	99	1	1		N	Nil	Nil	2	1	1	1	1	1	
	El Ferouhia	3.6	L	1,400	5.70	2&3	4	1,400	100	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Sandiseen	1.1	R	7,000	11.66	2&3	29	600	9	2	1	Illegal rice cultivation	N	5%	Nil	2	1	1	1	1	1	
Sandiseen	El Rawateb	4.7	L	1,600	8.67	2&3	9	1,360	84	2	1		N	Nil	Nil	2	1	1	1	1	1	
Bahr El Masah El Gadid	El Sarwal	4.1	R	7,600	14.82	2&3	52	7,600	100	2	1		N	5%	Nil	2	1	1	1	1	1	
Bahr Shebin	Ganabia No.3 Left, area (B)	31.6	L	120	1.00		-			2	1		N	Nil	Nil	1	1	1	1	1	1	
Total Area Served				34,345																		34,345 (given by the Directorate)

Note: 1=Rare, 2=Often, 3=Very often, 4=Always   Y=yes, N=no, Nil=negligible
Note: Tail Condition [1=Flow or nothing, 2=Tail escape, 3=Regulator, 4=Feeder], Garbage [1=negligible, 2=Often, 3=Very often], Intake Condition [1=Good, 2=Repair, 3=Replacement]
Note: Domestic Waste [1=Little, 2=Considerable amount, 3=Much], Washing [1=Rare, 2=Often]

Table F.6.3 Water District Based Canal Inventory (Directorate: Gharbia, Inspectorate: El Mahallah El Kubra, District: West El Mahallah)

5/17

Main Canal	Branch Canal (Delivery)	Location km	Lt/Rht	Area (fed.) feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Karashia Ganabia			L	21,100	23.13	2 & 3										1 (F)	1	1	1	2	2	
	Directly from El Karashia Ganabia			2,000		2 & 3						If shortage, it's illegal rice.										
	Abou Wafa	23.1	R	800	0.14	2 & 3	1	350	44	1	1	do	N	Nil	Nil	1 (F)	1	1	2	2	2	
Abou Wafa	Safiana	6.0	L	4,000	12.80	2 & 3	18	3,630	91	1	1	do	N	Nil	Nil	3 (F)	1	1	1	2	2	
	Nawara	6.0	L	2,550	3.38	2 & 3	2	1,000	39	1	1	do	N	Nil	Nil	3 (F)	1	1	1	2	2	
Nawara	El Mak	1.8	L	760	3.20	2 & 3	1	400	50	1	1	do	N	Nil	Nil	2	1	1	1	2	1	
El Karashia Ganabia	El Hayatem	23.1	L	8,000	13.88	2 & 3	10	7,015	88	1	1	do	N	Nil	Nil	3 (F)	1	1	1	2	2	
El Hayatem	El Nasria	1.7	L	2,000	4.15	2 & 3	5	1,100	55	1	1	do	N	Nil	Nil	2	1	1	1	1	1	
	Lakaheet	9.2	L	1,000	2.40	2 & 3	1	500	50	1	1	do	N	Nil	Nil	3 (F)	1	1	1	1	1	
Bahr Shebin				2,360																		
	Ganabia No.5 Left	21.2	L	760	2.20	2 & 3	-		0	1	1	do	N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.6 Left	23.6	L	960	2.80	2 & 3	-		0	1	1	do	N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.7 Left	26.5	L	600	3.30	2 & 3	-		0	1	1	do	N	Nil	Nil	2	1	1	1	1	1	
Total Area Served				23,400																		46,000 (whole West Mahallah)

Table F.6.3 Water District Based Canal Inventory (Directorate: Kafr El Sheikh, Inspectorate: Sidi Salem, District: Rafiaya)

6/17

Main Canal	Branch Canal (Delivery)	Location km	Lt/Rht	Area (fed.) feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Tera				37,605	18.00	Cont.																
	Directly from Bahr Tera			10,800		2 & 3	18															
	El Magaz	47.1	R	3,600	5.90	2 & 3	8	2,100	60	2	1	Not enough water allocation				3 (F)	1	2	2	2	2	Irrigated by drainage only (total 4,700)
El Magaz	El Magaz Branch	1.4	R	1,200	3.00	2 & 3	4	900	67	2	1	do	Y	Nil	Nil	1 (F)	1	1	3	2	2	Irrigated by drainage only
Bahr Tera	Branch No.1 Left Tera	47.7	L	1,300	2.50	2 & 3	3	1,000	77	1	1		Y	Nil	Nil	2	1	1	2	2	2	
	Branch No.2 Left Tera	50.6	L	1,300	2.40	2 & 3	8	1,100	85	1	1		Y	Nil	Nil	3 (F)	1	2	2	2	2	
	Branch No.3 A Tera	52.0	L	905	2.40	2 & 3	5	700	77	1	1		Y	Nil	Nil	3 (F)	1	2	2	2	2	
	Branch No.4 Tera	53.4	L	1,380	2.50	2 & 3	4	900	67	1	1		Y	Nil	Nil	3 (F)	1	2	2	2	2	
	El Helmia	53.4	R	700	1.50	2 & 3	4	600	86	1	1		Y	Nil	Nil	1 (F)	1	1	3	2	2	
	El Khashaa	54.0	L	1,300	7.80	2 & 3	11	1,100	85	3	1	Not enough water allocation	Y	Nil	Nil	1 (F)	1	1	2	2	2	Irrigated by drainage only (total 3,250)
El Khashaa	Branch No.1 (A) Left	3.4	R	1,950	1.80	2 & 3	11	1,800	92	3	1	do	Y	Nil	Nil	3 (F)	1	2	2	2	2	Irrigated by drainage only
Bahr Tera	Ganabia El Wasphat	58.6	L	800	2.70	2 & 3	4	600	75	3	1	do	Y	Nil	Nil	1	1	1	2	2	2	
	Ganabia El Gharbia	60.0	R	1,500	8.00	2 & 3	11	1,100	73	4	2	do	Y	Nil	Nil	1	1	1	2	2	2	
	Branch No.1 (A) Right El Khashaa	61.4	R	1,600	2.80	2 & 3	16	1,300	81	3	1	do	Y	Nil	Nil	2	1	1	2	2	2	
	Branch No.2 El Khashaa	63.0	R	1,400	2.80	2 & 3	13	1,250	89	3	2	do	Y	Nil	Nil	2	1	1	2	2	2	
	Bathorn	64.8	R	2,000	1.00	2 & 3	7	1,300	65	4	3	do	Y	Nil	Nil	2	1	1	2	2	2	
Bathorn	El Sheikh El Mabarak	2.8	L	1,000	1.50	2 & 3	8	650	65	4	3	do	Y	Nil	Nil	1	1	1	2	2	2	
El Sheikh El Mabarak	El Mabarak Branch	1.3	R	1,000	2.40	2 & 3	5	600	60	4	3	do	Y	Nil	Nil	1	1	1	2	2	2	
Bahr Tera	West Ganabia	65.0	R	3,000	7.14	2 & 3	4	2,200	73	4	3	do	Y	Nil	Nil	1	1	1	2	2	2	
West Ganabia	El Rahma	4.9	R	1,000	3.00	2 & 3	2	650	65	4	3	do	Y	Nil	Nil	1	1	1	3	2	2	
Total Area Served				37,605																		38,300 (given by the Directorate)

Note: 1=rare, 2=often, 3=very often, 4=always   Y=yes, N=no, Nil=negligible
Note: Tail Condition (1=Dry or nothing, 2=Tail escape, 3=Aquaduct, F=Feeder), Spillage (1=Negligible, 2=Often, 3=Very often), Intake Condition (1=Good, 2=Repair, 3=Replacement)
Note: Domestic Waste (1=Little, 2=Considerable amount, 3=Much), Washing (1=Rare, 2=Often)

Table F.9.3 Water District Based Canal Inventory (Directorate: Kafr El Sheikh, Inspection: Biyala, District: El Mansour)

Main Canal	Branch Canal (Delivery)	Location km	Location Lft/Rht	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Mansour		37.4		46,700	24.10	2&3				4	2	Not enough water allocation & Harhoul MPS shortage	Y	Nil	Nil	2	1	1	1	1	1	Km from intake of Bahr Tera
	Directly from El Mansour			5,300		2&3	34															
	El Khaleeg	2.5	L	6,000	17.60	2&3	9	1,460	31	4	2	do	Y	Nil	Nil	2	1	1	1	1	1	Km from intake of Mansour
El Khaleeg	El Khaleeg Branch	1.0	R	1,000	2.21	2&3	-		0	3	2	do	Y	Nil	Nil	1	1	1	3	1	1	
	Kom El Tean	8.5	L	3,500	8.90	2&3	4	1,680	47	3	2	do	Y	Nil	Nil	2	1	1	3	1	1	
Kom El Tean	Kom El Tean Branch	3.6	R	2,000	2.85	2&3	6	1,200	60	3	3	do	Y	Nil	Nil	2	1	1	1	1	1	Km from intake of Kom El Tean
	El Bashrah	8.6	R	3,200	4.90	2&3	10	2,100	66	4	3	do	Y	Nil	Nil	2	1	1	No gate	1	1	
El Mansour	Ganabia No.2 Right Mansour	2.6	R	1,300	6.50	2&3	-		0	2	1	do	Y	Nil	Nil	1 (F)	1	1	3	1	1	
	Ganabia No.2 Left Mansour	2.0	L	1,500	5.40	2&3	-		0	2	1	do	Y	Nil	Nil	1 (F)	1	1	1	1	1	
	El Hallas	8.8	L	7,000	10.50	2&3	22	8,200	74	4	2	do	Y	Nil	Nil	2	1	1	2	1	1	
	Kom El Nasf	8.8	R	1,500	2.11	2&3	6	1,000	67	2	1	do	Y	Nil	Nil	1	1	1	2	1	1	
	Kom Abo Hallaf	11.6	R	1,800	4.50	2&3	5	1,050	58	3	2	do	Y	Nil	Nil	2	1	1	1	1	1	
	Kataa El Zaiat	16.7	L	3,900	1.80	2&3	6	1,460	37	2	1	do	Y	Nil	Nil	1 (F)	1	1	3	1	1	
Kataa El Zaiat	Kom El Bortoh	4.6	R	3,100	7.00	2&3	12	1,500	48	4	3	do	Y	Nil	Nil	2	1	1	1	1	1	
El Mastaba	El Mastaba	15.7	R	1,200	2.00	2&3	2	500	42	2	1	do	Y	Nil	Nil	3 (F)	1	1	1	1	1	
El Malahah	El Gadiah	1.5	L	2,000	6.75	2&3	11	1,750	88	3	2	do	Y	Nil	Nil	2	1	1	1	1	1	
El Gadiah	Branch No.1	2.1	R	1,000	1.00	2&3	1	200	20	3	2	do	Y	Nil	Nil	3 (F)	1	1	2	1	1	
	Branch No.2	4.7	R	400	1.00	2&3	-		0	3	2	do	Y	Nil	Nil	3 (F)	1	1	3	1	1	
													Y	Nil	Nil							
Total Area Served				46,700																		47,500 (given by the Directorate)

Table F.9.3 Water District Based Canal Inventory (Directorate: Kafr El Sheikh, Inspection: Biyala, District: Hamoul)

Main Canal	Branch Canal (Delivery)	Location km	Location Lft/Rht	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Tera	Before rising			30,666	14.00	Cont.																Length in the District
	Directly from Bahr Tera			3,100		2&3																
	El Kafr El Sharkia	31.5	L	1,425	7.08	2&3	4	800	56	1	1		N	10%	5%	2	1	1	3	2	2	
	El Banawan El Aafai	31.2	R	5,000	12.30	2&3	19	3,142	63	2	2	Located at tail end of Banawan	N	Nil	Nil	3 (F)	1	1	1	2	2	
El Banawan El Aafai	Banawan Branch	6.6	L	2,000	3.90	2&3	6	890	45	2	1	do	N	Nil	Nil	1	1	1	1	2	2	added during F/S
	Rashid Basha	31.7	R	2,050	5.50	2&3	7	632	31	3	2	Long canal	N	Nil	Nil	1	1	1	1	2	2	
	El Mahalla	31.7	L	2,500	2.57	2&3	8	500	20	1	1		N	Nil	Nil	1	1	1	3	2	2	
	Ganabia No.7 Left	31.8	L	1,150	3.25	2&3	3	423	37	2	1	Direct irrigation & Congestion	N	Nil	Nil	1 (F)	1	1	1	2	2	
	Ganabia No.10 Right	31.8	R	600	2.48	2&3	-		0	3	2	High (bed) level of intake	N	Nil	Nil	1 (F)	1	1	3	1	1	
	Zoban	34.0	R	3,800	8.15	2&3	13	1,806	48	2	2	Long canal	N	Nil	Nil	1	1	1	1	1	1	
	El Waida	38.5	R	1,000	5.60	2&3	-		0	3	2	not specified	Y	Nil	Nil	1 (F)	1	1	1	1	1	
El Waida	El Waida Branch	6.2	L	850	3.50	2&3	-		0	3	1	do	Y	Nil	Nil	1	1	3	1	1	1	Irrigated by drainage only (total 6,600)
	El Wasta	6.6	[illegible]	3,850	6.00	2&3	2	760	20	2	2	do	Y	Nil	Nil	1	1	3	1	2	2	Irrigated by drainage only
Bahr Tera	Ganabia No.1 Right Hamoul	35.5	R	3,000	8.20	2&3	-		0	3	2	do	N	Nil	Nil	1 (F)	1	1	1	2	1	
	Ganabia No.1 Left Hamoul	35.5	L	330	1.65	2&3	-		0	2	2	do	N	Nil	Nil	1 (F)	1	1	1	2	2	
Bahr Tera	After rising			11,300																		
	Ganabia No1. Left Mansour	37.4	L	700	2.60	2&3	1	360	50	2	1	do	Y	Nil	Nil	2 (F)	1	1	1	1	1	
	Ganabia No1 Right El Mansour	37.4	L	1,300	8.60	2&3	1	250	19	2	1	do	Y	Nil	Nil	2 (F)	1	1	1	2	1	
	Ganabia Left Hamoul B	37.4	L	1,800	3.75	2&3	2	1,100	61	2	2	do	Y	Nil	Nil	1 (F)	1	1	1	1	1	
Ganabia Left Hamoul B	El Shoma	0.4	L	1,300	2.56	2&3	-		0	3	2	do	Y	Nil	Nil	1	1	3	2	2	2	
Bahr Tera	Ganabia No.2 Right Hamoul	41.0	R	1,800	3.70	2&3	1	186	10	2	1	do	Y	Nil	Nil	1 (F)	1	1	1	1	1	
	Ganabia No.2 Left Hamoul	41.1	L	1,700	3.75	2&3	-		0	2	1	do	Y	Nil	Nil	1	1	1	1	1	2	
	El Thalathoon	44.7	R	1,200	1.40	2&3	1	370	31	3	2	do	Y	Nil	Nil	1 (F)	1	1	1	2	1	Irrigated by drainage only
	Ganabia No.3 Right Hamoul	46.6	R	1,000	3.75	2&3	1	360	36	3	2	do	Y	Nil	Nil	1 (F)	1	1	1	2	1	
	Abo Soliman	46.5	R	700	2.15	2&3	3	450	64	2	1	do	Y	Nil	Nil	1 (F)	1	1	1	1	1	Irrigated by drainage only
Total Area Served				41,865																		39,200 (given by the Directorate)
	Note: Renamed during Feasibility Study																					

Note: 1=rare, 2=often, 3=very often, 4=always; Y=yes, N=no, Nil=negligible
Note: Tail Condition [1=Slow or nothing, 2=Tail escape, 3=Aqueduct, 4=Feeder], Spillage [1=Negligible, 2=Often, 3=Very often], Intake Condition [1=Good, 2=Repair, 3=Replacement]
Note: Domestic Waste [1=Little, 2=Considerable amount, 3=Much], Washing [1=Rare, 2=Often]

Table F.8.3 Water District Based Canal Inventory (Directorate: Kafr El Sheikh, Inspection: Biyala, District: Biyala)

Main Canal	Branch Canal (Delivery)	Location km	Location L/R/Wht	Area (ser., feddan)	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% by Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Tera		47.2		44,646	31.60	Cont.													1			Km from El Alexan
	Directly from Bahr Tera			4,750		2 & 3																Km from intake of Bahr Tera
	Ganabia No.7 Right	1.0	R	1,400	2.80	2 & 3	7	676	48	1	3	Low water level of Tera	N	Nil	Nil	1 (F)	1	1	1	1	2	
	Ganabia No.2 Left	6.2	L	640	3.62	2 & 3	3	400	62	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Ganabia No.3 Right	7.0	R	680	0.51	2 & 3	4	400	83	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Fada	10.8	L	1,660	3.90	2 & 3	12	1,467	88	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.4 Right	10.8	R	1,440	2.67	2 & 3	8	1,026	71	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Ganabia No.3 Left	11.8	L	300	0.75	2 & 3	1	300	100	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Bahr Biyala	11.8	R	6,470	13.80	2 & 3	28	6,187	95	4	1	Illegal rice & long canal (11.8km)	Y*	Nil	Nil	1	1	1	1	2	1	
Bahr Biyala	Bahr Biyala & El Nour	0.0	R	1,150	1.65	2 & 3	4	307	27	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	El Agamy	0.9	R	850	4.44	2 & 3	2	120	14	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Bahr El Nour	1.2	R	4,000	7.39	2 & 3	20	2,176	54	1	1		N	Nil	Nil	1	1	1	1	1	1	
	Tahwwelah Bahr Biyala	3.3	R	1,320	1.35	2 & 3	1	300	23	2	1	Long Maskas & weeds	N	Nil	Nil	1	1	1	1	3	1	
	El Shareia	3.8	R	840	4.82	2 & 3	3	260	31	2	1	long Maskas & illegal rice cultivation	N	2%	Nil	1	1	1	1	1	1	
	Hassan	7.2	L	760	2.78	2 & 3	1	100	13	1	1		N	Nil	Nil	3 (F)	1	1	1	2	1	
Bahr Tera	Ganabia No.4 Left	13.5	L	1,850	3.94	2 & 3	4	680	38	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Ganabia No.8 Right	13.6	R	1,150	3.88	2 & 3	4	820	71	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	El Shorbagiah	16.2	R	1,712	4.49	2 & 3	9	964	56	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Akahan	17.4	L	3,750	17.00	2 & 3	12	1,500	40	4	1	Long canal (17.4 km)	N	10%	Nil	1 (F)	1	1	1	2	1	
Akahan	Kom El Hagra	2.2	L	700	5.34	2 & 3	2	450	64	1	1		N	Nil	Nil	1 (F)	1	1	1	2	1	
Bahr Tera	El Hessen	17.4	L	2,880	8.39	2 & 3	16	1,609	56	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
	Marzouk	24.4	R	1,000	3.18	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Ganabia No.7 Right	25.4	R	480	0.94	2 & 3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	1	1	1	
Total Area Served				68,505								Y* Small MPS (Working in June&July, 10hours per day)										36,000 (given by the Directorate)
	Note; Reexamined during Feasibility Study																					

Table F.8.3 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Wigas, District: Hefz)

Main Canal	Branch Canal (Delivery)	Location km	Location L/R/Wht	Area (ser., feddan)	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% by Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Nile		13.1		11,621	22.76	2 & 3				2	1	Illegal rice cultivation & congestion during day time only irrigation	N	Nil	Nil	1 (F)	1	1	1	1	2	Km from intake of Bahr Hafir
	Directly from El Nile			6,340		2 & 3	4	500	8													
	El Naka	16.3	L	2,600	2.30	2 & 3	1	150	6	2	1		N	Nil	Nil	2	1	1	1	1	2	Km from intake of El Nile
	Amar	20.2	L	2,781	2.76	2 & 3	3	300	13	2	1	do	N	Nil	Nil	2	1	1	1	1	2	
El Esiah		4.6	L	16,961	9.06	2 & 3				2	1	do	N	Nil	Nil	2 (F)	1	1	1	1	2	Km from intake of Nile
	Directly from El Esiah			3,036		2 & 3	2	300	10													
El Esiah	Koum El Tabn	2.3	R	3,500	7.20	2 & 3	3	500	14	2	1	do	N	Nil	Nil	2	1	1	1	1	2	
	El Nahasin	4.4	R	4,200	8.00	2 & 3	2	250	6	3	1	do	N	Nil	Nil	2	1	1	1	1	2	
	Basir	6.6	R	4,026	9.20	2 & 3	2	200	5	3	1	do	N	Nil	Nil	2	1	1	1	1	2	
	El Drofeel	8.5	R	4,216	11.37	2 & 3	3	360	9	2	1	do	N	Nil	Nil	2	1	1	1	1	2	
				30,602																		30,602 (given by the Directorate)

Note: 1=rare, 2=often, 3=very often, 4=always. Y=yes, N=no, Nil=negligible
Note: Tail Condition [1=Glass or nothing, 2=Tail escape, 3=Aqueduct, F=Feeder], Spillage [1=negligible, 2=Often, 3=Very often], Intake Condition [1=Good, 2=Repair, 3=Replacement]
Note: Domestic Waste [1=Little, 2=Considerable amount, 3=Much], Washing [1=Rare, 2=Often]

Table F.8.3 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Bilqas, District: Bassandila)

11/17

Main Canal	Branch Canal (Delivery)	Location km	Location L/R	Area Served feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. reuse Summer	Unofficial D. reuse Winter	Tail Condition	Siltage Summer	Siltage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Shebin				3,024		Cont.														1		Km from intake of Rayah El Abassi
	Tosan Ganabia El Yaumia	65.8	R	1,085	3.85	2 & 3	3	500	40	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Tosan Ganabia El Yousra	65.8	L	1,300	5.40	2 & 3	2	200	16	1	1		N	Nil	Nil	2	1	1	3		1	
Bahr Bassandila		69.8		64,137	34.50	Cont.																Km from intake of Rayah El Abassi
	Directly fr Bassandila			8,027		2 & 3																
	Meet Zarkar Ganabia	4.0	R	1,300	2.78	2 & 3	1	200	15	1	1		N	Nil	Nil	2	1	1	3	2	2	Km from intake of Bahr Bassandila
	El Gawadia Ganabia	5.4	L	440	3.66	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	2	2	
El Gawadia Ganabia	El Tahwelah	1.0	L	510	2.50	2 & 3	2	200	39	1	1		N	Nil	Nil	2	1	1	1	1	1	
Bahr Bassandila	Thabet Ganabia	8.7	R	580	2.40	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Ganayia	8.1	L	1,800	6.50	2 & 3	2	300	17	2	1	Illegal direct pumping	N	5%	5%	2	1	1	1	1	2	
	Menshaat Bassandila Ganabia	8.3	R	850	2.80	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	El Ahmadia	10.4	L	1,270	8.40	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	2	2	2	
	Kom El Dika Ganabia	10.8	L	1,800	3.72	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	2	2	1	
	El Khat	12.9	R	800	2.95	2 & 3	1	100	10	1	1		N	Nil	Nil	2	1	1	1	2	1	
	Om Shiney	13.9	L	1,100	6.20	2 & 3	4	500	46	1	1		N	Nil	Nil	2	1	1	No gate	2	1	
	El Ramla	13.2	L	3,500	11.90	2 & 3	-		0	3	1	High bed level & Illegal direct pumping	N	2%	2%	2	1	1	1	2	2	
	El Gharaba Ganabia A	14.0	L	850	1.30	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	2	1	
	El Kheda	14.7	R	2,905	7.46	2 & 3	3	600	21	2	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	2	
	El Fawal El Ola	14.9	R	1,605	6.20	2 & 3	1	500	31	2	1	Domestic waste	N	10%	Nil	2	1	1	1	2	2	
	El Sawaki	16.6	L	577	6.40	2 & 3	2	100	17	1	1		N	Nil	Nil	2	1	1	1	2	1	
El Samaki	El Gharaba Ganabia B	0.0	R	923	1.30	2 & 3	1	100	11	1	1		N	Nil	Nil	2	1	1	3	2	1	
Bahr Bassandila	Bahr El Samar, Left	16.8	L	8,000	6.40	2 & 3	3	400	7	2	1	High bed level & domestic waste	N	5%	Nil	2	1	1	1	2	2	
	Bahr El Samar El Aiman, Right	16.6	L	3,840	14.97	2 & 3	4	600	21	3	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	2	
Bahr El Samar, Right	Om Arad	8.6	L	400	1.90	2 & 3	2	100	13	3	1	Domestic waste	N	Nil	Nil	2	1	1	2	2	1	
	El Mansura	10.2	R	1,331	3.80	2 & 3	1	70	5	3	1	Domestic waste	N	Nil	Nil	2	1	1	2	1	2	
Bahr Bassandila	El Haj Sharkawy Ganabia	16.6	L	990	4.20	2 & 3	1	600	66	2	1	Domestic waste	N	Nil	Nil	2	1	1	1	2	1	
	Abo Sead Ahmed Ganabia	21.0	L	900	2.20	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	2	1	
	Abo Zaher	22.0	R	535	4.38	2 & 3	1	300	56	1	1		N	Nil	Nil	2	1	1	1	2	2	
Abo Zaher	El Fawal El Ola Extension	2.2	L	596	1.23	2 & 3	1	600	10	1	1		N	Nil	Nil	2	1	1	2	2	1	
Bahr Bassandila	El Fawal El Safla	20.0	R	1,426	3.52	2 & 3	2	400	28	3	1	High bed level & Illegal rice	N	Nil	Nil	2	1	1	3	2	2	
El Fawal El Safla	El Masha	0.7	L	445	2.83	2 & 3	-		0	3	1	High bed level & Illegal rice	N	Nil	Nil	2	1	1	3	2	2	
Bahr Bassandila	Abo Sead Ahmed 02	23.2	L	620	2.16	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	1	2	1	
	Abo Seid	25.2	R	1,365	3.70	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	El Hodeda	28.0	R	1,679	5.45	2 & 3	1	100	6	2	1	Illegal rice cultivation	Y	Nil	Nil	2	1	1	1	1	1	Irrigated by drainage (total 11,684 fed)
	Kafr El Wakaa	28.4	R	2,365	5.30	2 & 3	1	180	8	2	1	Illegal rice cultivation	Y	Nil	Nil	2	1	1	1	2	2	Irrigated by drainage
	El Salaka	29.9	L	770	4.38	2 & 3	-		0	1	1		Y	Nil	Nil	2	1	1	2	2	1	Irrigated by drainage
	Om El Nagar	30.2	R	1,360	8.2	2 & 3	-		0	3	1	Illegal rice cultivation	Y	Nil	Nil	2	1	1	1	1	1	Irrigated by drainage
	Om Khorsan	32.0	R	680	3.0	2 & 3	3	400	59	1	1		Y	Nil	Nil	2	1	1	1	2	1	Irrigated by drainage
	El Khasha	32.5	R	1,180	7.65	2 & 3	3	200	17	2	1	Illegal rice cultivation	Y	Nil	Nil	1	1	1	2	2	2	Irrigated by drainage
	Abou Amd	32.8	L	420	2.14	2 & 3	-		0	1	1		Y	Nil	Nil	2	1	1	1	1	1	Irrigated by drainage
	Bahr El Qatra	35.9	L	770	1.60	2 & 3	-		0	1	1		Y	Nil	Nil	1	1	1	1	1	1	Irrigated by drainage
Bahr El Qatra	Zalan	1.6	L	2,000	6.1	2 & 3	2	0	0	1	1		Y	Nil	Nil	1	1	1	1	2	2	Feeder from Drain No.2
Bahr Bassandila	Om Atia El Kablia	34.1	R	580	5.6	2 & 3	1	160	28	1	1		Y	Nil	Nil	1	1	1	1	1	1	Irrigated by drainage
Om Atia El Kablia	Om Atia El Baharia	1.2	L	770	4.7	2 & 3	1	200	26	1	1		Y	Nil	Nil	1	1	1	1	1	1	Irrigated by drainage
Total Area Served				97,182																		90,182 (given by the Directorate)

Table F.8.3 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Bilqas, District: Bilqas)

12/17

Main Canal	Branch Canal (Delivery)	Location km	Location L/R	Area Served feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. reuse Summer	Unofficial D. reuse Winter	Tail Condition	Siltage Summer	Siltage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Bahr Shebin				3,240		Cont.																
	Kafr Damira Ganabia	46.6	R	2,000	5.00	2 & 3	3	600	30	1	1		N	Nil	Nil	1	1	1	2	1	1	Km from intake of Rayah El Abassi
	Bahot Ganabia	66.9	L	1,240	4.60	2 & 3	2	400	32	1	1		N	Nil	Nil	1	1	1	No gate	1	1	
Rayah Bilqas		66.4		11,746	9.70	Cont.													2			Km from intake of Rayah El Abassi
	Bahot Branch	4.6	L	1,080	3.10	2 & 3	1	100	9	1	1		N	Nil	Nil	3 (?)	1	1	1	1	1	Km from intake of Rayah Bilqas
	Bahot Ganabia No.2	4.6	L	1,010	2.70	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Bilqas Ganabia	8.0	R	1,309	3.85	2 & 0	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
Bilqas Ganabia	Shoba El Owen	1.0	R	470	3.80	2 & 3	1	250	53	1	1		N	Nil	Nil	3 (?)	1	1	2	1	1	
Rayah Bilqas	Zafarana	7.2	L	1,140	7.80	2 & 0	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Tahweelat Bahr El Masrara	8.3	L	-	1.80	2 & 0	-		-	1	1		N	Nil	Nil	1	1	1	3	1	1	Bypass to Bahr El Masrara
	Bashmour	8.0	R	3,418	9.40	2 & 8	12	2,800	73	2	1	High bed level of intake (km 0.0)	N	10%	Nil	2	1	1	3	2	1	
Bashmour	Dafram	0.9	R	410	3.50	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
Rayah Bilqas	Hafir Ganabia Right	8.4	R	1,242	3.80	2 & 3	2	200	16	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Hafir Ganabia Left	8.4	L	511	4.40	2 & 5	1	100	82	1	1		N	Nil	Nil	1	1	1	2	1	1	
Hafir Ganabia Left	Aabeen	0.8	L	4,100	3.10	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	3	1	1	
Bahr Hafir Shehab El Deen		8.4		81,461	24.00	Cont.													1	1	1	Km from intake of Rayah Bilqas
	Directly fr Bahr Hafir Shehab El Deen			2,422		2 & 3																
	Hafir Ganabia No.2	8.0	R	1,000	4.40	2 & 3	1	200	20	1	1		N	Nil	Nil	1	1	1	3	1	1	Km from intake of Bahr El Hafir
Hafir Ganabia No.2	Abo Khadra	1.8	R	1,000	3.02	2 & 3	1	160	16	1	1		N	Nil	Nil	3 (?)	1	1	2	1	1	
Bahr Hafir Shehab El Deen	Hafir Ganabia No.2	4.6	L	480	2.36	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	2	1	1	
Hafir Ganabia No.2	El Mashra	1.2	L	800	1.76	2 & 3	2	200	33	1	1		N	Nil	Nil	2	1	1	1	1	1	
Bahr Hafir Shehab El Deen	Hafir Ganabia No.3	7.2	L	1,100	3.60	2 & 3	2	300	27	1	1		N	Nil	Nil	2	1	1	2	1	1	
	El Shamamy Ganabia No.1 Right	8.1	R	680	2.70	2 & 3	1	260	38	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Shamamy	8.1	R	8,150	15.76	2 & 3	6	1,200	15	2	1	Heading up at Regulator km 9.00	N	2%	Nil	2	1	1	1	1	1	
Shamamy	Gharbeen	7.4	R	500	2.40	2 & 0	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Shamamy Ganabia No.2 Left	8.2	L	600	2.80	2 & 3	1	180	30	1	1		N	Nil	Nil	2	1	1	1	1	1	
	El Had	8.1	L	750	8.11	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Wastaniya	8.1	L	200	5.70	2 & 3	1	100	50	2	1	Illegal rice & direct pumping	N	1%	Nil	2	1	1	1	1	1	
Bahr Hafir Shehab El Deen	El Shamamy Ganabia No.1 Left	8.2	R	650	2.66	2 & 3	3	650	100	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Hafir Ganabia No.3 Right	8.3	R	1,400	4.66	2 & 3	3	1,000	71	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Abo Dashisha	11.2	L	2,080	7.40	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Hafir Ganabia No.4 Left	11.2	L	2,311	0.66	2 & 3	2	600	36	1	1		N	Nil	Nil	2	1	1	2	1	1	
	Salamoun	18.5	R	1,500	4.20	2 & 3	1	160	10	1	1		N	1%	Nil	2	1	1	2	1	1	
	El Mariai	18.6	R	2,000	4.60	2 & 3	-		0	1	1		N	1%	Nil	2	1	1	1	1	1	
	El Reda	21.0	R	1,200	3.89	2 & 8	-		0	1	1		N	1%	Nil	2	1	1	3	1	1	
	El Gaara	22.5	R	2,000	6.70	2 & 3	1	200	10	2	1	High bed level	N	Nil	Nil	2	1	1	3	1	1	
Total Area Served				48,469																		48,260 (given by the Directorate)

Note: 1=rare, 2=often, 3=very often, drainage   Y=yes, N=no, Nil=negligible
Note: Tail Condition [1=Sea or nothing, 2=Tail common, 3=Accumulat, 4=Feeder], Siltage [1=Negligible, 2=Often, 3=Very often], Intake Condition [1=Good, 2=Repair, 3=Replacement]
Note: Domestic Waste [1=Little, 2=Considerable amount, 3=Much], Washing [1=Rare, 2=Often]

Table F.8.3 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Bilqas, District: Mansura)

Main Canal	Branch Canal (Delivery)	Location km	Location Lft/Rht	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Raiah Bilqas				2,500		Cont.																
	Mansura Ganabia No.1 Right	8.1	R	1,200	2.44	2&3	-		0	1	1		N	5%	Nil	2	1	1	3	1	1	Km from intake of Raiah Bilqas
Mansura G. No.1 R	Bahra	1.2	R	1,300	3.46	2&3	2	400	31	1	1		N	10%	Nil	2	1	1	1	2	1	
Bahr El Mansura		9.7		82,260	7.20	Cont.														1	2	Km from intake of Raiah Bilqas
	Directly from Bahr El Mansura			1,214		2&3																
	Mansura Ganabia No.1 Left	1.8	L	1,287	4.40	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	Km from intake of El Mansura
	Salnea	2.0	R	2,680	7.60	2&3	4	600	22	2	1	Illegal rice cultivation	N	20%	Nil	2	1	1	1	1	2	
Salnea	El Tal	3.1	R	1,100	4.46	2&3	-		0	2	1	Illegal rice cultivation	N	20%	Nil	2	1	1	3	1	1	
	El Salam	4.9	R	1,110	3.60	2&3	1	100	9	2	1	Illegal rice cultivation	N	20%	Nil	2	1	1	1	1	2	
	Mansour	6.1	R	860	1.30	2&3	-		0	1	1		N	Nil	Nil	2	1	1	1	1	1	
Bahr El Mansura	Mansura Ganabia No.2 Right	2.0	R	2,000	1.27	2&3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	El Bahr El Gadid	4.4	L	576	2.25	2&3	2	200	35	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Mansura Ganabia No.2 Left	4.4	L	600	2.70	2&3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Arwad	6.3	R	2,050	6.97	2&3	-		0	2	1	Illegal rice cultivation	N	20%	Nil	2	1	1	1	1	2	
	Mansura Ganabia No.3 Right	5.4	R	500	2.27	2&3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	1	
	El Gard	7.2	L	1,690	3.86	2&3	-		0	1	1		N	20%	Nil	2	1	1	1	1	2	
	Bahr El Bashma	7.7	R	6,374	14.50	2&3	1	400	2	2	1	Illegal rice cultivation	N	Nil	Nil	2	1	1	1	1	2	
Bahr El Bashma	Sorto	5.6	L	1,096	6.00	2&3	-		0	2	1	Illegal rice cultivation	N	75%	Nil	1	1	1	3	1	2	
	Hasab	8.2	R	1,300	3.70	2&3	2	850	27	2	1	Unstability of side slope	N	25%	Nil	2	1	1	1	1	1	
	Shalat	7.8	L	987	3.20	2&3	-		0	2	1	Unstability of side slope	N	15%	Nil	1	1	1	1	1	2	
	Komaran	8.1	R	3,200	5.10	2&3	-		0	1	1		N	20%	Nil	2	1	1	1	1	2	
	Kaf	8.9	R	1,405	4.10	2&3	-		0	1	1		N	Nil	Nil	2	1	1	3	1	2	
	Ras El Farkh	11.8	R	780	2.86	2&3	-		0	3	1	Located at the most downstream	N	30%	Nil	2	1	1	1	1	2	
Bahr El Mansura	Sabarta	7.7	R	2,420	6.35	2&3	-		0	2	1	Illegal rice cultivation	N	10%	Nil	2	1	1	1	1	2	
Sabarta	Shalab	2.2	L	702	4.60	2&3	-		0	1	1		N	20%	Nil	2	1	1	1	1	2	
Bahr El Banawan El Aiaa		7.7		6,668	13.90	Cont.														1	2	Km from intake of El Mansura
	Directly from Bahr El Banawan El Aiaa			6,012		2&3																
	El Banawan El Aiaa Branch	4.6	L	170	4.60	2&3	-		0	1	1		N	15%	Nil	2	1	1	2	1	2	Km from intake of El Banawan
	Tatwala	9.8	L	516	3.00	2&3	-		0	2	1	High bed level of intake	N	Nil	Nil	2	1	1	1	1	2	
Bahr El Banawan El Awad		13.8		-	4.70	2&3																Km from intake of El Aiaa
Total Area Served				80,476																		40,478 (given by the Directorate)

Table F.8.3 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Bilqas, District: Zahraa)

Main Canal	Branch Canal (Delivery)	Location km	Location Lft/Rht	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Eslah				11,420	3.00	2&3				2	1	Many branches	Y	Nil	Nil	2 (F)	1	1		1	2	irrigated by drainage
	El Sharkawia	12.7	R	4,716	13.66	2&3	8	3,000	64	1	1		Y	Nil	Nil	1	1	1	1	2	2	Km from intake of El Eslah
El Shrinwa	Feran 1	4.2	R	815	1.30	2&3	-		0	1	1		Y	Nil	Nil	1	1	1	3	1	2	
	Feran 2	7.8	R	905	2.00	2&3	-		0	1	1		Y	Nil	Nil	2	1	1	1	1	2	
	Feran 3 (Feran El Shrinwa)	10.7	R	990	1.60	2&3	-		0	1	1		Y	Nil	Nil	2	1	1	1	1	2	
El Eslah	El Tarfania	12.7	Ext.	3,988	13.00	2&3	8	1,350	34	1	1		Y	Nil	Nil	2	1	1	1	1	2	
El Nile				28,880	16.05	2&3				1	1		Y	Nil	Nil	1 (F)	1	1		1	2	irrigated by drainage
	Directly from El Nile			3,271		2&3																
	El Sasan El Sharkia	24.2	L	2,888	3.20	2&3	1	180	5	1	1		Y	Nil	Nil	2	1	1	1	1	2	Km from intake of El Nile
	El Shaikha	24.2	R	5,900	5.00	2&3	-		0	1	1		Y	Nil	Nil	2	1	1	1	1	2	
	Dahhan	29.2	R	6,100	6.50	2&3	11	2,200	36	1	1		Y	Nil	Nil	2	1	1	3	1	2	
	El Sasan El Gharbia	28.2	L	5,811	3.76	2&3	3	600	10	1	1		Y	Nil	Nil	2	1	1	3	1	2	
El Salah El Gharbia	Eastern Ganabia of El Gharbia Main Drain	58.8		2,000	6.20	2&3	4	850	40	1	1		Y	Nil	Nil	2	1	1	1	1	2	
				85,400																		35,400 (given by the Directorate)

Note: 1=rare, 2=often, 3=very often, 4=always Y=yes, N=no, Nil=negligible
Note: Tail Condition (1=Dry or nothing, 2=Tail escape, 3=Aqueduct, 4=Feeder), Spillage (1=Negligible, 2=Often, 3=Very often), Intake Condition (1=Good, 2=Repair, 3=Replacement)
Note: Domestic Waste (1=Little, 2=Considerable amount, 3=Much), Washing (1=Rare, 2=Often)

Table F.8.2 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Talkha, District: Talkha)

Main Canal	Branch Canal (Delivery)	Location km	L/R/Am	Area ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Sahel El Olia		36.8	R	11,860	42.70	Cont.																Km at El Sahel a intake fr El Abbasa
	Directly from El Sahel El Olia			8,610		2 & 3																
	Mest Nabat	12.0	R	720	4.50	2 & 3	-		0	2	1	Unstable side slope & high bed level	N	Nil	Nil	3 (F)	1	1	3	2	1	Km from intake of El Sahel
	Bahr Wan	12.5	L	1,080	4.50	2 & 3	1	200	18	1	1		N	10%	Nil	2	1	1	2	3	2	
	Sorsak	14.9	L	100	3.00	2 & 3	-		0	1	1		N	15%	Nil	3 (F)	1	2	1	2	1	
	Arab	16.0	L	800	4.40	2 & 3	-		0	1	1		N	Nil	Nil	2	1	2	1	2	1	
Arab	Bawra	1.6	L	430	1.85	2 & 3	-		0	1	1		N	Nil	Nil	3 (F)	1	2	3	1	1	
Bahr Shebin				36,284		Cont.																
	Tera Ganabia Left	47.2	L	1,979	5.10	2 & 3	4	750	38	1	2	Low water level & high bed level	N	Nil	Nil	2	1	1	3	1	1	Km from El Abbasa
	Tera Ganabia Right	47.3	L	3,000	6.10	2 & 3	4	990	30	1	2	Low water level & high bed level	N	Nil	Nil	2	1	1	3	2	1	
	Tonsieh Ganabia Right	47.7	R	900	4.50	2 & 3	1	130	14	1	1		N	Nil	Nil	1	1	1	3	1	1	
	Tonsieh Ganabia Left	47.8	L	880	3.50	2 & 3	3	800	91	1	1		N	Nil	Nil	1	1	1	3	1	1	
	Dream	50.9	L	2,400	6.70	2 & 3	1	1,000	42	1	1		N	10%	Nil	2	1	2	2	1	2	
	El Hessa Ganabia Left	50.8	L	2,325	3.80	2 & 3	1	260	11	1	1		N	Nil	Nil	1	1	2	2	1	1	
	El Hessa Ganabia Right	50.9	R	600	1.35	2 & 3	-		0	1	1		N	Nil	Nil	1	1	2	2	1	1	
	Kafr El Ganena	53.2	R	1,310	4.50	2 & 3	2	300	23	1	1		N	15%	Nil	3 (F)	1	2	1	1	1	
	Kafr El Ganena Ganabia	53.8	R	1,095	1.26	2 & 3	1	150	14	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Nasha	56.1	L	3,360	11.80	2 & 3	6	1,500	45	4	1	Illegal rice & submerged weed	N	20%	Nil	2	1	1	1	3	2	
Nasha	Mesthek	8.3	R	1,380	3.86	2 & 3	1	300	22	4	1	Illegal rice & submerged weed	N	15%	Nil	2	1	1	2	1	1	
Bahr Shebin	New Nahro	56.7	R	1,350	3.37	2 & 3	-		0	1	1		N	Nil	Nil	2	1	3	2	1	1	
	Nahro Ganabia Right	56.7	R	640	3.40	2 & 3	-		0	1	1		N	Nil	Nil	2	1	3	2	1	1	
	Tatas	58.2	L	2,070	11.00	2 & 3	5	1,600	72	4	1	Not enough intake & Reg. Km8 3	N	20%	Nil	2	1	1	3	2	2	
Talkha	Katsara	2.7	R	680	2.30	2 & 3	1	200	30	1	1		N	Nil	Nil	2	1	2	2	1	1	
	Hesha	4.9	R	2,000	9.00	2 & 3	3	800	40	4	1	Tatas intake & the regulator	N	20%	Nil	2	1	1	2	2	2	
	Sherbasia	5.4	L	400	3.35	2 & 3	2	400	100	1	1		N	Nil	Nil	3 (F)	1	2	1	1	1	
	Tatas Branch (Tatas)	6.8	R	1,668	3.78	2 & 3	3	600	36	4	1	Tatas intake & the regulator	N	Nil	Nil	1 (F)	1	1	2	1	2	
	Gard El Agamy	8.1	L	600	2.65	2 & 3	3	600	100	3	1	Tatas intake & the regulator	N	Nil	Nil	1	1	1	1	1	1	
Bahr Shebin	Nahro Ganabia Left	58.3	L	260	2.25	2 & 3	-		0	1	1		N	Nil	Nil	2	1	2	2	1	1	
	Kafr Bonot	58.7	L	1,690	4.50	2 & 3	2	360	21	1	1		N	Nil	Nil	2	1	2	1	1	2	
	El Tafteh Ganabia Left	59.6	L	1,460	6.00	2 & 3	3	600	41	1	1		N	Nil	Nil	2	1	2	2	3	1	
	Kafour El Arab Ganabia	60.2	R	940	2.05	2 & 3	2	300	32	2	1	High bed level of the intake	N	15%	Nil	2	1	1	3	1	1	
	Kafr Damira El Kadim	62.0	R	1,020	3.10	2 & 3	2	400	39	2	1	High bed level of the intake	N	15%	Nil	2	1	1	3	2	2	
	Om Dorman Talkha	63.1	R	1,675	3.60	2 & 3	2	420	25	2	1	High bed level of the intake	N	15%	Nil	2	1	1	3	1	1	
	El Tafteh Ganabia Right	64.1	R	660	1.01	2 & 3	1	250	38	1	1		N	Nil	Nil	2	1	2	2	1	1	
Total Area Served				47,894																		47,934 (given by the Directorate)

Table F.8.2 Water District Based Canal Inventory (Directorate: West Dakahlia, Inspection: Talkha, District: Sherbin)

Main Canal	Branch Canal (Delivery)	Location km	L/R/Am	Area ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% for Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
El Sahel El Olia				19,962		Cont.	5															
	Batra Ganabia	34.0	L	669	1.80	2 & 3	3	350	40	1	1		N	Nil	Nil	1	1	1	1	1	1	Km from intake of El Sahel El Ala
	Abd Elah	35.9	L	260	2.40	2 & 3	1	90	32	1	1		N	Nil	Nil	2	1	1	1	1	1	
	Deel	39.6	R	672	1.70	2 & 3	-		0	1	2	High bed level of the intake	N	Nil	Nil	1	1	1	3	1	1	
	El Omda	40.4	R	880	1.85	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	3	1	1	
	El Khet	41.0	L	2,463	5.00	2 & 3	4	900	37	2	1	Illegal direct pumping	N	Nil	Nil	1 (F)	1	1	3	2	1	
El Khet	El Dawar	5.0	R	980	2.85	2 & 3	1	50	5	2	1	Illegal direct pumping	N	5%	Nil	2	1	3	1	2	1	
El Sahel El Olia	El Sheikh Smk	41.5	L	740	2.27	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
	Bahr El Hessa	41.8	L	1,800	8.00	2 & 3	3	260	16	1	1		N	Nil	Nil	2	1	1	1	1	1	
Bahr El Hessa	El Sharka El Gedida	2.2	R	800	4.50	2 & 3	-		0	1	1		N	Nil	Nil	2	1	1	2	1	1	
	El Sharka El Kadima	4.1	R	1,340	3.00	2 & 3	1	250	19	1	1		N	Nil	Nil	2	1	1	2	1	1	
El Sahel El Wasta	(extension of El Sahel El Ala)	42.7	Ext.	8,449	75.40	Cont.	-		0	1	2	Domestic waste	N	Nil	Nil	1 (F)	1	1	1	3	1	
El Balamoun	(Branch of El Sahel)	42.7	L	22,880	39.50	Cont.													1			Km from intake of El Sahel El Ala
	Directly from El Balamoun			3,590		2 & 3	3															
	El Balamoun Ganabia	0.8	L	1,000	3.70	2 & 3	1	50	5	1	2	High bed level of the intake	N	Nil	Nil	2	1	1	1	1	1	Km from intake of El Balamoun
	El Bosha	4.0	L	2,145	6.40	2 & 3	-		0	1	2	High bed level of the intake	N	5%	Nil	2	1	1	2	1	1	
	El Balamoun Ganabia No.3	7.0	L	690	2.10	2 & 3	1	280	31	1	1		N	Nil	Nil	1 (F)	1	1	2	1	1	
El Balamoun G. No.3	El Ghaphgaba	0.1	L	570	3.00	2 & 3	-		0	3	1	A molon casing under its bed	N	10%	10%	2	1	1	2	1	1	
El Balamoun	Abu Qatal	10.2	L	4,140	8.40	2 & 3	3	250	6	3	1	Illegal rice cultivation & direct pumping	Y*	5%	Nil	2	1	1	1	1	1	
Abu Qatal	Sidy Saleh	6.0	L	1,425	3.00	2 & 3	1	40	3	3	1	Illegal rice cultivation & direct pumping	N	5%	Nil	2	1	1	3	1	1	
El Balamoun	El Balamoun Ganabia No.4	10.2	L	1,710	1.70	2 & 3	1	100	6	1	1		N	Nil	Nil	2	1	1	3	1	1	
	Ras El Khalig	10.2	L	4,080	8.40	2 & 3	2	250	6	3	1	Not enough water reaches	Y*	5%	Nil	1	1	1	1	2	1	
Ras El Khalig	El Bark	8.1	R	1,870	6.40	2 & 3	1	60	3	3	1	Not enough water reaches	N	5%	5%	2	1	1	1	1	1	
El Balamoun	El Balamoun Ganabia No.5	12.2	L	1,490	5.10	2 & 3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	2	1	1	
Total Area Served				42,812								Y*: Small MPS 1cum/s 1unit										43,894 (given by the Directorate)

Note: 1=non, 2=often, 3=very often, 4=always; Y=yes, N=no, Nil=negligible

Note: Tail Condition (1=Stop or nothing, 2=Tail excess, 3=Adequate, F=Feeder), Spillage (1=Negligible, 2=Often, 3=Very often), Intake Condition (1=Good, 2=Repair, 3=Replacement)

Note: Domestic Waste (1=Little, 2=Considerable amount, 3=Much), Washing (1=Rare, 2=Often)

Table F.6.3 Water District Based Canal Inventory (Directorate: Damietta, Inspection: Damietta, District: Kafr Saad)

Main Canal	Branch Canal (Delivery)	Location km	Location L/R/Rtd	Area Ser. feddan	Length km	Rotation Type	No. of Mesqa	Area by Mesqa	% by Mesqa	Water Shortage Summer	Water Shortage Winter	Reason of Water Shortage	Official D. reuse	Unofficial D. use Summer	Unofficial D. use Winter	Tail Condition	Spillage Summer	Spillage Winter	Intake Condition	Domestic Waste	Washing	Remarks
Salamoun	Km from intake of El Sahel El Ala	42.7		44,400	21.20	Cont.																Length in the District only
	Directly fr Salamoun			1,998		2 & 3																
	Wastania	17.2	L	6,350	10.60	2 & 3	3	1,960	31	2	1	Domestic waste	Yes	Nil	Nil	3 (F)	1	1	2	2	2	Km from intake of Salamoun
Wastania	Wastania Branch	4.0	L	300	1.10	2 & 3	-		0	2	1	Domestic waste	N	Nil	Nil	1	1	1	No gate	1	2	MPS under construction for Wastania
Salamoun	Maska Kafr Saad El Qadia	19.5	L	4,500	12.25	2 & 3	8	2,250	50	2	1	Large area served & domestic waste	N	1%	Nil	3 (F)	1	1	1	1	2	
Maska Kafr Saad El Qadia	No.1 Branch	2.5	R	720	2.20	2 & 3	-		0	2	1	do	N	Nil	Nil	1 (F)	1	1	No gate	1	1	
	No.2 Branch	6.5	L	1,200	0.65	2 & 3	-		0	2	1	do	N	Nil	Nil	1 (F)	1	1	No gate	1	1	
	Rokabia	12.6	R	836	6.05	2 & 3	-		0	2	2	do	N	75%	75%	1	1	1	No gate	1	1	
Salamoun	Maktaa Saad El Kasim from Salamoun	14.6	L	600	1.74	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	3	2	2	
	Mashaieh	21.8	L	6,335	9.40	2 & 3	-		0	1	1		Yes	Nil	Nil	3 (F)	1	1	1	1	2	MPS under construction
Mashaieh	Om Amer	7.5	R	2,153	4.65	2 & 3	-		0	1	1		N	Nil	Nil	3 (F)	1	1	1	1	1	
Salamoun	Kafr Salman	22.9	L	2,990	7.10	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	1	1	1	
	Sharkia	26.0	L	2,340	4.92	2 & 3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	2	1	1	
	Om Dangal	26.5	L	5	4.50	2 & 3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	1	1	2	
Om Dangal	Om Dangal El Kablia	0.6	L	2,990	12.10	2 & 3	-		0	2	1	Domestic waste	N	2%	2%	2	1	1	1	1	2	
	Om Dangal El Baharia	0.5	R	0	13.60	2 & 3	-		0	2	1	Unstable side slope (sandy soil)	N	2%	2%	1	1	1	2	1	1	
Om Dangal El Baharia	Shahawy	7.2	R	1,071	3.80	2 & 3	-		0	2	1	do	N	Nil	Nil	1	1	1	1	1	1	
	Om Reda	9.8	R	2,340	3.00	2 & 3	-		0	2	1	do	N	Nil	Nil	1	1	1	1	1	1	
	Shalaby	17.6	R	2,205	3.00	2 & 3	-		0	2	1	do	N	Nil	Nil	1	1	1		1	2	
Salamoun	Tabia	33.0	L	2,808	3.40	2 & 3	1	2,808	100	1	1		N	Nil	Nil	1	1	1	2	1	2	Af'ted by Feeder Km220 (TU 6,608 fed)
	Senania	37.2	L	1,600	6.40	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	do
Baharia	Nad	0.7	R	600	3.32	2 & 3	-		0	2	1	Domestic waste	N	Nil	Nil	1	1	1	2	1	1	do
	Arfy	4.8	R	600	0.40	2 & 3	-		0	2	1	do	N	Nil	Nil	1	1	1	2	1	1	do
Salamoun	Zaher	56.6	L	600	3.70	2 & 3	-		0	2	2	do	N	Nil	Nil	1	1	1	2	3	1	do
El Sahel El Sefta		26.4		8,280	18.60	Cont.																Km fr intake of El Sahel El Wasta
	Directly fr El Sahel El Sefta			2,980		2 & 3																
	Maktaa Saad El Radin	1.0	L	400	3.30	2 & 3	1	400	100	1	1		N	Nil	Nil	1	1	1	2	1	1	Km from BP of El Sahel El Sefta
	Kafr El Manasia	5.6	L	1,600	3.96	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	2	1	1	
	El Lawy	7.0	L	1,200	2.40	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	1	1	1	
	El Badry	11.5	L	1,200	2.30	2 & 3	-		0	1	1		N	Nil	Nil	1	1	1	1	1	1	
	Branch of El Sahel El Sefta (extension)	34.0		1,000	3.40	2 & 3	-		0	1	1		N	Nil	Nil	1 (F)	1	1	2	1	2	Assisted by Feeder Km220 (1,000 fed)
Nile Canal from Damietta Branch (Km from Delta Barrage)		215.0		6,400	7.10	2 & 3	3	1,360	26							1 (F)	1	1	1	1	2	
Total Area Served				58,290									Ye, Small MPS (owner's turn)									57,442 (by the Directorate)
	Salamoun			37,997																		
	Feeder Km 220			6,608																		
	Total			44,600																		
	El Sahel E. Sefta			7,280																		
	Feeder Km220			1,000																		
	Total			8,280																		

Note: 1=rare, 2=often, 3=very often, 4=always   Y=yes, N=no, Nil=negligible
Note: Tail Condition (1=Stop or nothing, 2=Tail escape, 3=Aqueduct, F=Feeder), Spillage (1=Negligible, 2=Often, 3=Very often), Intake Condition (1=Good, 2=Repair, 3=Replacement)
Note: Domestic Waste (1=Little, 2=Considerable amount, 3=Much), Washing (1=Rare, 2=Often)

F.9 Water Resources Available for the Whole Study Area (Master Plan Study Area)

F.9.1 Nile Fresh Water

Available Nile fresh water for the Bahr Shebin command area is composed of inflows from Raiah Abbasee and El Monofy canals. While the inflow from Raiah Abbasee is known, the flow discharged by Monofy at the meeting point between El Monofy and Raiah Abbasee is not known. However, with reference to the discharge measured at Santa Regulator located 9 km upstream of the meeting point, the flow into the Bahr Shebin command Area from El Monofy canal can be estimated. Measurements had been made until 1992 at old Santa Regulator, and then ceased when the construction of new Santa Regulator started. The new Santa Regulator has discharge data for year of 1997 only. Therefore, to know the discharges between 1993 and 1996, a flow ratio between El Meleeg Regulator, located at 26 km upstream from Santa Regulator, and Santa Regulator is undertaken.

Referring to discharges from 1988 to 1992 at both El Meleeg Regulator and Santa Regulator, a monthly mean ratio ranging 0.26 to 0.4 becomes available. The year-round ratio is 0.34. With the ratio, discharges at Santa Regulator between 1993 and 1996 can be estimated. Further taking into consideration the irrigation area of 1,700 fed located between Santa Regulator and the meeting point, 95 % of the discharge at Santa Regulator is undertaken as the inflow into the Bahr Shebin command area. The estimated annual inflow for the last five years from 1993 and 1997 ranges from 224 MCM in 1997 to 259 MCM with the five years mean of 237 MCM (See Table F.9.1).

With reference to the last five years (1993-1997) discharge records at the intake of Raiah Abbasee, the principal canal had conveyed an annual inflow ranging 4,286 MCM in 1994 to 4,676 MCM in 1997 with the mean of 4,479 MCM. Discharge at the intake of Meet Yazied must be subtracted to estimate the water only available for the Bahr Shebin command area. Referring the same five years, the discharge at Meet Yazied is between 1,341 MCM in 1994 and 1,497 MCM in 1996. The mean of the last five years is 1,424 MCM.

Two pump stations supply Nile fresh water into the Bahr Shebin command area; namely, Balamoun P.S. and Kafr Saad P.S. With reference to the pump operation records between 1993 and 1997, an annual amount of 192 MCM to 220 MCM had been lifted at Balamoun P.S., and 269 MCM to 313 MCM at Kafr Saad P.S. The mean for the five years is 208 MCM at Balamoun P.S. and 291 MCM at Kafr Saad P.S. (Tables F.9.2 & F.9.3 and Figures F.9.1 & F.9.2).

Taking the sum above, the fresh water available for whole Bahr Shebin command area can be estimated. The mean annual amount for the five years of 1993 – 1997 is 3,791 MCM, the annual minimum is 3,640 MCM in 1993 (4% less than the mean), and the annual maximum is 3,948 MCM (4% more than the mean). As the Water Distribution Sector has practiced, since 1992, to distribute same amounts to all irrigation directorates with exception of minor changes, the available fresh water for the Bahr Shebin command area has not practically changed in volume for the last five years (See Table F.9.4 and Figure F.9.3).

F.9.2 Drainage Water

Two mixing pumping stations, East El Monofia M.P.S. and Hamoul M.P.S., lift drainage

water and mix it into relevant canals. East El Monofia M.P.S. lifts the drainage water in Karene drain, upstream of Gharbia drain, and discharges it into Raiah Abbasee. The annual drainage mixed for the last five years from 1993 to 1997 ranges between 42 MCM in 1996 and 72 MCM in 1994 with the mean of 57 MCM. According to the Hamoul M.P.S. operation, the annual drainage mixed for the last five years is between 279 MCM in 1994 and 390 MCM in 1997. The annual average is 321 MCM. (See Tables F.9.5 & F.9.6 and Figures F.9.4 & F.9.5)

F.9.3 Present Available Water

The fresh water and drainage water mentioned above consist of the total known water available for Bahr Shebin command area. This reaches an annual amount of 4,169 MCM which is composed of 3,292 MCM (79%) from the canals, 499 MCM (12%) from the two irrigation pumping stations, and 378 MCM (9%) from the two mixing pumping stations (See Table F.9.7 and Figure F.9.6).

There are municipal and small scale industrial usages within the area, and these have to be subtracted from the known amount in order to estimate the irrigation consumption. The usages reach an annual total amount of 143 MCM, which consists of about 3.8 % of the known total Nile fresh water of 3,791 MCM. Subtracting the municipal and industrial usages, an amount available for irrigation only can be estimated. This amount reaches an annual amount of 4,026 MCM. (See Tables F.9.7 & F.9.8).

Table F.9.1 Estimation of Discharge into the Study Area from Monofy in MCM

Year	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Remarks
1988	Meleeg	42.70	25.40	62.50	70.30	66.55	99.30	108.65	107.50	73.95	64.15	73.35	75.00	869	
	Santa	25.70	8.60	38.30	39.55	35.50	38.35	46.40	45.25	33.20	24.70	33.65	33.50	403	
	Rate	0.60	0.34	0.61	0.56	0.53	0.39	0.43	0.42	0.45	0.39	0.46	0.45	0.46	
1989	Meleeg	47.80	17.10	70.50	57.75	59.70	96.70	97.50	82.10	74.40	46.85	63.60	76.60	791	
	Santa	18.00	1.60	28.10	22.15	9.60	37.55	31.80	24.55	28.40	6.90	21.50	36.60	267	
	Rate	0.38	0.09	0.40	0.38	0.16	0.39	0.33	0.30	0.38	0.15	0.34	0.48	0.34	
1990	Meleeg	46.90	29.95	58.94	54.60	66.55	93.50	102.85	99.00	86.75	52.25	57.35	55.10	809	
	Santa	N.A.	5.40	14.50	5.50	16.75	32.20	30.50	33.10	38.90	10.65	7.80	7.30	262	
	Rate	N.A.	0.18	0.25	0.10	0.25	0.33	0.30	0.33	0.45	0.20	0.14	0.13	0.32	
1991	Meleeg	35.50	26.60	56.20	55.10	54.55	87.00	87.95	102.70	74.65	61.70	60.75	57.75	761	
	Santa	1.70	7.05	12.00	4.60	5.50	22.15	10.65	34.65	28.35	20.50	15.60	19.35	182	
	Rate	0.05	0.27	0.21	0.08	0.10	0.25	0.12	0.34	0.38	0.33	0.26	0.34	0.24	
1992	Meleeg	40.20	12.90	48.10	58.20	58.10	108.10	103.70	95.30	68.90	71.60	53.95	52.40	771	
	Santa	12.80	6.20	10.80	5.70	16.85	42.60	35.90	23.40	21.15	39.35	18.90	21.20	255	
	Rate	0.32	0.48	0.22	0.10	0.29	0.39	0.35	0.25	0.31	0.55	0.35	0.40	0.33	
Average	Meleeg	42.62	22.389	59.248	59.19	61.09	97.92	100.13	97.32	75.77	59.31	61.8	63.37	800	
	Santa	14.55	5.77	20.74	15.5	16.84	34.57	31.05	32.19	30	20.42	19.49	23.59	274	
	Rate	0.34	0.26	0.35	0.26	0.28	0.35	0.31	0.33	0.40	0.34	0.32	0.37	0.34	Applied
1993	Meleeg	41.80	22.50	55.90	51.20	60.60	85.10	83.40	91.95	62.60	59.45	42.60	65.50	723	
	Santa	14.27	5.60	19.57	13.41	16.70	30.04	25.86	30.41	24.79	20.47	13.43	24.38	247	
1994	Meleeg	42.60	19.00	47.35	47.40	55.95	84.15	94.60	100.65	75.80	54.30	41.45	44.70	708	
	Santa	14.54	4.90	16.58	12.41	15.42	29.71	29.34	33.29	30.01	18.70	13.07	16.64	242	
1995	Meleeg	20.40	48.30	55.85	48.60	56.80	108.35	91.30	96.40	53.95	52.15	55.05	48.10	735	
	Santa	6.96	12.45	19.55	12.73	15.66	38.25	28.31	31.89	21.36	17.95	17.36	17.91	252	
1996	Meleeg	18.70	41.50	55.90	50.40	70.65	102.40	108.05	102.75	72.30	58.00	59.80	54.90	795	
	Santa	6.38	10.70	19.57	13.20	19.48	36.15	33.51	33.99	28.63	19.97	18.86	20.44	272	
1997	Santa	15.50	18.70	14.40	16.00	26.30	27.60	28.50	25.50	8.70	20.05	20.55	14.00	236	Actual
1993	To S.A.	13.56	5.51	18.59	12.74	15.87	28.54	24.57	28.89	23.55	19.44	12.76	23.16	235	95%
1994	do	13.82	4.65	15.75	11.79	14.65	28.22	27.87	31.63	28.51	17.76	12.42	15.81	230	do
1995	do	6.62	11.83	18.57	12.09	14.87	36.34	26.90	30.29	20.29	17.06	16.49	17.01	239	do
1996	do	6.06	10.16	18.59	12.54	18.50	34.34	31.83	32.29	27.19	18.97	17.92	19.42	259	do
1997	do	14.73	17.77	13.68	15.20	24.99	26.22	27.08	24.23	8.27	19.05	19.52	13.30	224	do
Average	do	10.96	9.98	17.04	12.87	17.78	30.73	27.65	29.46	21.56	18.46	15.82	17.74	237	do

Source: Gharbia Irrigation Directorate & Water Distribution Directorate

Table F.9.2 Discharge at Balamoun I.P.S. (Damietta to Balamoun & El Sahel) In '000CUM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	9,216	1,382	21,744	19,411	15,926	18,634	26,683	26,640	21,499	12,845	12,355	6,509	192,845
1994	4,435	4,493	18,259	14,126	21,312	26,626	35,880	23,674	20,102	10,656	9,850	2,606	192,019
1995	12,629	10,411	17,726	17,654	17,525	21,427	26,899	34,004	21,845	10,714	15,797	11,246	217,877
1996	9,245	13,162	16,186	16,142	20,102	28,368	30,110	27,043	20,794	12,859	15,350	11,102	220,464
1997	9,806	9,072	14,054	15,466	23,357	29,506	32,011	29,491	20,966	11,362	13,075	9,418	217,584
Average	9,066	7,704	17,594	16,560	19,644	24,912	30,317	28,170	21,041	11,687	13,285	8,176	208,158
mm/day	1.74	1.64	3.38	3.29	3.77	4.94	5.82	5.41	4.17	2.24	2.64	1.57	3.39

Source: MED Computer Center, Kafr El Sheikh

Table F.9.3 Discharge at Kafr Saad I.P.S. (Damietta to Balamoun & El Sahel) In '000CUM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	7,766	5,976	30,429	31,205	24,017	37,874	35,141	31,896	23,914	15,202	13,029	12,871	269,319
1994	8,489	13,109	27,830	23,246	29,347	39,907	40,193	38,491	29,213	18,456	13,966	9,154	291,399
1995	14,731	18,593	22,565	22,044	30,442	35,267	41,538	32,755	28,037	14,942	18,401	14,573	293,886
1996	7,034	15,221	13,054	25,942	31,154	43,762	42,278	41,054	35,546	17,525	24,142	15,808	312,520
1997	12,643	8,520	14,438	23,666	30,614	45,432	44,191	40,915	31,876	15,782	19,742	100	287,921
Average	10,133	12,284	21,663	25,221	29,115	40,448	40,668	37,022	29,717	16,381	17,856	10,501	291,009
mm/day	1.10	1.48	2.36	2.83	3.17	4.54	4.42	4.02	3.34	1.78	2.01	1.14	2.69

Source: MED Computer Center, Kafr El Sheikh

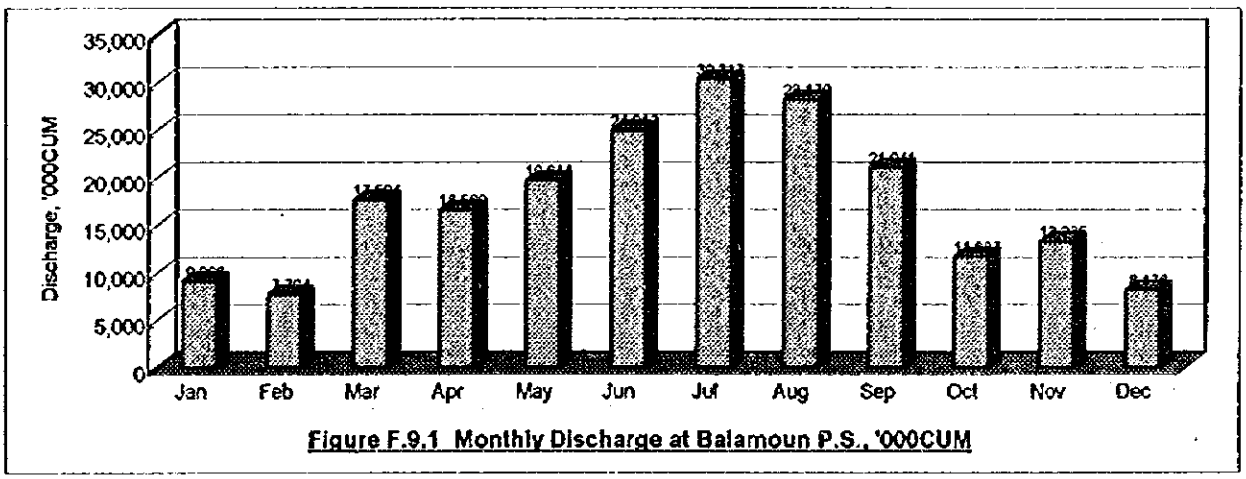

Figure F.9.1 Monthly Discharge at Balamoun P.S., '000CUM

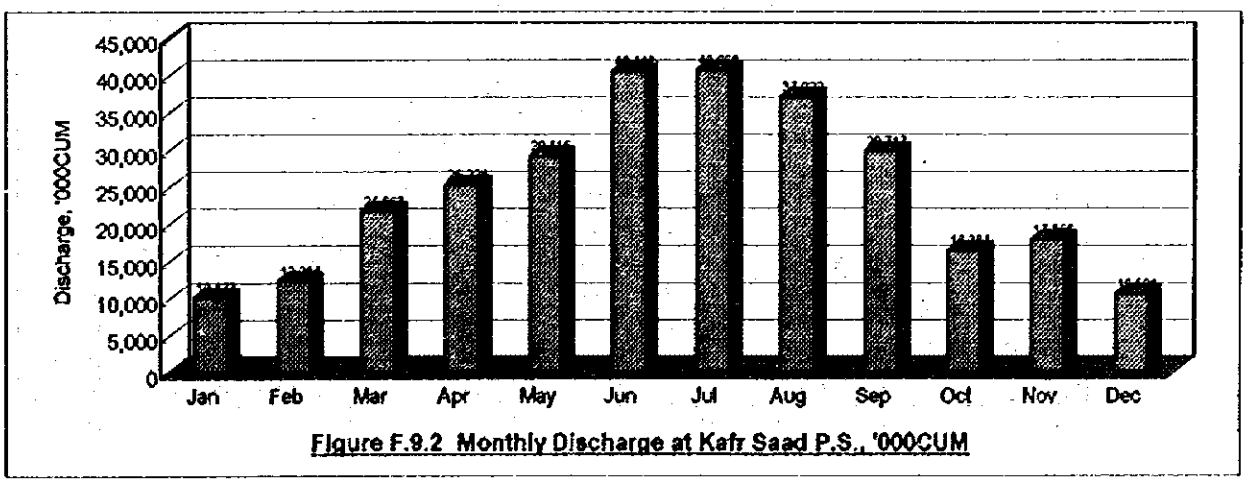

Figure F.9.2 Monthly Discharge at Kafr Saad P.S., '000CUM

Table F.9.4 Estimation of Fresh Water Available for the Study Area from 1993 to 1997 in MCM

Year	Place	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	Ralah Abbasee	127.00	156.25	301.50	330.25	348.40	639.00	696.50	567.70	410.90	238.50	256.20	228.75	4,301
	El Monofy	13.56	5.51	18.59	12.74	15.67	28.54	24.57	28.89	23.55	19.44	12.76	23.16	235
	Balamoun P.S.	9.22	1.38	21.74	19.41	15.93	18.63	26.68	26.64	21.50	12.84	12.36	6.51	193
	Kafr Saad P.S.	7.77	5.98	30.43	31.20	24.02	37.87	35.14	31.90	23.91	15.20	13.03	12.87	269
	Meet Yazied	-53.70	-32.75	-92.85	-113.70	-114.10	-198.80	-211.30	-171.90	-131.45	-80.60	-73.10	-83.65	-1,358
	Total	103.84	136.37	279.41	279.90	290.11	525.25	571.59	483.23	348.41	205.39	221.25	187.64	3,640
1994	Ralah Abbasee	175.50	129.00	335.00	290.00	347.00	629.00	705.45	585.25	432.00	238.50	265.50	153.50	4,286
	El Monofy	13.82	4.65	15.75	11.79	14.65	28.22	27.87	31.63	28.51	17.76	12.42	15.81	230
	Balamoun P.S.	4.44	4.49	18.26	14.13	21.31	26.63	35.88	23.67	20.10	10.66	9.85	2.61	192
	Kafr Saad P.S.	8.49	13.11	27.83	23.25	29.35	39.91	40.19	38.49	29.21	18.46	13.97	9.15	291
	Meet Yazied	-56.00	-32.00	-120.45	-99.90	-106.40	-165.30	-193.80	-187.65	-142.70	-78.70	-87.20	-51.00	-1,341
	Total	146.24	119.25	276.39	239.26	305.91	538.46	615.59	491.39	367.13	206.67	214.53	130.07	3,658
1995	Ralah Abbasee	147.75	218.00	297.50	313.50	373.00	644.00	699.00	613.55	434.25	227.10	287.00	225.75	4,480
	El Monofy	6.62	11.83	18.57	12.09	14.87	36.34	26.90	30.29	20.29	17.06	16.49	17.01	239
	Balamoun P.S.	12.63	10.41	17.73	17.65	17.52	21.43	26.90	34.00	21.84	10.71	15.80	11.25	218
	Kafr Saad P.S.	14.73	18.59	22.56	22.04	30.44	35.27	41.54	32.76	28.04	14.94	18.40	14.57	294
	Meet Yazied	-45.30	-70.60	-94.70	-101.00	-114.30	-209.90	-212.90	-199.00	-151.10	-78.10	-88.80	-68.40	-1,434
	Total	136.43	188.23	261.66	264.29	321.54	527.13	581.43	511.60	353.32	191.71	248.89	200.18	3,797
1996	Ralah Abbasee	131.75	242.50	284.00	319.50	425.50	667.20	718.20	638.00	443.00	243.90	313.75	226.00	4,653
	El Monofy	6.06	10.16	18.59	12.54	18.50	34.34	31.83	32.29	27.19	18.97	17.92	19.42	259
	Balamoun P.S.	9.24	13.16	16.19	16.14	20.10	28.37	30.11	27.04	20.79	12.86	15.35	11.10	220
	Kafr Saad P.S.	7.03	15.22	13.05	25.94	31.15	43.76	42.28	41.05	35.55	17.52	24.14	15.81	313
	Meet Yazied	-37.60	-89.60	-87.90	-96.90	-130.75	-211.15	-233.00	-211.40	-148.00	-79.20	-98.50	-73.20	-1,497
	Total	116.49	191.44	243.93	277.22	364.51	562.52	589.42	526.98	378.53	214.05	272.66	199.13	3,948
1997	Ralah Abbasee	147.50	211.50	262.50	333.50	447.00	679.20	732.30	649.40	432.00	236.50	323.60	220.70	4,676
	El Monofy	14.73	17.77	13.68	15.20	24.99	26.22	27.08	24.23	8.27	19.05	19.52	13.30	224
	Balamoun P.S.	9.81	9.07	14.05	15.47	23.36	29.51	32.01	29.49	20.97	11.36	13.08	9.42	218
	Kafr Saad P.S.	12.64	8.52	14.44	23.67	30.61	45.43	44.19	40.92	31.68	15.78	19.74	0.10	288
	Meet Yazied	-32.70	-74.60	-89.50	-107.30	-131.80	-212.20	-238.20	-188.50	-154.70	-79.80	-100.50	-82.20	-1,492
	Total	151.97	172.26	215.17	280.53	394.16	568.16	597.38	555.53	338.41	202.89	275.44	161.32	3,913
Average	Ralah Abbasee	145.90	191.45	296.10	317.35	388.18	651.68	710.29	610.78	430.43	236.90	289.21	210.94	4,479
	El Monofy	10.96	9.98	17.04	12.87	17.78	30.73	27.65	29.46	21.56	18.46	15.82	17.74	237
	Balamoun P.S.	9.07	7.70	17.59	16.56	19.64	24.91	30.32	28.17	21.04	11.69	13.29	8.18	208
	Kafr Saad P.S.	10.13	12.28	21.66	25.22	29.11	40.45	40.67	37.02	29.72	16.38	17.86	10.50	291
	Meet Yazied	-45.06	-59.91	-97.08	-103.76	-119.47	-203.47	-217.84	-191.69	-145.59	-79.28	-89.62	-71.69	-1,424
	Total	130.99	161.51	255.31	268.24	335.25	544.30	591.08	513.75	357.16	204.14	246.55	175.67	3,791
Maximum 1996		116.49	191.44	243.93	277.22	364.51	562.52	589.42	526.98	378.53	214.05	272.66	199.13	3,948
Percent to average		89	119	96	103	109	103	100	103	106	105	111	113	104
Minimum 1993		103.84	136.37	279.41	279.90	290.11	525.25	571.59	483.23	348.41	205.39	221.25	187.64	3,640
Percent to average		79	84	109	104	87	96	97	94	98	101	90	107	96

Source: Gharbia Irrigation Directorate and Water Distribution Sector in MPWWR, MED Computer Center Kafr El Sheikh

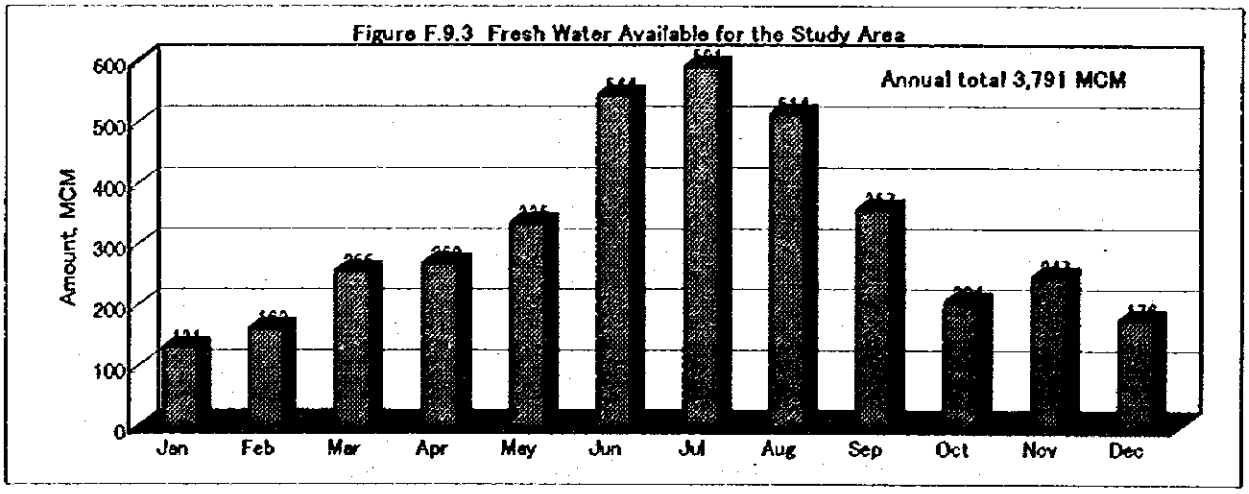

Table F.9.5 Discharge at East El Monofia M.P.S. (Karene drain, Upsteram of Gharbia, to Ralah Abbasee) in '000CUM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	6,538	3,130	4,122	3,695	3,700	3,501	2,434	3,916	6,050	5,080	4,529	3,231	50,126
1994	8,125	417	6,155	5,724	4,991	4,416	4,130	6,179	10,056	7,184	8,156	5,974	71,507
1995	2,494	4,634	6,352	6,753	4,259	4,001	5,423	5,103	8,207	3,843	3,141	4,032	58,242
1996	2,626	5,164	6,588	5,636	4,050	2,664	2,961	2,754	2,502	2,034	3,051	2,169	42,201
1997	1,782	4,662	12,820	7,149	2,836	3,870	4,266	5,614	6,207	3,402	4,365	5,254	62,227
Average	4,313	3,601	7,207	5,831	3,967	3,690	3,843	4,713	6,604	4,309	4,648	4,132	56,861

Source: MED Computer Center, Kafr El Sheikh

Table F.9.6 Discharge at Hamoul M.P.S. (Gharbia drain to Bahr Tera) in '000CUM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	16,895	3,793	31,795	31,291	27,790	23,180	38,117	37,864	37,334	26,522	21,682	12,444	308,707
1994	12,242	2,940	28,664	35,752	32,772	35,147	28,882	35,992	37,443	16,007	13,247	121	279,209
1995	15,024	9,795	14,073	13,456	25,785	35,431	39,338	36,770	35,569	30,847	15,096	16,284	287,468
1996	7,867	20,629	23,627	29,676	32,539	38,135	39,887	39,233	36,871	26,169	24,274	19,832	338,739
1997	11,227	20,257	26,271	27,484	33,539	33,637	50,435	53,004	48,969	36,419	28,305	20,340	389,866
Average	12,651	11,483	24,686	27,532	30,465	33,106	39,332	40,573	39,237	27,193	20,521	13,804	320,802

Source: MED Computer Center, Kafr El Sheikh

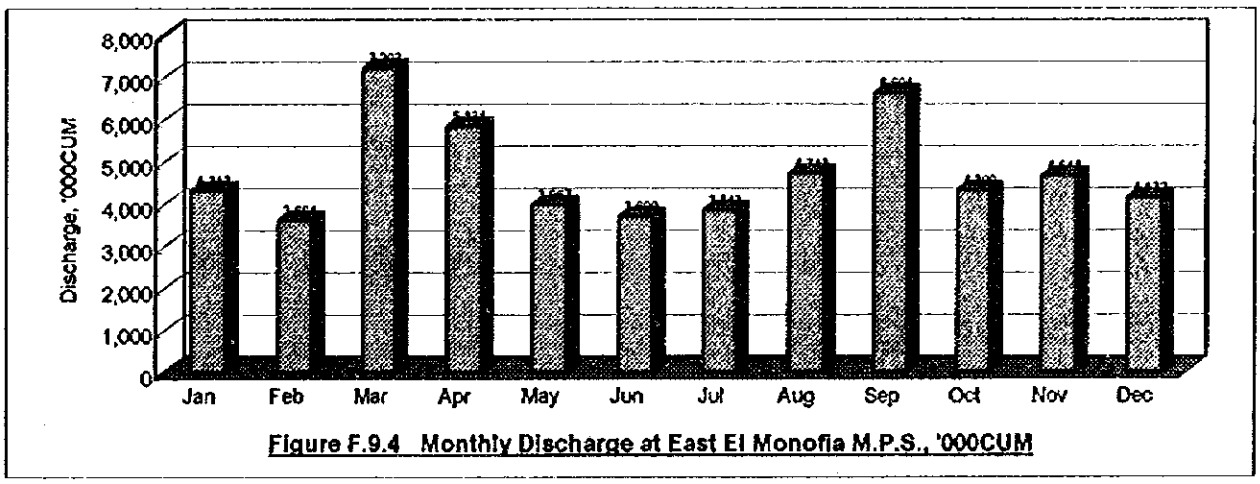

Figure F.9.4 Monthly Discharge at East El Monofia M.P.S., '000CUM

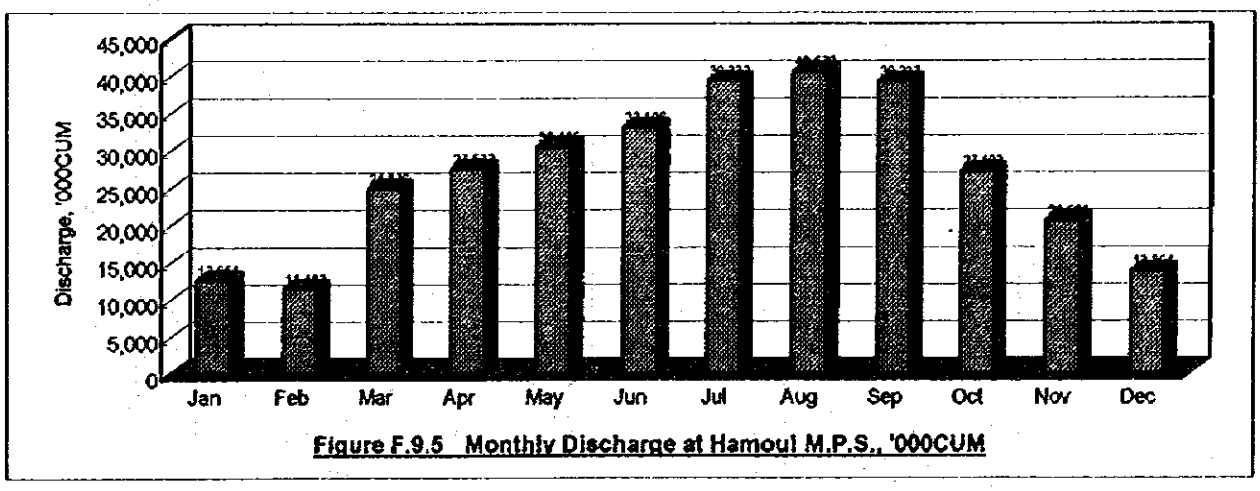

Figure F.9.5 Monthly Discharge at Hamoul M.P.S., '000CUM

Table F.9.7 Known Water Amount Avairable for Bahr Shebin Command Area in MCM and Estimation of Unit Irrigation Cunsumption

Intake	Avrg Duration	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Raiah Abbasee	1993-1997	145.90	191.45	296.10	317.35	388.18	651.68	710.29	610.78	430.43	236.90	289.21	210.94	4,479
El Monofy	do	10.96	9.98	17.04	12.87	17.78	30.73	27.65	29.46	21.56	18.46	15.82	17.74	237
Meet Zaled	do	-45.06	-59.91	-97.08	-103.76	-119.47	-203.47	-217.84	-191.69	-145.59	-79.28	-89.62	-71.69	-1,424
Sub Total	do	111.80	141.52	216.06	226.46	286.49	478.94	520.10	448.55	306.40	176.08	215.41	156.99	3,292
Balamoun I.P.S.	1993-1997	9.07	7.70	17.59	16.56	19.64	24.91	30.32	28.17	21.04	11.69	13.29	8.18	208
Kafr Saad I.P.S.	do	10.13	12.28	21.66	25.22	29.11	40.45	40.67	37.02	29.72	16.38	17.86	10.50	291
Sub Total	do	19.20	19.99	39.26	41.78	48.76	65.36	70.98	65.19	50.76	28.07	31.14	18.68	499
Sub Total of Fresh Nile	do	130.99	161.51	255.31	268.24	335.25	544.30	591.08	513.75	357.16	204.14	246.55	175.67	3,791
East El Monofia M.P.S.	1993-1997	4.31	3.60	7.21	5.83	3.97	3.69	3.84	4.71	6.60	4.31	4.65	4.13	57
Hamoul M.P.S.	do	12.65	11.48	24.89	27.53	30.48	33.11	39.33	40.57	39.24	27.19	20.52	13.80	321
Sub Total of Drainage	do	16.96	15.08	32.09	33.36	34.45	36.80	43.17	45.29	45.84	31.50	25.17	17.94	378
Known Total Amount in MCM		**147.96**	**176.59**	**287.41**	**301.61**	**369.70**	**581.10**	**634.26**	**559.03**	**403.00**	**235.65**	**271.72**	**193.60**	**4,169**
Munucipality & Industry		**12.79**	**8.33**	**12.79**	**12.46**	**12.79**	**12.46**	**12.79**	**11.80**	**11.47**	**11.80**	**11.47**	**11.80**	**143**
Avairable for Irrigation		**135.17**	**168.26**	**274.62**	**289.15**	**356.90**	**568.64**	**621.47**	**547.23**	**391.53**	**223.85**	**260.25**	**181.80**	**4,026**

Bahr Shebin Whole Area Served =	**641,397 fed.**	**269,387 ha**	**U.C.=**	**1,496 mm**	**6,277 CUM/fed**
Bahr Shebin excluding Areas Served by Drainage & Feeder=	**566,745 fed.**	**238,033 ha**	**U.C.=**	**1,691 mm**	**7,104 CUM/fed**

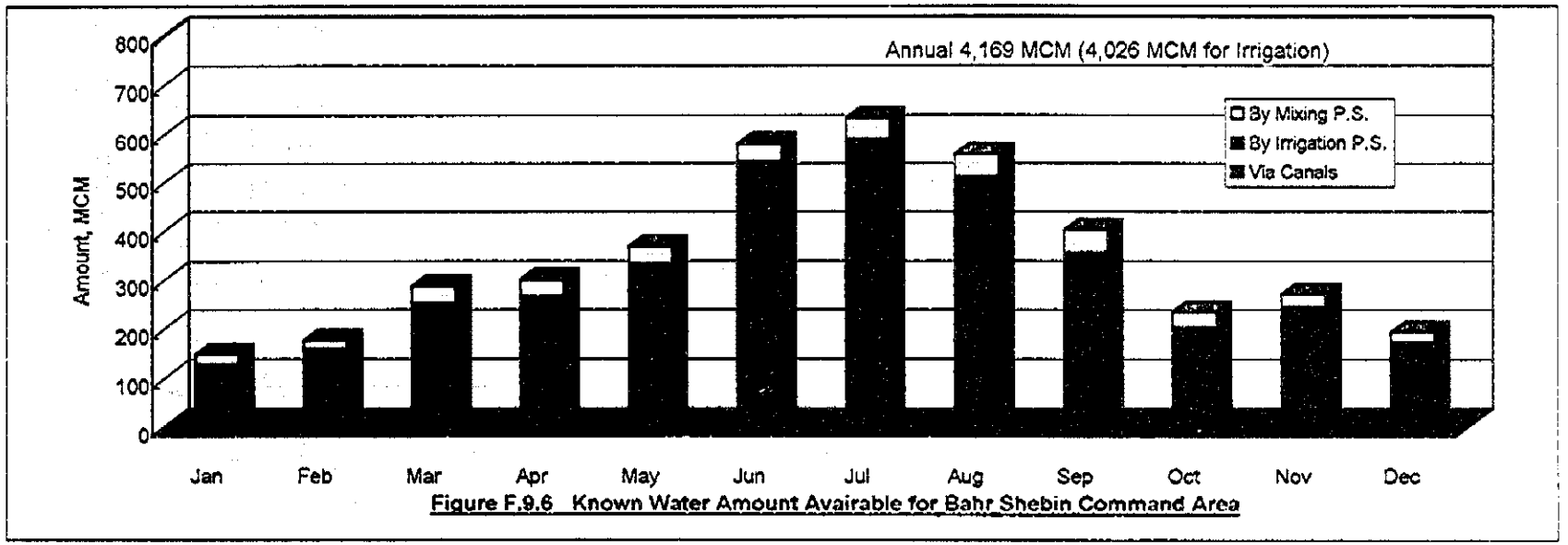

Figure F.9.6 Known Water Amount Avairable for Bahr Shebin Command Area

Table F.9.8 Municipality and Industry Requirement for Canals, MCM

Directorate	Canal	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Gharbia	Bahr Shebin	2.790	2.520	2.790	2.700	2.790	2.700	2.790	2.790	2.700	2.790	2.700	2.790	32.85
West Dakahlia	Bahr Shebin	4.978	2.420	4.978	4.840	4.978	4.840	4.978	4.978	4.840	4.978	4.840	4.978	56.63
	El Sahel	3.162	1.530	3.162	3.060	3.166	3.060	3.162	3.162	3.060	3.162	3.060	3.162	35.91
Kafr El Sheikh	Tera	1.860	1.860	1.860	1.860	1.860	1.860	1.860	0.870	0.870	0.870	0.870	0.870	17.37
Total		**12.790**	**8.330**	**12.790**	**12.460**	**12.794**	**12.460**	**12.790**	**11.800**	**11.470**	**11.800**	**11.470**	**11.800**	**142.75**

Source: Water Distribution Sector, MPWWR

F.10 Discharge Data

Discharge data at representative barrages have been collected at Gharbia Irrigation Directorate and Water Distribution Sector in the Headquarters of MPWWR. Those are attached hereunder, and the data collected at Gharbia Directorate had been employed in this Study.

Table F.10.1 Discharge at Ralah Abbasee from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	73.00	28.00	86.00	116.75	92.50	187.60	226.50	190.50	148.50	96.50	79.20	100.25	1,425
	11-20	32.00	53.00	89.50	115.50	100.80	228.00	238.25	180.00	139.70	66.50	83.50	71.00	1,398
	21-	22.00	75.25	126.00	98.00	155.10	223.40	231.75	197.20	122.70	75.50	93.50	57.50	1,478
	Total	127.00	156.25	301.50	330.25	348.40	639.00	696.50	567.70	410.90	238.50	256.20	228.75	4,301
1994	1-10	65.50	0.00	112.50	113.50	95.00	174.50	235.15	197.00	171.75	79.50	76.50	38.00	1,359
	11-20	104.00	54.00	93.00	94.00	113.50	225.00	234.80	183.50	145.25	83.00	121.50	57.00	1,509
	21-	6.00	75.00	129.50	82.50	138.50	229.50	235.50	204.75	115.00	76.00	67.50	58.50	1,418
	Total	175.50	129.00	335.00	290.00	347.00	629.00	705.45	585.25	432.00	238.50	265.50	153.50	4,286
1995	1-10	90.50	87.00	68.00	125.00	105.00	178.50	234.00	203.75	169.50	72.60	83.00	79.75	1,497
	11-20	45.50	90.00	88.00	96.00	119.00	232.50	231.00	195.20	149.00	68.00	96.50	65.50	1,476
	21-	11.75	41.00	141.50	92.50	149.00	233.00	234.00	214.60	115.75	86.50	107.50	80.50	1,508
	Total	147.75	218.00	297.50	313.50	373.00	644.00	699.00	613.55	434.25	227.10	287.00	225.75	4,480
1996	1-10	93.00	86.50	74.00	123.00	125.50	194.00	237.00	207.50	178.75	77.40	89.50	81.75	1,568
	11-20	16.75	84.00	83.00	101.50	138.00	236.20	236.40	207.00	144.75	72.75	105.25	61.50	1,487
	21-	22.00	72.00	127.00	95.00	162.00	237.00	244.80	223.50	119.50	93.75	119.00	82.75	1,598
	Total	131.75	242.50	284.00	319.50	425.50	667.20	718.20	638.00	443.00	243.90	313.75	226.00	4,653
1997	1-10	90.25	70.50	68.00	129.00	119.50	206.00	237.00	228.90	175.75	72.75	89.75	84.00	1,571
	11-20	16.75	83.00	78.50	102.00	146.00	236.20	237.00	205.00	138.00	76.25	112.20	61.70	1,493
	21-	40.50	58.00	116.00	102.50	181.50	237.00	258.30	215.50	118.25	87.50	121.65	75.00	1,612
	Total	147.50	211.50	262.50	333.50	447.00	679.20	732.30	649.40	432.00	236.50	323.60	220.70	4,676
Average		145.90	191.45	296.10	317.35	388.18	651.68	710.29	610.78	430.43	236.90	289.21	210.94	4,479

Source: Gharbia Irrigation Directorate

Table F.10.2 Discharge at El Santa (Old Regulator) from 1988 to 1992 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1988	1-10	12.90	0.00	11.50	13.65	10.80	14.60	17.45	13.80	11.50	4.90	10.95	9.10	131
	11-20	12.80	7.30	15.25	14.55	12.05	7.05	14.20	14.30	12.00	6.90	12.70	11.50	141
	21-	0.00	1.30	11.55	11.35	12.65	16.70	14.75	17.15	9.70	12.90	10.00	12.90	131
	Total	25.70	8.60	38.30	39.55	35.50	38.35	46.40	45.25	33.20	24.70	33.65	33.50	403
1989	1-10	9.70	0.00	7.55	9.85	1.20	11.50	17.50	5.15	5.30	2.20	5.50	10.65	86
	11-20	8.30	0.80	10.30	5.20	3.20	8.25	6.85	9.30	14.75	3.00	5.70	12.10	88
	21-	0.00	0.80	10.25	7.10	5.20	17.80	7.45	10.10	8.35	1.70	10.30	13.85	93
	Total	18.00	1.60	28.10	22.15	9.60	37.55	31.80	24.55	28.40	6.90	21.50	36.60	267
1990	1-10	31.70	0.00	5.70	2.50	2.60	7.50	13.50	8.05	11.60	3.50	0.40	5.20	92
	11-20	28.10	0.00	5.80	1.30	5.75	12.30	8.55	10.30	15.20	2.25	2.70	0.60	93
	21-	0.00	5.40	3.00	1.70	8.40	12.40	8.45	14.75	11.90	4.90	4.70	1.50	77
	Total	59.80	5.40	14.50	5.50	16.75	32.20	30.50	33.10	38.90	10.65	7.80	7.30	262
1991	1-10	1.10	0.00	5.00	1.30	2.20	3.90	5.45	8.55	13.05	7.95	2.00	5.10	56
	11-20	0.60	3.05	3.90	1.10	1.30	9.45	1.60	10.00	12.50	6.15	6.50	4.40	61
	21-	0.00	4.00	3.10	2.20	2.00	8.80	3.60	16.10	2.80	6.40	7.10	9.85	66
	Total	1.70	7.05	12.00	4.60	5.50	22.15	10.65	34.65	28.35	20.50	15.60	19.35	182
1992	1-10	7.50	0.00	3.60	0.90	3.90	10.80	14.05	1.90	3.00	13.40	6.10	2.70	68
	11-20	5.30	0.80	7.00	1.50	4.00	13.75	13.50	9.10	10.10	15.85	7.00	4.70	93
	21-	0.00	5.40	0.20	3.30	8.95	18.05	8.35	12.40	8.05	10.10	5.80	13.80	94
	Total	12.80	6.20	10.80	5.70	16.85	42.60	35.90	23.40	21.15	39.35	18.90	21.20	255
Average		23.60	5.77	20.74	15.50	16.84	34.57	31.05	32.19	30.00	20.42	19.49	23.59	274

Note: The measurement at the old regulator ceased in 1993 and new H-Q at the new regulator in now under establishment.

Table F.10.3 Discharge at Meet Yazied from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	26.20	0.00	25.55	49.20	29.35	56.80	75.10	57.80	47.80	30.50	24.50	32.75	456
	11-20	27.50	9.70	26.80	34.30	33.65	62.10	66.60	55.20	45.80	24.70	24.40	24.60	435
	21-	0.00	23.05	40.50	30.20	51.10	79.90	69.60	58.90	37.85	25.40	24.20	26.30	467
	Total	53.70	32.75	92.85	113.70	114.10	198.80	211.30	171.90	131.45	80.60	73.10	83.65	1,358
1994	1-10	24.10	0.00	41.50	39.70	32.20	51.00	64.00	59.00	59.20	25.60	27.30	16.60	440
	11-20	31.90	12.60	32.30	31.40	34.20	67.50	63.60	60.10	49.00	28.60	34.50	16.30	462
	21-	0.00	19.40	46.65	28.80	40.00	66.80	66.20	68.55	34.50	24.50	25.40	18.10	439
	Total	56.00	32.00	120.45	99.90	106.40	185.30	193.80	187.65	142.70	78.70	87.20	51.00	1,341
1995	1-10	29.20	25.00	25.10	40.20	30.20	53.20	72.10	61.00	58.10	25.45	25.60	27.30	472
	11-20	16.10	28.30	26.50	30.40	38.10	76.60	70.00	62.90	51.30	24.40	31.60	16.40	473
	21-	0.00	17.30	43.10	30.40	46.00	80.10	70.60	75.10	41.70	28.25	31.60	24.70	489
	Total	45.30	70.60	94.70	101.00	114.30	209.90	212.90	199.00	151.10	78.10	88.80	68.40	1,434
1996	1-10	27.10	32.50	24.90	39.00	37.55	57.90	77.00	68.60	58.30	25.20	27.20	25.70	501
	11-20	3.50	31.00	27.00	29.90	44.40	76.65	77.00	65.80	49.50	24.80	36.90	21.60	488
	21-	7.00	26.10	36.00	28.00	48.80	76.60	79.00	77.00	40.20	29.20	34.40	25.90	508
	Total	37.60	89.60	87.90	96.90	130.75	211.15	233.00	211.40	148.00	79.20	98.50	73.20	1,497
1997	1-10	30.70	26.00	23.60	42.10	32.50	60.50	76.70	78.70	69.70	23.70	27.20	29.50	519
	11-20	1.00	28.00	24.80	33.60	44.60	75.70	76.80	75.50	49.80	25.30	35.00	24.20	494
	21-	1.00	20.60	41.10	31.70	54.50	76.00	84.70	36.30	35.20	30.80	38.30	28.50	479
	Total	32.70	74.60	89.50	107.30	131.80	212.20	238.20	188.50	154.70	79.80	100.50	82.20	1,492
Average		45.06	59.81	97.08	103.76	119.47	203.47	217.84	191.69	145.59	79.28	89.62	71.69	1,424

Source: Gharbia Irrigation Directorate

Table F.10.4 Discharge at Rahbeen from 1993 to 1997 (10 days basis) In MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	31.40	0.00	59.00	78.30	69.10	95.00	106.10	107.20	80.00	52.50	38.25	61.40	778
	11-20	56.10	23.60	57.42	75.70	66.60	113.80	124.70	102.01	73.70	38.30	46.90	44.00	823
	21-	0.00	45.90	81.50	72.00	94.10	108.70	129.40	109.40	71.80	41.85	47.80	37.50	840
	Total	87.50	69.50	197.92	226.00	229.80	317.50	360.20	318.61	225.50	132.65	132.95	142.90	2,441
1994	1-10	31.20	0.00	57.70	58.70	51.70	96.25	125.10	107.45	95.20	44.75	43.15	24.50	736
	11-20	60.00	25.00	52.60	54.00	60.40	121.70	130.20	101.90	80.00	47.55	73.00	29.00	835
	21-	0.00	41.00	64.00	50.20	112.90	123.50	132.00	111.40	64.35	44.50	39.20	34.00	817
	Total	91.20	66.00	174.30	162.90	225.00	341.45	387.30	320.75	239.55	136.80	155.35	87.50	2,388
1995	1-10	49.05	50.70	35.70	71.00	61.50	99.34	128.90	114.60	94.16	41.50	46.43	47.10	840
	11-20	16.30	49.60	48.30	55.00	73.15	125.64	128.90	106.64	83.15	38.50	55.00	31.40	812
	21-	0.00	22.50	78.20	51.20	88.90	129.16	129.50	118.15	65.55	48.60	60.90	40.00	833
	Total	65.35	122.80	162.20	177.20	223.55	354.14	387.30	339.39	242.86	128.60	162.33	118.50	2,484
1996	1-10	52.20	46.85	50.10	71.20	66.19	107.00	130.40	115.00	91.08	43.00	48.57	45.46	867
	11-20	0.00	50.00	56.50	54.85	73.00	134.70	130.80	114.40	79.55	39.88	60.12	32.82	827
	21-	0.00	49.00	77.00	50.00	87.90	130.40	135.10	124.05	66.41	49.13	67.62	44.62	881
	Total	52.20	145.85	183.60	176.05	227.09	372.10	396.30	353.45	237.04	132.01	176.31	122.90	2,575
1997	1-10	56.05	42.60	42.00	61.10	64.05	112.96	130.00	130.90	101.50	38.66	48.20	47.30	876
	11-20	0.00	47.20	45.10	52.00	75.00	129.52	130.00	125.00	77.30	40.88	61.00	33.05	816
	21-	11.68	30.20	57.30	56.90	96.78	130.72	143.00	122.00	65.70	45.10	69.00	40.80	869
	Total	67.73	120.00	144.40	170.00	235.83	373.20	403.00	377.90	244.50	124.84	178.20	121.15	2,561
Average		72.80	104.83	172.48	182.43	228.25	351.68	386.82	342.02	237.89	130.98	161.03	118.59	2,490

Source: Gharbia Irrigation Directorate

Table F.10.5 Discharge at El Sahel Intake from 1993 to 1997 (10 days basis) In MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	2.30	0.00	2.70	3.80	3.45	11.10	7.30	6.20	3.60	3.40	3.20	5.25	52
	11-20	2.80	0.60	2.15	5.20	4.80	12.85	5.95	5.90	2.40	3.10	3.55	3.25	53
	21-	0.00	3.50	4.70	3.45	10.60	13.00	7.60	4.40	3.80	2.65	3.45	3.00	60
	Total	5.10	4.30	9.55	12.45	18.85	36.95	20.85	16.50	9.80	9.15	10.20	11.50	165
1994	1-10	3.58	0.00	4.85	4.60	4.60	5.10	12.80	9.00	8.70	3.65	3.75	2.27	63
	11-20	4.85	1.60	5.00	4.30	5.10	9.60	10.55	8.00	7.70	4.40	5.90	2.44	69
	21-	0.00	3.20	2.60	2.85	6.30	10.90	10.60	10.20	6.10	4.75	3.70	2.80	64
	Total	8.43	4.80	12.45	11.75	16.00	25.60	33.95	27.20	22.50	12.80	13.35	7.51	196
1995	1-10	4.10	4.40	2.85	7.80	5.75	7.72	11.03	9.90	9.90	4.70	4.31	3.60	76
	11-20	1.05	5.70	2.05	5.40	5.50	11.38	11.09	10.00	9.40	4.00	5.05	3.15	74
	21-	0.00	3.10	7.50	2.80	4.60	11.20	11.19	10.96	7.80	5.15	5.00	3.85	73
	Total	5.15	13.20	12.40	16.00	15.85	30.30	33.32	30.86	27.10	13.85	14.36	10.60	223
1996	1-10	3.95	3.15	4.90	5.60	6.46	8.22	11.20	11.50	9.05	3.25	4.12	3.70	75
	11-20	0.00	5.00	5.00	5.00	4.20	11.10	11.00	8.80	7.20	3.45	4.78	3.35	69
	21-	0.00	1.30	3.00	5.00	7.06	12.00	11.80	9.62	6.00	4.35	5.25	3.82	69
	Total	3.95	9.45	12.90	15.60	17.72	31.32	34.00	29.92	22.25	11.05	14.15	10.87	213
1997	1-10	3.35	4.85	4.20	5.10	5.38	10.45	10.00	11.60	10.20	1.70	4.10	4.90	76
	11-20	0.00	4.20	4.85	4.00	3.50	10.20	10.00	11.30	9.30	4.00	6.10	3.60	71
	21-	0.77	3.50	3.10	4.64	7.82	10.00	11.00	11.20	7.20	4.70	7.00	4.20	75
	Total	4.12	12.55	12.15	13.74	16.70	30.65	31.00	34.10	26.70	10.40	17.20	12.70	222
Average		5.35	8.86	11.89	13.91	17.02	30.96	30.62	27.72	21.67	11.45	13.85	10.64	204

Source: Gharbia Irrigation Directorate

Table F.10.6 Discharge at El Mahalla from 1993 to 1997 (10 days basis) In MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	0.50	0.00	0.35	0.60	0.50	0.50	0.60	0.80	0.70	0.45	0.40	0.60	6
	11-20	0.45	0.50	0.30	0.60	0.00	0.60	0.80	0.60	0.60	0.20	0.20	0.30	5
	21-	0.00	0.50	0.40	0.10	0.60	0.60	1.00	1.20	0.50	0.30	0.20	0.20	6
	Total	0.95	1.00	1.05	1.30	1.10	1.70	2.40	2.60	1.80	0.95	0.80	1.10	17
1994	1-10	0.60	0.00	0.50	0.50	0.10	0.20	1.00	1.00	0.90	1.05	0.80	1.05	8
	11-20	0.70	0.00	0.80	0.70	0.50	0.60	1.00	1.00	0.85	0.45	0.30	0.10	7
	21-	0.00	0.10	0.40	0.50	0.75	0.85	1.15	1.35	0.90	0.30	0.75	0.40	7
	Total	1.30	0.10	1.70	1.70	1.35	1.65	3.15	3.35	2.65	1.80	1.85	1.55	22
1995	1-10	0.55	0.30	0.20	0.70	0.60	0.40	0.55	0.80	1.00	0.55	0.53	0.30	6
	11-20	0.10	1.00	0.10	0.80	0.20	0.60	0.60	0.80	1.00	0.50	0.50	0.50	7
	21-	0.00	0.50	0.90	0.10	0.50	0.45	0.85	0.75	0.70	0.20	0.20	0.35	6
	Total	0.65	1.80	1.20	1.60	1.30	1.45	2.00	2.35	2.70	1.25	1.23	1.15	19
1996	1-10	0.30	0.60	0.50	0.60	0.50	0.75	0.75	0.75	0.60	0.40	0.40	0.40	7
	11-20	0.00	0.50	0.40	0.70	0.70	0.75	0.75	0.60	0.50	0.50	0.50	0.50	6
	21-	0.30	0.10	0.40	0.40	0.15	1.00	0.60	0.60	0.40	0.10	0.10	0.20	4
	Total	0.60	1.20	1.30	1.70	1.35	2.50	2.10	1.95	1.50	1.00	1.00	1.10	17
1997	1-10	0.30	0.50	0.40	0.30	0.00	0.70	0.75	0.75	0.65	0.40	0.50	0.50	6
	11-20	0.00	0.50	0.70	0.50	0.75	0.65	0.75	0.75	0.50	0.30	0.40	0.40	6
	21-	0.20	0.80	0.40	0.50	0.30	0.75	0.90	0.90	0.50	0.20	0.20	0.10	6
	Total	0.50	1.80	1.50	1.30	1.05	2.10	2.40	2.40	1.65	0.90	1.10	1.00	18
Average		0.80	1.18	1.35	1.52	1.23	1.88	2.41	2.53	2.06	1.18	1.20	1.18	19

Source: Gharbia Irrigation Directorate

Table F.10.7 Discharge at Mallah from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	6.10	0.10	9.05	9.00	7.00	13.70	16.70	14.60	11.90	8.10	6.80	7.20	110
	11-20	7.10	8.00	7.90	8.60	8.30	17.70	16.70	11.80	11.00	6.70	6.90	6.00	117
	21-	0.00	6.80	11.10	7.90	12.70	17.60	17.70	14.70	10.00	6.20	6.90	5.45	117
	Total	13.20	14.90	28.05	25.50	28.00	49.00	51.10	41.10	32.90	21.00	20.60	18.65	344
1994	1-10	5.70	0.00	8.50	9.70	7.45	11.50	17.80	13.20	11.30	5.60	4.85	7.90	104
	11-20	8.10	3.30	8.20	8.30	7.00	17.00	16.90	13.00	9.80	5.90	9.40	4.70	112
	21-	0.00	5.20	11.80	6.50	8.30	19.00	14.90	14.90	8.10	4.95	9.60	5.20	108
	Total	13.80	8.50	28.50	24.50	22.75	47.50	49.60	41.10	29.20	16.65	23.85	17.80	324
1995	1-10	7.50	6.80	6.70	9.90	8.10	13.30	16.00	13.00	12.90	5.40	5.00	6.60	111
	11-20	4.00	9.60	7.50	8.10	9.80	15.20	16.00	14.20	10.10	4.50	7.35	4.50	111
	21-	0.00	5.20	10.80	7.30	12.60	16.40	17.10	15.20	7.60	5.50	8.00	6.30	112
	Total	11.50	21.60	25.00	25.30	30.50	44.90	49.10	42.40	30.80	15.40	20.35	17.40	334
1996	1-10	7.55	7.60	9.40	9.20	10.80	11.00	13.60	13.70	13.70	6.00	6.10	7.30	116
	11-20	0.95	8.30	9.00	7.30	10.20	17.10	12.10	14.30	12.00	6.00	7.30	5.50	110
	21-	0.00	8.30	11.70	7.60	10.30	6.90	16.70	15.30	11.20	6.60	7.80	6.00	108
	Total	8.50	24.20	30.10	24.10	31.30	35.00	42.40	43.30	36.90	18.60	21.20	18.80	334
1997	1-10	5.80	5.80	6.00	11.80	8.60	15.50	17.50	18.30	14.90	6.10	6.10	7.80	124
	11-20	0.00	7.20	8.00	8.60	12.20	19.40	16.00	16.00	10.40	6.00	9.00	5.50	118
	21-	1.80	5.00	11.60	8.40	12.90	18.00	18.20	17.60	9.60	6.60	9.00	6.40	125
	Total	7.60	18.00	25.60	28.80	33.70	52.90	51.70	51.90	35.10	18.70	24.10	19.70	368
Average		10.92	17.44	27.45	25.64	29.25	45.86	48.78	43.96	32.98	18.07	22.02	18.47	341

Source: Gharbia Irrigation Directorate

Table F.10.8 Discharge at El Quaysarala from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	0.90	0.00	0.15	0.40	0.50	0.40	0.75	0.50	0.40	0.20	0.10	0.30	5
	11-20	0.65	0.50	0.55	0.30	0.50	0.75	0.45	0.40	0.40	0.50	0.50	0.50	6
	21-	0.00	0.10	0.60	0.20	0.20	0.45	0.60	0.30	0.40	0.20	0.00	0.30	3
	Total	1.55	0.60	1.30	0.90	1.20	1.60	1.80	1.20	1.20	0.90	0.60	1.10	14
1994	1-10	0.30	0.00	0.50	0.50	0.30	0.75	0.75	0.45	0.90	0.45	0.60	0.45	6
	11-20	0.50	0.30	0.40	0.20	0.30	0.60	0.60	0.75	0.60	0.30	1.20	0.75	7
	21-	0.00	0.20	0.60	0.60	0.20	0.90	0.75	0.75	0.60	0.75	0.75	0.60	7
	Total	0.80	0.50	1.50	1.30	0.80	2.25	2.10	1.95	2.10	1.50	2.55	1.80	19
1995	1-10	0.55	0.00	0.20	0.50	0.40	0.40	0.60	0.40	0.50	0.30	0.40	0.80	5
	11-20	0.10	1.00	0.50	0.60	0.50	0.50	0.40	0.50	0.40	0.10	0.20	0.20	5
	21-	0.00	0.60	0.50	0.50	0.50	0.30	0.60	0.60	0.40	0.30	0.30	0.30	5
	Total	0.65	1.60	1.20	1.60	1.40	1.20	1.60	1.50	1.30	0.70	0.90	1.30	15
1996	1-10	0.80	0.60	0.70	0.40	0.50	0.40	0.75	0.75	0.75	0.30	0.40	0.50	7
	11-20	0.00	0.00	0.00	0.20	0.00	0.75	0.75	0.75	0.60	0.00	0.10	0.10	3
	21-	0.40	0.60	0.70	0.50	0.60	0.75	1.05	0.90	0.50	0.50	0.40	0.40	7
	Total	1.20	1.20	1.40	1.10	1.10	1.90	2.55	2.40	1.85	0.80	0.90	1.00	17
1997	1-10	0.30	0.70	0.80	0.50	0.50	0.90	0.75	0.75	0.50	0.40	0.40	0.40	7
	11-20	0.00	0.30	0.30	0.00	0.60	0.75	0.75	0.75	0.50	0.20	0.10	0.50	5
	21-	0.20	0.20	0.70	0.70	0.30	0.75	0.75	0.75	0.50	0.50	0.50	0.10	6
	Total	0.50	1.20	1.80	1.20	1.40	2.40	2.25	2.25	1.50	1.10	1.00	1.00	18
Average		0.94	1.02	1.44	1.22	1.18	1.87	2.06	1.86	1.59	1.00	1.19	1.24	17

Source: Gharbia Irrigation Directorate

Table F.10.9 Discharge at Omar Pick from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	3.50	0.00	1.80	5.00	3.60	4.70	6.10	8.00	5.60	2.00	2.00	1.70	44
	11-20	3.00	1.20	2.90	3.30	2.00	8.60	7.50	7.10	4.00	3.20	2.80	1.40	47
	21-	0.00	4.20	4.60	2.40	3.20	8.20	8.40	7.70	4.00	4.00	3.20	1.15	51
	Total	6.50	5.40	9.30	10.70	8.80	21.50	22.00	22.80	13.60	9.20	8.00	4.25	142
1994	1-10	1.55	0.00	3.00	5.00	4.90	5.30	7.00	8.00	8.00	2.00	2.00	2.15	49
	11-20	4.40	0.00	4.00	4.90	3.80	9.00	7.80	7.50	6.50	2.80	2.90	0.90	55
	21-	0.00	4.00	4.40	3.60	4.40	8.10	8.80	8.80	4.40	3.60	2.50	0.70	53
	Total	5.95	4.00	11.40	13.50	13.10	22.40	23.60	24.30	18.90	8.40	7.40	3.75	157
1995	1-10	2.50	4.90	3.25	4.50	1.85	5.40	8.50	8.00	8.00	3.00	2.80	2.10	55
	11-20	1.00	4.00	3.50	4.60	3.70	8.40	8.00	8.00	7.90	2.00	2.00	0.90	54
	21-	0.00	0.80	4.50	3.65	4.00	9.00	8.80	8.80	6.30	4.50	3.20	2.40	56
	Total	3.50	9.70	11.25	12.75	9.55	22.80	25.30	24.80	22.20	9.50	8.00	5.40	165
1996	1-10	3.20	3.00	1.60	4.50	1.20	2.90	7.00	7.00	6.20	3.50	2.40	1.80	44
	11-20	0.40	1.00	4.00	4.15	3.20	8.70	7.00	7.00	5.80	2.50	2.00	0.50	46
	21-	0.60	1.60	4.95	4.00	4.00	8.80	7.70	7.70	5.00	4.00	3.60	3.30	55
	Total	4.20	5.60	10.55	12.65	8.40	20.40	21.70	21.70	17.00	10.00	8.00	5.60	146
1997	1-10	2.10	3.00	1.80	4.80	4.00	4.10	7.00	7.00	6.30	2.70	2.00	2.00	47
	11-20	0.00	1.50	2.70	2.00	2.00	7.50	7.00	7.00	5.00	2.40	2.40	1.40	41
	21-	0.60	1.85	3.30	2.00	3.20	8.50	7.70	7.70	5.00	3.60	3.60	3.00	50
	Total	2.70	6.35	7.80	8.80	9.20	20.10	21.70	21.70	16.30	8.70	8.00	6.40	138
Average		4.57	6.21	10.06	11.68	9.81	21.44	22.86	23.06	17.60	9.16	7.88	5.08	149

Source: Gharbia Irrigation Directorate

Table F.10.10 Discharge at G. Dahtoura from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	0.50	0.00	0.45	0.50	0.20	0.15	0.15	0.10	0.05	0.05	0.20	0.25	3
	11-20	0.25	0.20	0.25	0.05	0.25	0.25	0.25	0.30	0.25	0.25	0.20	0.15	3
	21-	0.00	0.40	0.40	0.15	0.10	0.10	0.15	0.25	0.20	0.25	0.10	0.10	2
	Total	0.75	0.60	1.10	0.70	0.55	0.50	0.55	0.65	0.50	0.55	0.50	0.50	7
1994	1-10	0.45	0.00	0.00	0.25	0.35	0.25	0.25	0.25	0.20	0.20	0.15	0.21	3
	11-20	0.35	0.00	0.35	0.10	0.00	0.05	0.05	0.20	0.20	0.00	0.11	0.12	2
	21-	0.00	0.10	0.30	0.30	0.25	0.20	0.20	0.20	0.25	0.25	0.18	0.14	2
	Total	0.80	0.10	0.65	0.65	0.60	0.50	0.50	0.65	0.65	0.45	0.44	0.47	6
1995	1-10	0.44	0.50	0.00	0.15	0.10	0.25	0.25	0.25	0.25	0.35	0.25	0.25	3
	11-20	0.03	0.25	0.25	0.30	0.15	0.25	0.25	0.25	0.25	0.05	0.10	0.10	2
	21-	0.00	0.20	0.25	0.35	0.40	0.25	0.25	0.25	0.25	0.20	0.15	0.15	3
	Total	0.47	0.95	0.50	0.80	0.65	0.75	0.75	0.75	0.75	0.60	0.50	0.50	8
1996	1-10	0.20	0.50	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.30	0.25	0.25	3
	11-20	0.10	0.00	0.15	0.15	0.00	0.25	0.25	0.25	0.25	0.00	0.05	0.05	2
	21-	0.10	0.20	0.35	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.20	0.20	3
	Total	0.40	0.70	0.70	0.60	0.50	0.75	0.75	0.75	0.75	0.55	0.50	0.50	7
1997	1-10	0.30	0.35	0.25	0.35	0.25	0.20	0.25	0.25	0.25	0.30	0.20	0.25	3
	11-20	0.00	0.15	0.05	0.20	0.25	0.25	0.25	0.25	0.25	0.10	0.05	0.05	2
	21-	0.10	0.10	0.40	0.00	0.25	0.25	0.30	0.30	0.25	0.25	0.45	0.50	3
	Total	0.40	0.60	0.70	0.55	0.75	0.70	0.80	0.80	0.75	0.65	0.70	0.80	8
Average		0.56	0.59	0.73	0.66	0.61	0.64	0.67	0.72	0.68	0.56	0.53	0.55	8

Source: Gharbia Irrigation Directorate

Table F.10.11 Discharge at Ganablat in Bahr Shebin from 1993 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	1-10	0.00	0.00	0.40	0.80	0.50	1.50	1.60	2.60	1.50	0.40	0.40	0.95	11
	11-20	0.35	0.20	0.80	1.60	0.80	2.30	1.90	1.55	1.00	0.35	0.20	0.60	12
	21-	0.00	0.50	0.35	1.15	1.70	2.70	3.00	2.70	0.90	0.55	0.20	0.50	14
	Total	0.35	0.70	1.55	3.55	3.00	6.50	6.50	6.85	3.40	1.30	0.80	2.05	37
1994	1-10	0.90	0.00	0.75	0.70	0.55	0.90	1.75	2.10	2.05	1.55	2.00	1.20	14
	11-20	0.75	0.20	0.50	0.85	0.65	1.50	2.30	2.25	1.60	0.95	0.40	0.15	12
	21-	0.00	0.80	0.50	0.50	0.55	1.75	2.25	2.70	1.50	0.65	1.05	0.80	13
	Total	1.65	1.00	1.75	2.05	1.75	4.15	6.30	7.05	5.35	3.15	3.45	2.15	40
1995	1-10	0.95	0.75	0.40	0.85	0.50	1.30	2.00	3.20	4.30	1.60	1.00	0.95	18
	11-20	0.20	0.25	0.65	0.70	0.35	1.95	2.20	3.40	3.10	0.90	0.40	1.30	15
	21-	0.00	0.75	0.85	0.25	0.55	1.80	2.75	3.10	3.45	0.40	0.60	1.00	16
	Total	1.15	1.75	1.90	1.80	1.40	5.05	6.95	9.70	10.85	3.10	2.00	3.25	49
1996	1-10	1.05	0.96	0.65	0.40	1.50	2.30	2.10	3.00	1.60	0.50	0.70	0.95	16
	11-20	0.00	1.29	0.60	1.00	0.75	2.60	1.85	3.02	1.20	0.75	0.75	0.55	14
	21-	0.00	0.89	1.00	0.50	1.80	1.90	1.95	3.17	1.15	0.25	0.55	0.40	14
	Total	1.05	3.14	2.25	1.90	4.05	6.80	5.90	9.19	3.95	1.50	2.00	1.90	44
1997	1-10	0.30	0.70	1.00	0.85	0.25	1.25	2.00	2.50	2.30	1.20	0.90	0.40	14
	11-20	0.00	0.80	0.65	1.00	0.75	1.50	2.00	2.50	2.00	0.50	0.50	0.10	12
	21-	0.00	0.30	0.90	0.75	0.60	2.00	2.30	2.90	1.80	0.70	0.60	0.40	13
	Total	0.30	1.80	2.55	2.60	1.60	4.75	6.30	7.90	6.10	2.40	2.00	0.90	39
Average		0.90	1.68	2.00	2.38	2.36	5.45	6.39	8.14	5.93	2.29	2.05	2.05	42

Source: Gharbia Irrigation Directorate

Table F.10.12 Discharge at Kafr El Arab from 1996 to 1997 (10 days basis) in MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1996	1-10	3.39	3.12	2.69	4.49	4.34	7.22	10.33	8.08	7.00	2.82	3.24	2.98	60
	11-20	0.00	3.02	3.02	3.48	4.85	10.12	10.09	8.04	5.91	2.62	3.78	2.24	57
	21-	0.00	2.63	2.84	2.35	5.85	10.33	9.58	8.45	4.72	3.23	4.34	3.02	57
	Total	3.39	8.78	8.56	10.32	15.04	27.67	30.00	24.57	17.63	8.67	11.37	8.24	174
1997	1-10	3.49	2.57	2.48	4.71	4.36	7.41	8.55	8.26	6.34	2.65	3.27	3.06	57
	11-20	0.12	3.03	2.86	3.72	4.78	8.52	8.55	7.40	4.88	2.78	4.09	2.25	53
	21-	0.82	2.13	4.23	3.75	6.57	8.55	9.32	6.43	4.26	3.19	4.43	2.73	56
	Total	4.43	7.73	9.57	12.18	15.70	24.49	26.42	22.09	15.48	8.62	11.80	8.04	167
Average		3.91	8.25	9.06	11.25	15.37	26.08	28.21	23.33	16.55	8.64	11.58	8.14	170

Source: Gharbia Irrigation Directorate

Table F.10.13 Discharge at El Meleeg from 1988 to 1997 (10 days basis) In MCM

Year	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1988	1-10	21.30	0.00	20.70	20.80	21.80	34.55	37.00	34.80	26.35	17.50	23.45	25.90	284
	11-20	21.40	11.00	20.00	25.90	21.10	28.00	35.25	34.35	26.70	18.80	26.00	25.00	294
	21-	0.00	14.40	21.80	23.60	23.65	36.75	36.40	38.35	20.90	27.85	23.90	24.10	292
	Total	42.70	25.40	62.50	70.30	66.55	99.30	108.65	107.50	73.95	64.15	73.35	75.00	869
1989	1-10	24.00	0.00	20.45	22.00	16.45	23.55	39.40	23.20	21.05	16.05	18.25	25.60	250
	11-20	23.80	2.50	22.55	18.00	19.40	32.40	30.20	29.60	30.35	13.35	20.35	25.00	268
	21-	0.00	14.60	27.50	17.75	23.85	40.75	27.90	29.30	23.00	17.45	25.00	26.00	273
	Total	47.80	17.10	70.50	57.75	59.70	96.70	97.50	82.10	74.40	46.85	63.60	76.60	791
1990	1-10	26.60	0.00	19.43	20.70	18.70	29.40	36.00	30.10	30.30	15.60	15.40	20.40	263
	11-20	20.30	9.60	16.59	18.50	19.70	34.50	32.50	30.20	32.30	15.50	20.15	16.70	267
	21-	0.00	20.35	22.93	15.40	28.15	34.60	34.35	38.70	24.15	21.15	21.80	18.00	280
	Total	46.90	29.95	58.94	54.60	66.55	98.50	102.85	99.00	86.75	52.25	57.35	55.10	809
1991	1-10	16.60	0.00	19.40	17.30	18.80	26.50	29.60	33.20	28.10	21.60	17.00	21.00	249
	11-20	18.90	10.00	18.40	19.20	14.90	31.40	27.50	29.60	26.50	19.00	21.65	15.60	253
	21-	0.00	16.60	18.40	18.60	20.85	29.10	30.85	39.70	20.25	21.10	22.10	21.15	259
	Total	35.50	26.60	56.20	55.10	54.55	87.00	87.95	102.70	74.85	61.70	60.75	57.75	761
1992	1-10	19.00	0.00	10.00	17.80	14.80	28.70	33.25	27.95	18.60	25.40	18.20	16.20	230
	11-20	21.20	2.00	22.70	20.80	18.30	38.70	35.05	30.80	25.30	22.80	19.25	12.80	270
	21-	0.00	10.90	15.40	19.60	25.00	40.70	35.40	36.55	25.00	23.40	16.50	23.40	272
	Total	40.20	12.90	48.10	58.20	58.10	108.10	103.70	95.30	68.90	71.60	53.95	52.40	771
1993	1-10	24.10	0.00	19.40	20.00	17.30	22.60	23.30	25.85	21.20	20.30	14.60	18.50	227
	11-20	17.70	4.50	16.00	17.90	20.10	35.80	30.70	29.70	22.40	20.30	14.00	23.20	252
	21-	0.00	18.00	20.50	13.30	23.20	26.70	29.40	36.40	19.00	18.85	14.00	23.80	243
	Total	41.80	22.50	55.90	51.20	60.60	85.10	83.40	91.95	62.60	59.45	42.60	65.50	723
1994	1-10	20.70	0.00	18.80	15.90	20.65	23.60	28.60	32.70	29.10	18.00	13.35	10.80	232
	11-20	21.90	7.00	13.25	15.20	16.00	30.45	34.50	31.70	25.40	20.30	16.70	14.80	247
	21-	0.00	12.00	15.30	16.30	19.30	29.90	31.50	36.25	21.30	16.00	11.40	19.10	228
	Total	42.60	19.00	47.35	47.40	55.95	84.15	94.60	100.65	75.80	54.30	41.45	44.70	708
1995	1-10	15.00	13.00	19.00	19.20	17.80	30.30	32.20	31.40	22.95	15.80	16.00	18.10	251
	11-20	5.40	21.00	12.80	14.00	18.00	38.85	27.70	32.00	15.50	17.70	17.50	13.30	234
	21-	0.00	14.30	24.05	15.40	21.00	39.20	31.40	33.00	15.50	18.65	21.55	16.70	251
	Total	20.40	48.30	55.85	48.60	56.80	108.35	91.30	96.40	53.95	52.15	55.05	48.10	735
1996	1-10	14.50	13.10	14.50	18.70	23.40	30.90	34.00	33.50	28.50	15.70	17.80	20.80	265
	11-20	1.60	16.40	17.60	15.80	24.05	35.60	33.90	33.70	26.10	20.70	19.80	15.25	261
	21-	2.60	12.00	23.60	15.90	23.20	35.90	40.15	35.55	17.70	21.60	22.20	18.85	269
	Total	18.70	41.50	55.90	50.40	70.65	102.40	108.05	102.75	72.30	58.00	59.80	54.90	795
1997	1-10	17.75	10.15	16.60	22.50	19.50	25.80	35.60	35.40	24.30	15.40	20.50	15.60	259
	11-20	4.05	18.20	16.90	19.40	22.00	36.60	35.10	32.95	18.60	17.50	21.70	14.40	258
	21-	9.40	11.40	19.85	20.05	25.10	36.55	39.05	32.20	13.80	24.10	19.60	20.10	271
	Total	31.20	39.75	53.35	61.95	66.60	98.95	109.75	100.55	56.90	57.00	61.80	50.10	788
Average		36.78	28.30	56.46	55.55	61.61	96.86	98.78	97.89	70.04	57.75	56.97	58.02	775

Source: Gharbia Irrigation Directorate

Table F.10.14 Discharge at Tera from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	NA	NA	58.90	52.90	64.14	118.93	120.72	108.16	82.55	45.55	45.35	47.72	NA
1994	19.75	12.73	58.98	53.11	71.55	114.37	117.72	105.94	78.19	43.75	49.87	31.53	757
1995	22.40	39.66	64.74	66.51	75.06	116.03	128.25	116.46	81.18	40.97	52.42	38.47	842
1996	16.55	42.29	47.40	67.61	79.50	124.41	134.68	122.68	94.69	50.60	64.38	42.25	887
1997	26.64	34.72	45.96	63.67	88.23	129.64	137.52	117.44	72.84	44.38	63.29	40.32	865
Average	21.34	32.35	55.20	60.76	75.70	120.68	127.82	114.14	81.89	45.05	55.06	40.06	830

Source: Water Distribution Sector in MPWWR

Table F.10.15 Discharge at Meet Yazied from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	55.70	33.55	94.30	116.30	114.75	205.53	210.90	171.70	133.25	80.70	75.55	83.65	1,376
1994	56.50	33.29	110.85	100.50	103.40	185.70	194.20	187.30	142.70	78.83	84.50	50.70	1,328
1995	45.10	69.70	90.80	100.70	114.50	210.90	214.10	205.20	151.50	78.10	50.05	47.75	1,378
1996	30.60	91.50	88.30	96.50	130.95	211.25	233.70	211.40	148.00	79.30	101.50	72.25	1,495
1997	32.75	67.60	79.50	107.30	131.80	212.20	238.00	228.40	144.30	79.80	97.50	82.40	1,502
Average	44.13	59.13	92.75	104.26	119.08	205.12	218.18	200.80	143.95	79.35	81.82	67.35	1,416

Source: Water Distribution Sector in MPWWR

Table F.10.16 Discharge at Meleeg from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	43.30	21.80	56.10	54.75	60.10	88.10	83.30	91.95	62.85	49.25	42.20	65.90	720
1994	42.60	22.80	49.35	47.70	55.80	84.15	94.65	100.65	75.00	54.80	41.45	44.50	713
1995	22.80	47.10	53.20	48.20	56.80	108.15	94.55	94.60	55.45	52.22	87.65	68.20	789
1996	18.30	41.50	55.90	50.40	69.05	102.40	108.05	103.15	72.60	58.00	59.60	55.20	794
1997	31.25	39.75	51.35	61.95	66.60	94.65	109.30	101.30	56.90	57.60	61.60	50.10	783
Average	31.65	34.59	53.18	52.60	61.67	95.49	97.97	98.33	64.56	54.41	58.58	56.78	760

Source: Water Distribution Sector in MPWWR

Table F.10.17 Discharge at Rahbeen from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	72.78	70.64	158.33	177.30	199.41	356.19	371.21	329.02	222.68	134.49	135.10	143.97	2,371
1994	107.65	67.24	177.97	155.74	197.67	336.94	371.33	318.76	245.20	135.52	144.24	101.94	2,360
1995	85.24	120.01	154.43	174.54	217.66	337.85	382.50	338.98	242.00	128.15	151.78	136.49	2,470
1996	63.70	121.05	139.72	178.70	233.60	361.07	386.78	340.52	250.94	135.35	172.20	131.84	2,515
1997	70.49	112.33	145.04	194.39	247.82	352.02	397.19	356.58	237.05	124.93	188.98	118.15	2,545
Average	82.34	94.73	157.61	171.57	212.09	348.01	377.96	331.82	240.21	133.38	150.63	128.56	2,429

Source: Water Distribution Sector in MPWWR

Table F.10.18 Discharge at Kafr El Arab from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	5.65	1.27	7.27	6.58	13.95	27.08	26.75	16.61	13.84	10.73	8.87	14.12	153
1994	10.95	2.96	9.95	9.51	10.08	13.28	18.78	15.23	12.31	9.69	9.45	13.95	136
1995	3.82	9.72	8.74	8.58	11.81	22.12	26.93	14.30	15.27	11.24	10.50	12.50	158
1996	2.84	7.41	9.59	10.83	12.86	23.78	19.87	21.15	16.12	10.93	12.33	10.78	158
1997	3.94	10.54	6.67	17.87	10.17	18.68	18.81	20.83	15.44	12.26	12.81	11.06	159
Average	5.44	6.38	8.44	10.67	11.77	20.99	22.63	17.62	14.60	10.97	10.79	12.48	153

Source: Water Distribution Sector in MPWWR

Table F.10.19 Discharge at Santa (New Regulator) from 1993 to 1997 in MCM

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993													
1994													
1995													
1996													
1997	15.50	18.70	14.40	16.00	26.30	27.60	28.50	25.50	8.70	20.05	20.55	14.00	236
Average	15.50	18.70	14.40	16.00	26.30	27.60	28.50	25.50	8.70	20.05	20.55	14.00	236

Source: Water Distribution Sector in MPWWR

F.11 Crop Evapotranspiration

For calculating crop water requirement, modified Penman method usually gives the most satisfactory results under the condition that such measured data are available as temperature, humidity, wind and sunshine duration, compared to other methods such as Blaney-Criddle method, Radiation and Penman Monteith methods. This Study employs the modified Penman method in estimating reference crop evapotranspiration (ETo) with reference to the mean data for the past recorded given by Meteorological Authority.

The stations referred to are Damietta for northern part of the Study Area, defined as downstream area in this Study, and Mansoura for the rest of the area which is defined as upstream and midstream areas. Modified Penman method gives such reference crop evapotranspirations as; annual ETo of 1,695mm for Damietta with daily maximum of 7.03 mm and 1,748 mm for Mansoura with daily maximum of 7.48 mm. The calculation is given in Tables F.11.1 & F.11.2, and also Table F.11.4 shows other ETo at Mansoura estimated by Blaney-Criddle, Radiation, and Penman Monteith methods. The comparison among the ETos is given in Figure F.11.1.

Station	Annual ETo, mm	Monthly Max ETo, mm	Daily Max ETo, mm
Damietta	1,695	217 (July)	7.03 (June)
Mansoura	1,748	224 (June)	7.48 (June)

Table F.11.1 Calculation of Reference Crop Evapotranspiration at Damietta

Item	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Remarks
ea, mbar	14.90	15.53	17.36	20.74	24.90	30.75	33.22	33.60	30.75	27.08	21.16	16.64	
ed, mbar	11.32	11.65	12.67	14.73	17.68	21.83	23.92	25.54	23.06	20.31	16.08	12.65	
(ea-ed), mbar	3.58	3.88	4.69	6.01	7.22	8.92	9.30	8.06	7.69	6.77	5.08	3.99	
Wind function f(u)	0.80	0.85	0.92	0.79	0.86	0.82	0.79	0.72	0.68	0.71	0.73	0.76	
Weighting Factor (1-w)	0.41	0.40	0.38	0.34	0.31	0.27	0.25	0.25	0.27	0.29	0.34	0.41	
Weighting Factor w	0.60	0.60	0.63	0.66	0.70	0.74	0.75	0.75	0.74	0.71	0.67	0.63	
Max. Possible Sunshine N	10.30	11.10	12.00	13.00	13.75	14.20	14.10	13.30	12.40	11.45	10.50	10.10	
Actual (n)/N	0.65	0.69	0.69	0.75	0.80	0.87	0.87	0.88	0.85	0.82	0.73	0.63	
Radiation Ra	8.50	10.44	12.94	15.08	16.50	17.00	16.80	15.63	13.65	11.34	9.23	8.00	
Radiation Rs	4.89	6.23	7.71	9.45	10.73	11.61	11.47	10.78	9.19	7.49	5.69	4.53	
Net Shortwave Radiation Rns	3.67	4.67	5.78	7.09	8.04	8.71	8.60	8.09	6.89	5.62	4.27	3.40	
f(T)	13.29	13.45	13.68	14.23	14.80	15.53	15.85	15.90	15.53	15.16	14.30	13.65	
f(ed)	0.19	0.19	0.18	0.17	0.15	0.13	0.12	0.12	0.13	0.14	0.16	0.18	
f(n/N)	0.69	0.72	0.72	0.78	0.82	0.88	0.88	0.89	0.86	0.84	0.76	0.67	
Net Longwave Radiation Rnl	1.75	1.85	1.81	1.90	1.88	1.84	1.74	1.67	1.72	1.80	1.78	1.68	
Net Radiation Rn=Rns-Rnl	1.92	2.82	3.97	5.19	6.16	6.87	6.86	6.42	5.17	3.82	2.49	1.72	
Adjustment Factor (c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Reference ETo, mm/day	2.32	3.01	4.16	5.04	6.21	7.03	6.99	6.24	5.26	4.11	2.93	2.33	
Reference ETo, mm/month	72	84	129	151	193	211	217	193	158	127	88	72	1695

Table F.11.2 Calculation of Reference Crop Evapotranspiration at Mansoura

Item	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Remarks
ea, mbar	14.00	14.60	16.70	21.40	26.74	33.03	36.33	34.23	30.94	25.65	20.48	15.55	
ed, mbar	10.22	10.37	11.19	13.05	14.97	19.16	24.34	23.96	21.04	17.19	14.54	11.51	
(ea-ed), mbar	3.78	4.23	5.51	8.35	11.77	13.87	11.99	10.27	9.90	8.46	5.94	4.04	
Wind function f(u)	0.79	0.83	0.87	0.85	0.80	0.76	0.66	0.61	0.63	0.66	0.70	0.74	
Weighting Factor (1-w)	0.42	0.41	0.37	0.34	0.29	0.25	0.24	0.25	0.26	0.30	0.34	0.40	
Weighting Factor w	0.58	0.59	0.62	0.67	0.71	0.75	0.76	0.75	0.74	0.71	0.66	0.60	
Max. Possible Sunshine N	10.35	11.08	11.98	12.93	13.65	14.10	13.95	13.22	12.40	11.47	10.57	10.17	
Actual (n)/N	0.62	0.67	0.68	0.71	0.74	0.82	0.82	0.82	0.81	0.78	0.70	0.66	
Radiation Ra	8.55	10.45	12.95	15.10	16.50	17.00	16.80	15.65	13.75	11.40	9.25	8.05	
Radiation Rs	4.78	6.10	7.62	9.15	10.23	11.24	11.06	10.36	8.98	7.27	5.55	4.66	
Net Shortwave Radiation Rns	3.59	4.58	5.71	6.86	7.67	8.43	8.30	7.77	6.74	5.45	4.16	3.50	
f(T)	13.10	13.25	13.62	14.35	15.16	15.81	16.20	16.12	15.68	14.90	14.19	13.40	
f(ed)	0.20	0.20	0.19	0.18	0.17	0.15	0.12	0.12	0.14	0.16	0.17	0.19	
f(n/N)	0.66	0.70	0.71	0.74	0.77	0.84	0.84	0.84	0.83	0.80	0.73	0.69	
Net Longwave Radiation Rnl	1.71	1.84	1.86	1.92	1.97	1.96	1.66	1.69	1.79	1.87	1.78	1.77	
Net Radiation Rn=Rns-Rnl	1.87	2.73	3.85	4.94	5.70	6.47	6.63	6.08	4.95	3.58	2.38	1.73	
Adjustment Factor (c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Reference ETo, mm/day	2.35	3.07	4.19	5.69	6.82	7.48	6.94	6.14	5.29	4.20	2.98	2.23	
Reference ETo, mm/month	73	86	130	171	212	224	215	190	159	130	89	69	1748

Table F.11.3 Calculation of Reference Crop Evapotranspiration at Tanta

Item	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Remarks
ea, mbar	13.98	14.58	16.67	21.38	26.72	31.90	33.65	33.03	30.00	25.95	19.76	15.33	
ed, mbar	10.21	10.06	11.34	12.83	15.23	18.50	22.55	23.45	21.00	17.65	14.03	11.04	
(ea-ed), mbar	3.77	4.52	5.33	8.55	11.49	13.40	11.10	9.58	9.00	8.30	5.73	4.29	
Wind function f(u)	0.74	0.80	0.82	0.83	0.83	0.79	0.69	0.63	0.64	0.68	0.67	0.68	
Weighting Factor (1-w)	0.42	0.41	0.38	0.33	0.29	0.26	0.25	0.25	0.27	0.29	0.35	0.40	
Weighting Factor w	0.58	0.59	0.62	0.67	0.71	0.74	0.75	0.75	0.73	0.71	0.65	0.51	
Max. Possible Sunshine N	10.38	11.09	11.99	12.92	13.62	14.08	13.92	13.21	12.40	11.47	10.58	10.18	
Actual (n)/N	0.64	0.63	0.68	0.72	0.76	0.85	0.83	0.83	0.81	0.78	0.72	0.63	
Radiation Ra	8.58	10.50	13.00	15.15	16.50	17.00	16.80	15.67	13.80	11.52	9.43	8.20	
Radiation Rs	4.87	5.94	7.70	9.24	10.36	11.43	11.20	10.44	9.01	7.40	5.74	4.63	
Net Shortwave Radiation Rns	3.65	4.45	5.77	6.93	7.77	8.58	8.40	7.83	6.76	5.55	4.31	3.47	
f(T)	13.07	13.22	13.60	14.30	15.00	15.68	16.00	15.80	15.43	14.80	14.00	13.40	
f(ed)	0.20	0.20	0.19	0.18	0.17	0.15	0.13	0.13	0.14	0.16	0.18	0.19	
f(n/N)	0.67	0.67	0.72	0.75	0.78	0.86	0.85	0.85	0.83	0.81	0.75	0.67	
Net Longwave Radiation Rnl	1.75	1.77	1.87	1.95	1.97	2.03	1.78	1.70	1.76	1.85	1.83	1.73	
Net Radiation Rn=Rns-Rnl	1.90	2.68	3.90	4.98	5.80	6.54	6.62	6.13	5.00	3.70	2.48	1.74	
Adjustment Factor (c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Reference ETo, mm/day	2.28	3.07	4.08	5.67	6.86	7.58	6.88	6.09	5.21	4.23	2.96	2.06	
Reference ETo, mm/month	71	86	126	170	213	227	213	189	156	131	89	64	1736

Table F.11.4 Comparison of ETo estimated by various Method (Meteorological data at El Mansoura (Normal Period: 1961-1995, Lo:31-27, La:31-00 El:MASL4.25m)

Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Remarks
ETo by M. Penman Method, mm/day	2.35	3.07	4.19	5.69	6.82	7.48	6.94	6.14	5.29	4.20	2.98	2.23	1,748	
ETo by M. Penman Method, mm/month	73	86	130	171	212	224	215	190	159	130	89	69	1,748	
Blaney Criddle Method														
Tmean	12.0	12.6	14.7	18.6	22.2	25.7	27.3	26.3	24.6	21.5	17.9	13.5	19.8	
P	0.238	0.250	0.270	0.290	0.310	0.320	0.312	0.300	0.280	0.250	0.238	0.228		
Px(0.46xTmean+8)	3.22	3.45	3.99	4.80	5.65	6.34	6.41	6.03	5.41	4.47	3.86	3.24		
ETo, mm/day	2.98	3.20	4.08	5.25	6.50	7.62	7.85	7.30	6.32	4.88	3.78	2.98		
ETo, mm/month	92	90	126	158	202	226	243	226	190	151	113	92	1,909	
Radiation Method														
Ra	8.55	10.45	12.95	15.1	16.5	17	16.8	15.65	13.75	11.4	9.25	8.05		
n/N	0.62	0.67	0.68	0.71	0.74	0.82	0.82	0.82	0.81	0.78	0.70	0.66		
Rs, mm/day	4.78	6.10	7.62	9.15	10.23	11.24	11.06	10.36	8.98	7.27	5.55	4.66		
W	0.58	0.59	0.62	0.67	0.71	0.77	0.76	0.75	0.74	0.70	0.66	0.60		
WxRs, mm/day	2.77	3.58	4.73	6.09	7.29	8.66	8.44	7.80	6.61	5.11	3.66	2.81		
ETo, mm/day	2.36	3.20	4.35	5.65	6.95	8.38	7.98	7.38	6.05	4.75	3.32	2.41		
ETo, mm/month	73	90	135	170	215	251	247	229	182	147	99	75	1,912	
Penman Monteith														
ETo, mm/day	1.78	2.3	3.21	4.49	5.59	6.35	5.96	5.29	4.5	3.43	2.34	1.71		
ETo, mm/month	55	64	100	135	173	191	185	164	136	106	70	53	1,431	

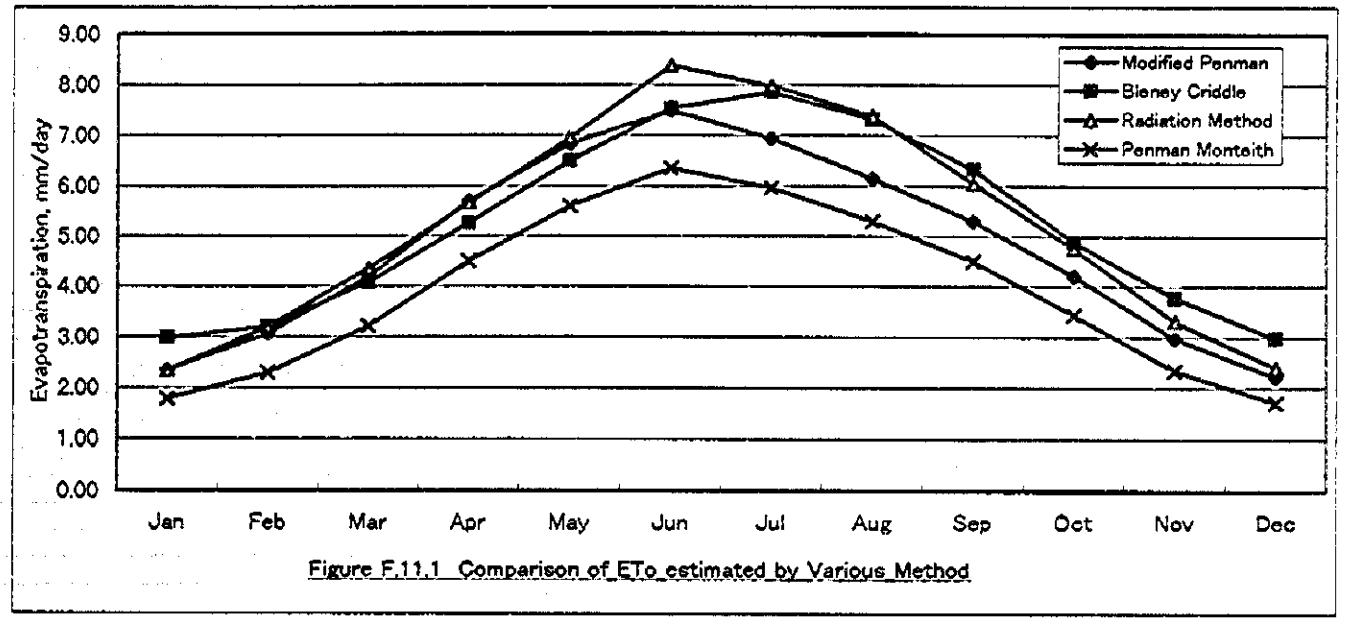

Figure F.11.1 Comparison of ETo estimated by Various Method

F.12 Irrigation Efficiencies

In this Study, efficiencies corespondent to conveyance, distribution and on-farm application are examined with reference to the ones undertaken in preceding projects, present field condition and practices, and irrigation efficiencies both with and without projects will be proposed.

F.12.1 General Applications

FAO Irrigation and Drainage Paper No. 24 suggests the conveyance efficiency to be 0.9 in case of continuous supply with no substantial changes in flow and 0.8 in case of rotational supply. In this Project, high conveyance efficiency could be expected since principal and main canals are operated with continuous flow and also seepage losses are thought not so much taking into consideration the Nile Delta's condition.

For distribution efficiency, Meska conveyance efficiency, the same FAO paper hints 0.8 in case of unlined canal and 0.9 in case of lined canal. With the Meskas unlined in the Project area, the efficiency may hover around 0.8. However, taking into consideration the situation that direct irrigation is now prevailing in the Study area, the efficiency is expected to be somewhat high than that suggested by FAO.

Field application efficiency largely depends on the irrigation scheme practiced by farmers. There are, mostly, such schemes as basin (flood) irrigation and furrow irrigation in the Study area, and the FAO paper gives the following efficiencies to those;

Basin irrigation; 0.60 – 0.80
Furrow irrigation; 0.55 – 0.70

Nile Delta, in which the Study area falls, has been practicing irrigated agriculture for a long period, therefore farmers are thought to be familiar with irrigation already, suggesting relatively high field application efficiency.

F.12.2 Efficiencies Applied to Preceding Project

(1) World Bank funded Projects

IIP and Project Preparation Department (PPD) under MPWWR had prepared a Preparation Reports, for an assistance by World Bank (WB), of Mahmoudia, El Wasat and Manaifa irrigation improvement projects in March 1994. The IIPs applied the irrigation efficiencies without and with projects shown in Table F.10.1, which were calculated as a ratio between net and gross requirements. The overall efficiency for without project is 0.44, while the efficiency with project is 0.66. The incremental efficiency between with and without projects is therefore 0.22.

These projects are now funded by WB and KFW. The WB had reviewed the irrigation efficiencies in July/August 1994 and undertook the irrigation efficiencies shown in Table F.10.2. On-farm irrigation efficiency is to increase by 0.05 while Meska conveyance efficiency is to by 0.1, with those of which overall efficiency will increase from 0.50 in without-project to 0.61 in with-project. Therefore, the incremental efficiency to the without-project's one is to be 0.22 ((0.61-0.50)/0.50),

which in turn is equal to the incremental efficiency applied in the aforementioned Preparation Report.

With the efficiencies undertaken, water balances had been assessed in both cases of with and without projects. Although the with-project cropping patters increased the rice cultivation areas by as much as 19 %, the projected total water demand had decreased thanks to the improved irrigation efficiencies. Table F.10.3 summarizes the annual water balances and also the rice cultivation areas correspondent. The projected saved water amounts are 66.9 MCM (6.7%), 94.3 MCM (14.0%), and 59.13 MCM (15.8%) for the projects of Mahmoudia, El Wasat, and Manaifa respectively despite the increased rice cultivation areas of 19.4%, 6.3% and 0.7%.

(2) Integrated Soil and Water Improvement Projects (ISAWIP)

The ISAWIP is a joint undertaking by the Government of Egypt (GOE) and the Government of Canada (GOC). The project was deigned to demonstrate how an integrated approach to agricultural development could increase production as much as 25 % in the East Dakahlia Directorate. The integrated approach undertakes both irrigation improvement, covering main and branch canals and Meskas, and soil improvement accompanied by sub-surface drainage system. The project started in 1987 as a five-year project, and completed in June 1994 with a two-year extension.

Prior to the implementation of the project, a full-year measurement had been done from May 1988 to April 1989 in the project area (gross 80,00 fed) and in a pilot area (gross 3,180 fed). The field measurements gave the irrigation efficiencies summarized in Table F.10.4; namely, 53 – 60 % of on-farm efficiency, 55 – 72 % canal efficiency, and 31 – 39 % overall irrigation efficiency.

In line with the irrigation system improvement, the project assumed such potential impacts as reduction of excessive discharge in the main canal, reduction of seepage and spill from Meskas, and better on-farm flow control. These assumed impacts are summarized in Table F.10.5 as irrigation efficiency improvement in percent. The measured overall efficiency was 37 %, against which 10 % overall increase was projected with the project implemented and thereby the irrigation system efficiency is expected to increase to a new level of 47 % (with-project data is not available yet).

F.12.3 Conveyance Efficiency Measured on Bahr Tera within F/S Area

Bahr Tera within the feasibility study (priority) area was divided into 4 reach, and those conveyance efficiencies were studied by carrying out current measurement at the beginning and the end points of each reach simultaneously. The measurement had been done 4 times each during November and December in 1998, and the average conveyance efficiencies are summarized below;

Reach A-A';	97.1 % (L = 10.6 km)
Reach B-B';	98.6 % (L = 6.5 km)
Reach C-C';	92.5 % (L = 7.7 km)
Reach D-D';	98.6 % (L = 5.7 km)

The conveyance efficiencies above are very high. The efficiency of reach C-C' is relatively low of 92.5%, and it is probably because of submerged weeds which were observed at the measurement section and direct irrigation along Bahr Tera. During current measurement, all deliveries'

intakes were closed but there were some leakages flowing through the gates. Also, direct irrigation had been sometimes observed.

Taking into the situation above, the conveyance efficiency of Bahr Tera can be concluded to be very high. This is most probably thanks to the high groundwater table that reduces seepage loss. Also, return-flows replenished by groundwater may contribute to the high efficiency. In Master Plan Study of Phase I, 462 MCM at least groundwater was estimated as the return flow into drains, which is equivalent to 11 % of the total inflow into the whole study area. Although the bed level of Bahr Tera canal is obviously higher than those of any open drains, there might be a possibility that there is a return-flow into Bahr Tera.

F.12.4 Efficiencies Applied to This Study

Considering the above discussions, this Study undertakes the irrigation efficiencies shown in Table F.10.6. Namely, 0.65, 0.90 and 0.95 efficiencies apply to irrigation application (on-farm), distribution (Meska), and conveyance (main, secondary and delivery) without project respectively, giving overall efficiency of 0.56. With-project, in turn, will have 0.73 (increase by 0.08), 0.95 (by 0.05), and 0.95 (no change) of efficiencies, as the base case, giving overall efficiency of 0.66 (by 0.10).

F.12.5 Examination of Previous Efficiencies in comparison to Ones in This Study

Though those without-project efficiencies undertaken in this Study may seem somewhat high comparing to the previously employed, it is conjectured that the previously employed must have been underestimated taking into consideration the present situation showing high cropping intensity and high yield. Although ISAWIP presented the measured efficiencies, it is usually very difficult to accurately measure the current flow under rotational irrigation, thus leading to underestimation.

An example that previously presented efficiencies for without-project had been underestimated is shown in Table F.12.7 and F.12.8. These tables show the water deficits for annual and peak period that were backward-calculated. In case of Preparation Report, 45 to 60% water deficit show up, and in case of World Bank funded project, 19 to 48%. Taking into consideration of present agricultural situation in the Nile Delta, these low efficiencies are not reasonable to accept, suggesting that these were presented in order to show IIPs somewhat very attractive by giving big efficiency difference between without- and with-project.

Table F.12.1 Irrigation Efficiencies applied in Preparation Reports

Efficiencies	Without Project	With Project	Remarks
On-farm Application	0.61	0.74	By 0.13
Delivery Application	0.72	0.90	By 0.18
Overall Efficiency	0.44	0.66	By 0.22

Table F.12.2 Irrigation Efficiencies applied for WB funded Projects

Efficiencies	Without Project	With Project	Remarks
On-farm Application	0.70	0.75	By 0.05
Meska Conveyance	0.85	0.95	By 0.10
Main, Sec, Del. Canal Conveyance	0.85	0.85	No change
Overall Efficiency	0.50	0.61	By 0.11

Table F.12.3 Water Balance Summary for the WB funded Project

Project	Without Project	With Project	Saved, MCM	Remarks
Mahmoudia (133,000 fed.)				
Demand, MCM (cm)	998.4 (179 cm)	931.5 (167 cm)	66.9 (6.7%)	(12.0 cm to be saved)
Rice Cultivation Area, %	29.9	49.3		+19.4 %
El Wasat (75,000 fed.)				
Demand, MCM (cm)	651.2 (207 cm)	556.9 (177 cm)	94.3 (14.0%)	(29.9 cm to be saved)
Rice Cultivation Area, %	43.8	50.1		+6.3 %
Manaifa (42,000 fed.)				
Demand, MCM (cm)	375.1 (213 cm)	316.0 (179 cm)	59.13 (15.8 %)	(33.5 cm to be saved)
Rice Cultivation Area, %	52.0	53.3		+0.7 %

Table F.12.4 Irrigation Efficiencies measured in ISAWIP Area (Without Project)

Efficiencies	Whole Project Area, %	Pilot Project Area, %	Remarks
On-farm Efficiency			
External drainage reuse considered	53.2	53.4	
External drainage reuse not considered	57.5	60.3	
Canal System Efficiency			
External drainage reuse considered	72.1	61.9	
External drainage reuse not considered	66.5	54.7	
Overall Irrigation Efficiency			
External drainage reuse considered	36.8	31.1	
External drainage reuse not considered	38.8	33.3	

Table F.12.5 Projected Irrigation Efficiencies Improvement

Efficiencies	Improvement, %	Remarks
Canal Automation	+2%	
Meska Improvement	+7%	
External Drainage Reuse	-3%	
On-farm Water Management	+8%	
Sub-surface Drainage	-4%	
Overall Increase	+10%	

Table F.12.6 Irrigation Efficiency Applied

Item	Without project	With Project	With Project (enhnt)	Remarks
On-farm Application	0.65	0.73		
Meska Conveyance	0.90	0.95		Incl. direct pumping
Main, Sec. Del. Conveyance	0.95	0.95		
Overall Efficiency	0.556	0.659	0.680	

Table F. 12. 7 Summary of Water Requirement by Project Preparation Report (Original)

	Avail. Water	Without Project (Ep=0. 44)		With Project (Ep=0. 66)		Remarks
	MCM	Gross Req.	Deficit, %	Gross Req.	Deficit, %	
Wasat						
Total	526	965	45	637	17	to be supplemented fr drain
Peak	79	157	50	104	24	do
Manaifa						
Total	243	542	55	358	32	do
Peak	35	89	60	58	40	do

Note; Net irrigation requirement based on TR17, and With project gross req. based on MPWWR.

Table F. 12. 8 Summary of Water Requirement submitted to the World Bank

	Avail. Water	Without Project (Ep=0. 50)		With Project (Ep=0. 61)		Remarks
	MCM	Gross Req.	Deficit, %	Gross Req.	Deficit, %	
Wasat						
Total	526	651	19	557	6	to be supplemented fr drain
Peak	79	114	31	98	20	do
Manaifa						
Total	242	375	35	316	23	to be supplemented fr drain
Peak	35	67	48	56	38	& main canals

F.13 Water Duties applied by MPWWR and TR 17 (Technical Report No.17)

F.13.1 Water Duties applied by MPWWR and TR 17

While this Study employs the Modified Penman method to estimate reference crop evapotranspiration, MPWWR exclusively employs their own water duties in order to allocate necessary water volume to each irrigation directorate. The duties are shown in gross requirement per feddan, and no efficiency, required for converting net to gross requirement, data is known. The gross duties are incorporated in a computer program (programmed by M. McDonalds) used in the Water Distribution Sector under Irrigation Department of MPWWR. The water release from Aswan High Dam is decided on basis of the calculation using the program taking into consideration 15% additional as the conveyance loss from the Aswan to the Delta.

There is a report titled Technical Report No.17, one of the total 20 reports of Water Master Plan made in 1981, and this report was referred to the gross water duty mentioned above. This report presents crop water consumption (net water requirement) for such crop as cotton, rice, maize, solgum, sugar cane, wheat, berseem and beans. These consumption data have been modified and now are used in Irrigation Improvement Sector when the sector plans irrigation improvement project.

The gross water duty and the net requirement in TR17 are shown in the following table;

F.13.1 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan (1/2)

F.13.2 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan (2/2)

F.13.3 Gross Monthly Basis Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan

F.13.4 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm (1/2)

F.13.5 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm (2/2)

F.13.6 Gross Monthly Basis Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm

F.13.7 Net Crop Water Consumption for Delta Region presented in TR17 and used in Irrigation Improvement Sector

F.13.8 Net Crop Water Consumption for Middle Egypt presented in TR17 and used in Irrigation Improvement Sector

F.13.9 Net Crop Water Consumption for Upper Egypt presented in TR17 and used in Irrigation Improvement Sector

The crop water consumptions (equivalent to net crop requirement) presented in TR17 were based on mainly experimental data in Soil and Water Research Institute under Agricultural Research Center of the Ministry of Agriculture and Land Development. The experimental method, carried out in 1960s', was to estimate the crop consumptive use with reference to the difference of the water contents

in the soil between right after an irrigation and right before the following irrigation. The report, TR17, also backward-estimated the Kc values by the consumptive use and ETo calculated by Modified Penman. Specially pointed out is the very low of the Kc as shown below in case of cotton:

0.46(Mar) 0.45(Apr) 0.59(May) 0.72(Jun) 0.86(Jul) 0.47(Aug) 0.37(Sep)

It is not reasonable that the Kc value of cotton, known as one of the high water consumptive summer crops, is less than 1.0. There may be a possibility that groundwater supplemented the crop requirement or the yield was not optimum thus requiring less water. Also, it is not clear that if the paddy field was equipped with subsurface drainage or not, leading to excess seepage currently prevailing over the Study area. It is noted that the crop consumptive use for summer crops in TR17 and MPWWR gross requirement are relatively low than that generally applied over the World. This could explain why the water shortage especially during summer season is prevailing over the Study area despite that the allocated water has mostly been delivered.

F.13.2 Comparison between Water Duties applied by MPWWR and TR 17

By comparing the water duties applied by MPWWR and crop water consumption mentioned in TR17, an efficiency equivalent to overall project (irrigation) efficiency required to convert the net irrigation requirement to gross requirement can be estimated. The comparison is shown in Table F.13.10. The table shows the efficiency ranges from 60 to 105% for winter crop and from 60 to 117%. The efficiencies for rice and cotton, representative summer crop, are 83% and 70%. This result implies that the efficiency is too high to achieve under generally practiced surface irrigation method. Also, the net requirements themselves for cotton and rice may have been underestimated as mentioned before. Therefor the gross requirement decided and being distributed by MPWWR seems less than actually required, indicating a reason why the water shortage is prevailing specially during summer season in the Study Area.

Table F.13.1 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan

Crop	Jan1	Jan2	Jan3	Feb1	Feb2	Feb3	Mar1	Mar2	Mar3	Apr1	Apr2	Apr3	May1	May2	May3	Jun1	Jun2	Jun3
Wheat	78.41	79.80	98.57	99.41	109.20	101.93	149.45	174.96	217.68	210.75	216.46	116.25	43.32	0.00	0.00	0.00	0.00	0.00
Beans	84.01	88.92	114.06	120.72	137.28	120.96	161.16	171.00	178.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barley	78.41	79.80	98.57	99.41	109.20	105.12	157.08	182.40	209.57	198.81	201.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fenugreek	95.22	100.32	118.29	113.62	117.00	86.40	91.80	91.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lupins	95.22	100.32	118.29	113.62	117.00	86.40	91.80	91.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chickpeas	95.22	100.32	118.29	113.62	117.00	86.40	91.80	91.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lentils	95.22	100.32	118.29	113.62	117.00	86.40	116.28	125.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clover c	95.22	96.90	119.70	119.60	128.33	115.58	83.64	33.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clover f	92.98	95.76	118.59	118.25	127.51	115.58	161.16	178.44	216.48	212.08	224.18	233.10	150.00	0.00	0.00	0.00	0.00	0.00
Flax	96.34	102.60	126.74	127.82	140.40	86.40	102.00	91.20	111.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onion w	98.58	104.88	128.15	127.82	140.40	126.72	175.44	193.80	231.92	226.82	244.80	265.58	0.00	0.00	0.00	0.00	0.00	0.00
Garlic	98.58	104.88	128.15	127.82	140.40	126.72	175.44	193.80	231.92	226.82	244.80	265.58	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable w	113.14	100.32	101.39	79.53	62.40	38.88	19.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Others w	89.62	91.20	107.02	102.25	109.20	97.92	134.64	148.20	181.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar Beet	67.21	85.50	105.61	106.51	117.00	112.32	167.28	193.80	254.27	271.62	315.18	345.26	379.50	410.88	405.11	326.40	277.20	0.00
Cotton	0.00	0.00	0.00	0.00	0.00	0.00	55.00	100.00	113.70	101.41	155.26	144.90	162.16	180.25	213.53	211.68	231.74	245.58
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	100.00	237.50	379.10	504.00	539.30	550.00
Maize s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.00	100.00	121.92	114.43	181.60	234.80
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soya Beans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	143.21	153.60	217.80	244.80	315.00	315.00
Sugar Cane	67.21	64.98	81.68	82.37	92.04	80.64	108.12	116.28	148.09	156.81	177.48	225.75	279.26	326.40	374.62	354.96	369.60	378.00
Sesame	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	143.21	153.60	239.58	265.20	315.00	336.00
Ground Nuts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	125.31	134.40	217.80	244.80	294.00	336.00
Onion s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	179.01	192.00	261.36	285.60	336.00	357.00
Vegetables s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	117.61	128.52	139.43	150.37	161.28	187.31	179.52	193.20	172.20
Others s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.86	65.28	74.05	146.88	231.00	235.20
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potatoes s	0.00	0.00	0.00	59.65	70.98	70.56	107.10	119.70	146.70	156.81	182.07	192.88	187.96	188.16	198.20	0.00	0.00	0.00
Sunflower s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	128.89	138.24	213.44	252.96	315.00	361.20
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Darawa s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	162.79	179.34	214.62
Maize n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gardens n	72.81	76.38	94.35	95.15	104.52	97.92	142.80	164.16	201.18	201.61	220.32	232.39	236.29	241.92	261.36	236.64	243.60	243.60
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprinkler	130.00	130.00	143.00	130.00	130.00	104.00	150.00	150.00	165.00	160.00	160.00	170.00	170.00	170.00	187.00	170.00	170.00	170.00
Surface	170.00	170.00	178.00	170.00	170.00	136.00	200.00	200.00	220.00	220.00	220.00	220.00	250.00	250.00	275.00	250.00	250.00	250.00
Soahel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Ministry of Public Works and Water Resources

Table F.13.2 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan

Crop	Jul1	Jul2	Jul3	Aug1	Aug2	Aug3	Sep1	Sep2	Sep3	Oct1	Oct2	Oct3	Nov1	Nov2	Nov3	Dec1	Dec2	Dec3	Total
Wheat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	55.00	100.00	96.17	51.08	69.38	84.71	2152.5
Beans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.79	74.41	72.36	85.92	1475.4
Barley	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.19	86.81	75.60	84.71	1834.6
Fenugreek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.60	123.42	117.00	109.20	102.19	94.26	84.24	99.24	1646.0
Lupins	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.60	123.42	117.00	109.20	102.19	94.26	84.24	99.24	1646.0
Chickpeas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.60	123.42	117.00	109.20	102.19	94.26	84.24	99.24	1646.0
Lentils	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.60	123.42	117.00	109.20	102.19	94.26	84.24	99.24	1704.7
Clover c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	36.77	94.32	193.78	250.83	199.75	113.40	112.73	111.48	102.94	90.72	102.55	2201.3
Clover f	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	99.31	197.61	153.79	78.13	78.04	96.38	2747.4
Flax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	78.00	76.99	76.89	75.60	94.40	1477.2
Onion w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	78.00	83.99	86.81	86.40	101.66	2591.8
Garlic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	90.00	78.00	83.99	86.81	86.40	101.66	2591.8
Vegetable w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	75.54	86.02	132.24	139.13	118.80	107.64	124.58	135.18	139.32	139.17	1713.3
Others w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	102.41	91.20	105.47	97.20	93.60	93.79	91.77	86.40	96.82	1920.3
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	151.98	152.88	149.09	143.37	135.66	130.38	100.80	81.90	71.53	60.77	49.90	53.37	1281.6
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sugar Beet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	60.48	75.03	4076.2
Cotton	260.32	275.80	293.52	234.96	192.85	168.01	123.78	67.34	20.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3552.6
Rice	550.00	570.00	573.85	494.90	485.50	513.74	406.60	370.60	316.72	150.00	150.00	150.00	0.00	0.00	0.00	0.00	0.00	0.00	7041.8
Maize s	250.27	279.30	316.08	269.45	305.19	275.16	209.16	187.20	170.39	153.61	136.80	134.64	130.00	0.00	0.00	0.00	0.00	0.00	3625.0
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Soya Beans	311.29	318.21	338.35	296.98	280.16	274.13	250.51	187.20	170.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3816.6
Sugar Cane	342.42	373.55	397.19	351.86	339.31	348.31	354.06	327.60	301.02	279.06	250.80	244.60	190.80	160.68	135.78	114.10	93.96	99.24	8188.6
Sesame	336.00	311.29	312.61	258.25	264.60	195.81	100.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3231.4
Ground Nuts	294.00	311.29	330.99	290.53	321.30	234.97	100.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3235.6
Onion s	357.00	357.00	330.99	274.39	302.40	274.13	200.41	156.00	141.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4005.3
Vegetables s	170.00	170.00	170.00	100.00	83.16	86.16	86.85	90.48	76.67	64.00	54.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2581.5
Others s	200.61	204.07	209.63	209.63	209.63	219.31	193.73	196.56	110.75	38.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2605.6
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Potatoes s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1680.8
Sunflower s	332.05	370.09	367.77	300.21	289.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3069.4
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa s	246.96	282.24	293.85	252.44	238.14	211.08	151.98	113.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2347.0
Maize n	0.00	201.60	223.29	177.54	189.89	225.76	287.26	299.52	266.94	235.54	205.20	157.08	93.60	0.00	0.00	0.00	0.00	0.00	2563.2
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	151.98	152.88	149.09	143.37	135.66	130.38	100.80	81.90	71.53	60.77	49.90	53.37	1281.6
Gardens n	200.61	200.61	213.31	187.23	180.55	187.06	193.73	180.96	167.55	156.17	143.64	141.37	113.40	98.28	88.19	78.13	68.04	77.45	5843.3
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sprinkler	170.00	170.00	187.00	170.00	170.00	178.00	160.00	160.00	160.00	160.00	160.00	176.00	130.00	130.00	130.00	115.00	115.00	126.50	5526.5
Surface	250.00	250.00	275.00	250.00	250.00	275.00	210.00	210.00	210.00	220.00	220.00	242.00	210.00	210.00	210.00	160.00	160.00	176.00	7787.0
Soahel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Source: Ministry of Public Works and Water Resources

Table F.13.3 Gross Monthly Basis Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, CUM/feddan

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	256.78	310.54	542.09	543.46	43.32	0.00	0.00	0.00	0.00	0.00	251.17	205.17	2152.5
Beans	286.99	378.96	510.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	65.79	232.69	1475.4
Barley	256.78	313.73	549.05	400.77	0.00	0.00	0.00	0.00	0.00	0.00	67.19	247.12	1834.6
Fenugreek	313.83	317.02	183.00	0.00	0.00	0.00	0.00	0.00	0.00	226.02	328.39	277.74	1646.0
Lupins	313.83	317.02	183.00	0.00	0.00	0.00	0.00	0.00	0.00	226.02	328.39	277.74	1646.0
Chickpeas	313.83	317.02	183.00	0.00	0.00	0.00	0.00	0.00	0.00	226.02	328.39	277.74	1646.0
Lentils	313.83	317.02	241.68	0.00	0.00	0.00	0.00	0.00	0.00	226.02	328.39	277.74	1704.7
Clover c	311.82	363.51	116.66	0.00	0.00	0.00	0.00	0.00	131.09	644.36	337.61	296.21	2201.3
Clover f	307.33	361.34	556.08	669.36	150.00	0.00	0.00	0.00	0.00	0.00	450.71	252.55	2747.4
Flax	325.68	354.62	304.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	244.99	246.89	1477.2
Onion w	331.61	394.94	601.16	737.20	0.00	0.00	0.00	0.00	0.00	0.00	251.99	274.87	2591.8
Garlic	331.61	394.94	601.16	737.20	0.00	0.00	0.00	0.00	0.00	0.00	251.99	274.87	2591.8
Vegetable w	314.85	180.81	19.99	0.00	0.00	0.00	0.00	0.00	75.54	357.39	351.02	413.67	1713.3
Others w	287.84	309.37	464.46	0.00	0.00	0.00	0.00	0.00	0.00	299.08	284.59	274.99	1920.3
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	453.95	409.41	254.23	164.04	1281.6
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sugar Beet	258.32	335.83	615.35	932.06	1195.49	603.60	0.00	0.00	0.00	0.00	0.00	135.51	4076.2
Cotton	0.00	0.00	268.70	401.57	555.94	689.00	829.64	595.82	211.95	0.00	0.00	0.00	3552.6
Rice	0.00	0.00	0.00	0.00	716.60	1593.30	1693.85	1494.14	1093.92	450.00	0.00	0.00	7041.8
Maize s	0.00	0.00	0.00	0.00	276.92	530.83	845.65	849.80	566.75	425.05	130.00	0.00	3625.0
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Soya Beans	0.00	0.00	0.00	0.00	514.61	874.80	967.85	851.27	608.10	0.00	0.00	0.00	3816.6
Sugar Cane	213.87	255.05	372.49	560.04	980.28	1102.56	1113.16	1039.48	982.68	774.46	487.26	307.30	8188.6
Sesame	0.00	0.00	0.00	0.00	536.39	916.20	959.90	718.66	100.21	0.00	0.00	0.00	3231.4
Ground Nuts	0.00	0.00	0.00	0.00	477.51	874.80	936.28	846.80	100.21	0.00	0.00	0.00	3235.6
Onion s	0.00	0.00	0.00	0.00	632.37	978.60	1044.99	850.92	498.40	0.00	0.00	0.00	4005.3
Vegetables s	0.00	0.00	0.00	385.56	498.96	544.92	510.00	269.32	254.00	118.72	0.00	0.00	2581.5
Others s	0.00	0.00	0.00	0.00	200.19	613.08	614.31	638.57	501.04	38.40	0.00	0.00	2605.6
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Potatoes s	0.00	201.19	373.50	531.76	574.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1680.8
Sunflower s	0.00	0.00	0.00	0.00	480.57	929.16	1069.91	589.71	0.00	0.00	0.00	0.00	3069.4
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa s	0.00	0.00	0.00	0.00	0.00	556.75	823.05	701.66	265.55	0.00	0.00	0.00	2347.0
Maize n	0.00	0.00	0.00	0.00	0.00	0.00	424.89	593.19	853.72	597.82	93.60	0.00	2563.2
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	453.95	409.41	254.23	164.04	1281.6
Gardens n	243.54	297.59	508.14	654.32	739.57	723.84	614.53	554.84	542.24	441.18	299.87	223.62	5843.3
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sprinkler	403.00	364.00	465.00	490.00	527.00	510.00	527.00	518.00	480.00	496.00	390.00	356.50	5526.5
Surface	518.00	476.00	620.00	660.00	775.00	750.00	775.00	775.00	630.00	682.00	630.00	496.00	7787.0
Soahel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Source: Ministry of Public Works and Water Resources

Table F.13.4 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm 1/2

Crop	Jan1	Jan2	Jan3	Feb1	Feb2	Feb3	Mar1	Mar2	Mar3	Apr1	Apr2	Apr3	May1	May2	May3	Jun1	Jun2	Jun3
Wheat	18.67	19.00	23.47	23.67	26.00	24.27	35.58	41.66	51.83	50.18	51.54	27.68	10.31	0.00	0.00	0.00	0.00	0.00
Beans	20.00	21.17	27.16	28.74	32.69	28.80	38.37	40.71	42.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barley	18.67	19.00	23.47	23.67	26.00	25.03	37.40	43.43	49.90	47.34	48.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fenugreek	22.67	23.89	28.16	27.05	27.86	20.57	21.86	21.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lupins	22.67	23.89	28.16	27.05	27.86	20.57	21.86	21.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chickpeas	22.67	23.89	28.16	27.05	27.86	20.57	21.86	21.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Lentils	22.67	23.89	28.16	27.05	27.86	20.57	27.69	29.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clover c	22.67	23.07	28.50	28.48	30.55	27.52	19.91	7.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Clover f	22.14	22.80	28.24	28.15	30.36	27.52	38.37	42.49	51.54	50.50	53.38	55.50	35.71	0.00	0.00	0.00	0.00	0.00
Flax	22.94	24.43	30.18	30.43	33.43	20.57	24.29	21.71	26.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Onion w	23.47	24.97	30.51	30.43	33.43	30.17	41.77	46.14	55.22	54.00	58.29	63.23	0.00	0.00	0.00	0.00	0.00	0.00
Garlic	23.47	24.97	30.51	30.43	33.43	30.17	41.77	46.14	55.22	54.00	58.29	63.23	0.00	0.00	0.00	0.00	0.00	0.00
Vegetable w	26.94	23.89	24.14	18.94	14.86	9.26	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Others w	21.34	21.71	25.48	24.35	26.00	23.31	32.06	35.29	43.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sugar Beet	16.00	20.36	25.15	25.36	27.86	26.74	39.83	46.14	60.54	64.67	75.04	82.20	90.36	97.83	96.45	77.71	66.00	0.00
Cotton	0.00	0.00	0.00	0.00	0.00	0.00	13.10	23.81	27.07	24.15	36.97	34.50	38.61	42.92	50.84	50.40	55.18	58.47
Rice	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.81	56.55	90.26	120.00	128.40	130.95
Maize s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.10	23.81	29.03	27.25	43.24	55.90
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Soya Beans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.10	36.57	51.86	58.29	75.00	75.00
Sugar Cane	16.00	15.47	19.45	19.61	21.91	19.20	25.74	27.69	35.26	37.34	42.26	53.75	66.49	77.71	89.20	84.51	88.00	90.00
Sesame	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	34.10	36.57	57.04	63.14	75.00	80.00
Ground Nuts	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	29.84	32.00	51.86	58.29	70.00	80.00
Onion s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.62	45.71	62.23	68.00	80.00	85.00
Vegetables s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	28.00	30.60	33.20	35.80	38.40	44.60	42.74	46.00	41.00
Others s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.49	15.54	17.63	34.97	55.00	56.00
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Potatoes s	0.00	0.00	0.00	14.20	16.90	16.80	25.50	28.50	34.93	37.34	43.35	45.92	44.75	44.80	47.19	0.00	0.00	0.00
Sunflower s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.69	32.91	50.82	60.23	75.00	86.00
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Darawa s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	38.76	42.70	51.10
Maize n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gardens n	17.34	18.19	22.46	22.65	24.89	23.31	34.00	39.09	47.90	48.00	52.46	55.33	56.26	57.60	62.23	56.34	58.00	58.00
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprinkler	30.95	30.95	34.05	30.95	30.95	24.76	35.71	35.71	39.29	38.10	38.10	40.48	40.48	40.48	44.52	40.48	40.48	40.48
Surface	40.48	40.48	42.38	40.48	40.48	32.38	47.62	47.62	52.38	52.38	52.38	52.38	59.52	59.52	65.48	59.52	59.52	59.52
Soahel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Ministry of Public Works and Water Resources

Table F.13.6 Gross Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm

Crop	Jul1	Jul2	Jul3	Aug1	Aug2	Aug3	Sep1	Sep2	Sep3	Oct1	Oct2	Oct3	Nov1	Nov2	Nov3	Dec1	Dec2	Dec3	Total
Wheat	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.10	23.81	22.90	12.16	16.52	20.17	512.5
Beans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.66	17.72	17.23	20.46	351.3
Barley	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.00	20.67	18.00	20.17	436.8
Fenugreek	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.43	29.39	27.86	26.00	24.33	22.44	20.06	23.63	391.9
Lupins	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.43	29.39	27.86	26.00	24.33	22.44	20.06	23.63	391.9
Chickpeas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.43	29.39	27.86	26.00	24.33	22.44	20.06	23.63	391.9
Lentils	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.43	29.39	27.86	26.00	24.33	22.44	20.06	23.63	405.9
Clover c	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.75	22.46	46.14	59.72	47.56	27.00	26.84	26.54	24.51	21.60	24.42	524.1
Clover f	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.65	47.05	36.62	18.60	18.58	22.95	654.1
Flax	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.43	18.57	18.33	18.31	18.00	22.48	351.7
Onion w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.43	18.57	20.00	20.67	20.57	24.20	617.1
Garlic	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	21.43	18.57	20.00	20.67	20.57	24.20	617.1
Vegetable w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.99	20.48	31.49	33.13	28.29	25.63	29.66	32.19	33.17	33.14	407.9
Others w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.38	21.71	25.11	23.14	22.29	22.33	21.85	20.57	23.05	457.2
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	36.19	36.40	35.50	34.14	32.30	31.04	24.00	19.50	17.03	14.47	11.88	12.71	305.2
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sugar Beet	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.40	17.86	970.5
Cotton	61.98	65.67	69.89	55.94	45.92	40.00	29.47	16.03	4.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	845.9
Rice	130.96	135.71	136.63	117.83	115.60	122.32	96.81	88.24	75.41	35.71	35.71	35.71	0.00	0.00	0.00	0.00	0.00	0.00	1676.6
Maize s	59.59	66.50	75.26	64.15	72.66	65.51	49.80	44.57	40.57	36.57	32.57	32.06	30.95	0.00	0.00	0.00	0.00	0.00	863.1
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Soya Beans	74.12	75.76	80.56	70.71	66.70	65.27	59.65	44.57	40.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	908.7
Sugar Cane	81.53	88.94	94.57	83.78	80.79	82.93	84.30	78.00	71.67	66.44	59.71	58.24	45.43	38.26	32.33	27.17	22.37	23.63	1949.7
Sesame	80.00	74.12	74.43	61.49	63.00	46.62	23.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	769.4
Ground Nuts	70.00	74.12	78.81	69.17	76.50	55.95	23.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	770.4
Onion s	85.00	85.00	78.81	65.33	72.00	65.27	47.72	37.14	33.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	953.6
Vegetables s	40.48	40.48	40.48	23.81	19.80	20.51	20.68	21.54	18.25	15.24	13.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	614.6
Others s	47.76	48.59	49.91	49.91	49.91	52.22	46.13	46.80	26.37	9.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	620.4
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Potatoes s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	400.2
Sunflower s	79.06	88.12	87.56	71.48	68.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	730.8
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa s	58.80	67.20	69.96	60.10	56.70	50.26	36.19	27.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	558.8
Maize n	0.00	48.00	53.16	42.27	45.21	53.75	68.40	71.31	63.56	56.08	48.86	37.40	22.29	0.00	0.00	0.00	0.00	0.00	610.3
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	36.19	36.40	35.50	34.14	32.30	31.04	24.00	19.50	17.03	14.47	11.88	12.71	305.2
Gardens n	47.76	47.76	50.79	44.58	42.99	44.54	45.13	43.09	39.89	37.18	34.20	33.66	27.00	23.40	21.00	18.60	16.20	18.44	1391.3
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sprinkler	40.48	40.48	44.52	40.48	40.48	42.38	38.10	38.10	38.10	38.10	38.10	41.90	30.95	30.95	30.95	27.38	27.38	30.12	1315.8
Surface	59.52	59.52	65.48	59.52	59.52	65.48	50.00	50.00	50.00	52.38	52.38	57.62	50.00	50.00	50.00	38.10	38.10	41.90	1854.0
Soahel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Source: Ministry of Public Works and Water Resources

Table F.13.6 Gross Monthly Basis Water Duties for Old Lands in Lower Egypt (Nile Delta) Practiced by MPWWR, mm

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Wheat	61.14	73.94	129.07	129.40	10.31	0.00	0.00	0.00	0.00	0.00	59.80	48.85	512.5
Beans	68.33	90.23	121.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.66	55.40	351.3
Barley	61.14	74.70	130.73	95.42	0.00	0.00	0.00	0.00	0.00	0.00	16.00	58.84	436.8
Fenugreek	74.72	75.48	43.57	0.00	0.00	0.00	0.00	0.00	0.00	53.81	78.19	66.13	391.9
Lupins	74.72	75.48	43.57	0.00	0.00	0.00	0.00	0.00	0.00	53.81	78.19	66.13	391.9
Chickpeas	74.72	75.48	43.57	0.00	0.00	0.00	0.00	0.00	0.00	53.81	78.19	66.13	391.9
Lentils	74.72	75.48	57.54	0.00	0.00	0.00	0.00	0.00	0.00	53.81	78.19	66.13	405.9
Clover c	74.24	86.55	27.78	0.00	0.00	0.00	0.00	0.00	31.21	153.42	80.38	70.53	524.1
Clover f	73.17	86.03	132.40	159.37	35.71	0.00	0.00	0.00	0.00	0.00	107.31	60.13	654.1
Flax	77.54	84.43	72.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.33	58.78	351.7
Onion w	78.95	94.03	143.13	175.52	0.00	0.00	0.00	0.00	0.00	0.00	60.00	65.45	617.1
Garlic	78.95	94.03	143.13	175.52	0.00	0.00	0.00	0.00	0.00	0.00	60.00	65.45	617.1
Vegetable w	74.96	43.05	4.76	0.00	0.00	0.00	0.00	0.00	17.99	85.09	83.58	98.49	407.9
Others w	68.53	73.66	110.59	0.00	0.00	0.00	0.00	0.00	0.00	71.21	67.76	65.47	457.2
Potatoes w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	108.08	97.48	60.53	39.06	305.2
Medical Plant w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop w	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sugar Beet	61.50	79.96	146.51	221.92	284.64	143.71	0.00	0.00	0.00	0.00	0.00	32.26	970.5
Cotton	0.00	0.00	63.98	95.61	132.37	164.05	197.53	141.86	50.46	0.00	0.00	0.00	845.9
Rice	0.00	0.00	0.00	0.00	170.62	379.36	403.30	355.75	260.46	107.14	0.00	0.00	1676.6
Maize s	0.00	0.00	0.00	0.00	65.93	126.39	201.35	202.33	134.94	101.20	30.95	0.00	863.1
Sorghum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Soya Beans	0.00	0.00	0.00	0.00	122.53	208.29	230.44	202.68	144.79	0.00	0.00	0.00	908.7
Sugar Cane	50.92	60.73	88.69	133.34	233.40	262.51	265.04	247.50	233.97	184.40	116.01	73.17	1949.7
Sesame	0.00	0.00	0.00	0.00	127.71	218.14	228.55	171.11	23.86	0.00	0.00	0.00	769.4
Ground Nuts	0.00	0.00	0.00	0.00	113.69	208.29	222.92	201.62	23.86	0.00	0.00	0.00	770.4
Onion s	0.00	0.00	0.00	0.00	150.56	233.00	248.81	202.60	118.67	0.00	0.00	0.00	953.6
Vegetables s	0.00	0.00	0.00	91.80	118.80	129.74	121.43	64.12	60.48	28.27	0.00	0.00	614.6
Others s	0.00	0.00	0.00	0.00	47.66	145.97	146.26	152.04	119.30	9.14	0.00	0.00	620.4
Fodder s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Trans Crop s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Potatoes s	0.00	47.90	88.93	126.61	136.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	400.2
Sunflower s	0.00	0.00	0.00	0.00	114.42	221.23	254.74	140.41	0.00	0.00	0.00	0.00	730.8
Medical Plant s	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa s	0.00	0.00	0.00	0.00	0.00	132.56	195.96	167.06	63.23	0.00	0.00	0.00	558.8
Maize n	0.00	0.00	0.00	0.00	0.00	0.00	101.16	141.24	203.27	142.34	22.29	0.00	610.3
Sorghum n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Vegetables n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	108.08	97.48	60.53	39.06	305.2
Gardens n	57.99	70.85	120.99	155.79	176.09	172.34	146.32	132.10	129.10	105.04	71.40	53.24	1391.3
Potatoes n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Darawa n	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Sprinkler	95.95	86.67	110.71	116.67	125.48	121.43	125.48	123.33	114.29	118.10	92.86	84.88	1315.8
Surface	123.33	113.33	147.62	157.14	184.52	178.57	184.52	184.52	150.00	162.38	150.00	118.10	1854.0
Soahei	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Source: Ministry of Public Works and Water Resources

Table F.13.7 Net Crop Water Consumption for Delta Regoin presented in TR17 and used in Irrigation Improvement Sector

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Seasonal
CUM/feddan													
WHEAT	182	231	404	441	141						174	184	1,756
BARLEY	182	231	404	441	141						174	184	1,756
BROAD BEANS	205	291	379	182							200	171	1,427
FLAX	357	378	147								336	336	1,554
BERSEEM (L)	223	265	394	595	491						330	208	2,505
BERSEEM (S)	223	265									330	208	1,025
TOMATOES (W)	323								252	357	424	412	1,768
VEGETABLES (W)	218	122	67	55					231	286	227	302	1,508
ONION (W)	323	319	458	323								365	1,788
SUGARBEET	227	302	218								231	286	1,264
POTATOES (N)	349									269	210	370	1,198
COTTON			260	232	517	645	745	387	180				2,965
RICE						210	1,436	1,458	1,424	371			4,899
MAIZE (S)					348	559	843	693	134				2,577
SESAME					336	630	693	294					1,953
PEANUTS				378	420	525	504	189					2,016
ONION (S)				399	441	588	672	651	231				2,982
POTATOES (S)		357	412	622	580								1,971
TOMATOES (S)		357	412	622	580								1,971
VEGETABLES (S)			193	269	341	402	294	176	189	118	71		2,053
WATERMELON			193	269	341	402	294						1,499
MAIZEFORAGE					349	559	844	693	134				2,579
ORCHARD			323	437	454	508	580	647	630	437			4,016
CITRUS	197	344	344	542	542	613	613	588	491	391	244	197	5,106
mm													
WHEAT	43.40	54.90	96.10	105.00	33.50						41.50	43.70	418
BARLEY	43.40	54.90	96.10	105.00	33.50						41.50	43.70	418
BROAD BEANS	48.70	69.20	90.20	43.30							47.70	40.70	340
FLAX	85.00	90.00	35.00								80.00	80.00	370
BERSEEM (L)	53.00	63.00	93.90	141.60	116.90						78.50	49.60	597
BERSEEM (S)	53.00	63.00									78.50	49.60	244
TOMATOES (W)	76.90								60.00	85.00	100.95	98.10	421
VEGETABLES (W)	51.90	29.05	15.95	13.10					55.00	68.10	54.05	71.90	359
ONION (W)	76.90	75.95	109.05	76.90								86.90	426
SUGARBEET	54.05	71.90	51.90								55.00	68.10	301
POTATOES (N)	83.10									64.05	50.00	88.10	285
COTTON			61.90	55.20	123.10	153.60	177.30	92.10	42.80				706
RICE						50.00	341.90	347.20	339.00	88.40			1,167
MAIZE (S)					82.90	133.00	200.80	165.10	31.80				614
SESAME					80.00	150.00	165.00	70.00					465
PEANUTS				90.00	100.00	125.00	120.00	45.00					480
ONION (S)				95.00	105.00	140.00	160.00	155.00	55.00				710
POTATOES (S)		85.00	98.10	148.10	138.10								469
TOMATOES (S)		85.00	98.10	148.10	138.10								469
VEGETABLES (S)			45.95	64.05	81.19	95.71	70.00	41.90	45.00	28.10	16.90		489
WATERMELON			45.95	64.05	81.19	95.71	70.00						357
MAIZEFORAGE					83.10	133.10	200.95	165.00	31.90				614
ORCHARD			76.90	104.05	108.10	120.95	138.10	154.05	150.00	104.05			956
CITRUS	46.90	81.90	81.90	129.05	129.05	145.95	145.95	140.00	116.90	93.10	58.10	46.90	1,216

Table F.13.8 Net Crop Water Consumption for Middle Egypt presented in TR17 and used in Irrigation Improvement Sector

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Seasonal
CUM/fedden													
WHEAT	265	328	559	487	71						193	244	2147
BARLEY	265	328	559	487	71						193	244	2147
BROAD BEANS	273	302	500	101							290	248	1714
FLAX	357	378	147								336	336	1554
BERSEEM (L)	248	353	542	664	550						378	260	2995
BERSEEM (S)	248	353									382	260	1243
TOMATOES (W)	155							197	265	290	441	424	1772
VEGETABLES (W)	122	122	67	55				172	176	336	361	281	1692
ONION (W)	323	361	458	323								365	1830
POTATOES (N)	378									269	248	416	1311
COTTON			275	391	664	819	915	430	208				3701
RICE						210	1436	1457	1424	370			4897
MAIZE (S)					351	640	941	681	146				2759
SORGHUM						575	806	962	554				2897
SESAME					340	659	748	315					2062
PEANUTS				378	420	525	504	189					2016
ONION (S)				399	462	588	714	693	252				3108
POTATOES (S)		357	454	622	588								2021
TOMATOES (S)		357	454	622	588								2021
VEGETABLES (S)		159	88	76	173	336	420	218	176	193	122	76	2037
OTHER SUM CROPS					294	521	609	538	475	113			2550
WATERMELON			235	76	173	336	420						1240
MAIZEFORAGE					353	638	941	680	147				2759
SUGAR-CANE	195	294	428	517	716	769	859	950	895	690	542	312	7168
ORCHARD			298	449	479	521	601	680	659	454			4141
CITRUS	202	252	353	563	601	626	626	605	504	403	252	202	5189
mm													
WHEAT	63.10	78.10	133.10	115.95	16.90						45.95	58.10	511
BARLEY	63.10	78.10	133.10	115.95	16.90						45.95	58.10	511
BROAD BEANS	65.00	71.90	119.05	24.05							69.05	59.05	408
FLAX	85.00	90.00	35.00								80.00	80.00	370
BERSEEM (L)	59.05	84.05	129.05	158.10	130.95						90.00	61.90	713
BERSEEM (S)	59.05	84.05									90.95	61.90	296
TOMATOES (W)	36.90							46.90	63.10	69.05	105.00	100.95	422
VEGETABLES (W)	29.05	29.05	15.95	13.10				40.95	41.90	80.00	85.95	66.90	403
ONION (W)	76.90	85.95	109.05	76.90								86.90	436
POTATOES (N)	90.00									64.05	59.05	99.05	312
COTTON			65.40	93.00	158.10	195.00	217.90	102.30	49.50				881
RICE						50.00	341.90	346.90	339.05	88.10			1,166
MAIZE (S)					83.50	152.40	224.10	162.10	34.80				657
SORGHUM						136.90	191.90	229.05	131.90				690
SESAME					80.95	156.90	178.10	75.00					491
PEANUTS				90.00	100.00	125.00	120.00	45.00					480
ONION (S)				95.00	110.00	140.00	170.00	165.00	60.00				740
POTATOES (S)		85.00	108.10	148.10	140.00								481
TOMATOES (S)		85.00	108.10	148.10	140.00								481
VEGETABLES (S)		37.86	20.95	18.10	41.19	80.00	100.00	51.90	41.90	45.95	29.05	18.10	485
OTHER SUM CROPS					70.00	124.05	145.00	128.10	113.10	26.90			607
WATERMELON			55.95	18.10	41.19	80.00	100.00						295
MAIZEFORAGE					84.05	151.90	224.05	181.90	35.00				657
SUGAR-CANE	46.50	70.00	102.00	123.00	170.50	183.00	204.60	226.30	213.00	164.30	129.00	74.40	1,707
ORCHARD			70.95	106.90	114.05	124.05	143.10	161.90	156.90	108.10			986
CITRUS	48.10	60.00	84.05	134.05	143.10	149.05	149.05	144.05	120.00	95.95	60.00	48.10	1,235

Table F.13.9 Net Crop Water Consumption for Upper Egypt presented in TR17 and used in Irrigation Improvement Sector

Crop	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Seasonal
CUM/feddan													
WHEAT	319	429	573	491							239	290	2,342
BARLEY	319	428	529	491							239	290	2,296
BROAD BEANS	310	449	520								389	306	1,974
FLAX	399	420	273								294	273	1,659
BERSEEM (L)	275	419	625	701	587						389	272	3,268
BERSEEM (S)	275	419									389	272	1,355
TOMATOES (W)	189							214	328	458	458	361	2,008
VEGETABLES (W)	118	67	71	59				176	210	395	374	286	1,756
ONION (W)	315	374	466	378								336	1,869
POTATOES (N)	479									281	290	491	1,541
COTTON			578	523	621	837	977	474					4,008
RICE													0
MAIZE (S)					389	690	998	734	138				2,949
SORGHUM						575	807	963	554				2,901
SESAME					349	672	790	336					2,147
PEANUTS				441	546	630	672	210					2,499
ONION (S)				399	462	588	714	693	252				3,108
POTATOES (S)		391	521	689	601								2,202
TOMATOES (S)		391	521	689	601								2,202
VEGETABLES (S)		164	92	143	260	697	433	202	185	197	118		2,491
OTHER SUM CROPS					371	596	647	638	529				2,781
WATERMELON			239	143	260	697	433						1,772
MAIZEFORAGE					391	689	1,000	735	139				2,954
SUGAR-CANE	260	353	417	587	1,016	1,101	1,277	1,245	1,050	845	582	391	9,123
ORCHARD			332	470	500	533	638	718	706	475			4,372
CITRUS	197	344	344	542	542	613	613	588	491	391	244	197	5108
mm													
WHEAT	76.00	102.20	136.40	117.00							57.00	69.10	558
BARLEY	75.95	101.90	125.95	116.90							56.90	69.05	547
BROAD BEANS	73.80	107.00	123.70								92.60	72.90	470
FLAX	95.00	100.00	65.00								70.00	65.00	395
BERSEEM (L)	65.40	99.70	148.90	166.80	139.80						92.60	64.80	778
BERSEEM (S)	65.40	99.70									92.60	64.80	323
TOMATOES (W)	45.00							50.95	78.10	109.05	109.05	85.95	478
VEGETABLES (W)	28.10	15.95	16.90	14.05				41.90	50.00	94.05	89.05	68.10	418
ONION (W)	75.00	89.05	110.95	90.00								80.00	445
POTATOES (N)	114.05									66.90	69.05	116.90	367
COTTON			137.60	124.50	147.80	199.20	232.50	112.80					954
RICE													
MAIZE (S)					92.50	164.40	237.70	174.70	32.80				702
SORGHUM						137.00	192.20	229.40	132.00				691
SESAME					83.10	160.00	188.10	80.00					511
PEANUTS				105.00	130.00	150.00	160.00	50.00					595
ONION (S)				95.00	110.00	140.00	170.00	165.00	60.00				740
POTATOES (S)		93.10	124.05	164.05	143.10								524
TOMATOES (S)		93.10	124.05	164.05	143.10								524
VEGETABLES (S)		39.05	21.90	34.05	61.90	165.95	103.10	48.10	44.05	46.90	28.10		593
OTHER SUM CROPS					88.33	141.90	154.05	151.90	125.95				662
WATERMELON			56.90	34.05	61.90	165.95	103.10						422
MAIZEFORAGE					93.10	164.05	238.10	175.00	33.10				703
SUGAR-CANE	62.00	84.00	99.20	139.75	241.80	262.20	304.10	296.40	249.90	201.20	138.60	93.00	2172
ORCHARD			79.05	111.90	119.05	126.90	151.90	170.95	168.10	113.10			1041
CITRUS	46.90	81.90	81.90	129.05	129.05	145.95	145.95	140.00	116.90	93.10	58.10	46.90	1216

F.14 Water Balance Study (Irrigation Requirement) in the Whole Study Aarea

The crop coefficients (Kc) are decided with reference to the ones proposed by FAO Irrigation and Drainage Paper No. 24 and also General Authority for Rehabilitation Projects and Agricultural Development (GARPAD) under Ministry of Agriculture and Land Reclamation (MALR), with the latter mainly. In calculating water requirement for paddy, land preparation and percolation should be considered in addition to the crop evapotranspiration. A total of 80 mm, composed of 30 mm for supplement into the soil and 50 mm for ponding is undertaken, and 2.0 mm/day is considered as the percolation.

With the cropping patterns proposed and irrigation efficiencies applied, following cases are studied for the Master Plan Study Area. Also, each case is examined with two conditions for areas, 61,644 fed in total, currently irrigated by gravity-fed drainage. One is that no supplemental fresh water feeds the areas, thus to be irrigated by drainage only as it is (referred to as "Drainage not Supplemented"), and the other is that half of the required irrigation water is supplemented by fresh water (referred to as "Drainage Supplemented"). Therefore total number of study cases becomes 12.

Cropping Pattern	Without Project Ep=0.57	With Project Ep=0.66	With Project Ep=0.68	Remarks
Present	O	O		
Pattern 1		O	O	DS Crop intensity; 170%
Pattern 2		O	O	Crop intensity; All 200%

The results calculated are tabulated as follows;

Tables F.14.1	Irrigation Efficiencies Applied
Tables F.14.2	Summary of Water Requirements for Master Plan Area, Surplus or Deficit and Modified Water Allocation, '000CUM
Figure F.14.1	Summary of Annual Requirement (Present C.P. & C.I. DS170% & All 200%), MCM
Figure F.14.2	Summary of Monthly Peak Requirement (Present C.P. & C.I. DS170% & All 200%), MCM
Figure F.14.3	Summary of Modified Annual Requirement (DS C.I. DS170%), MCM
Figure F.14.4	Water Requirement (DS C.I.170%, Drainage Suppl'ted, Ep=0.66) and Original Availability
Figure F.14.5	Water Requirement (DS C.I.170%, Drainage Suppl'ted, Ep=0.66) and Modified Availability
Figure F.14.6	Summary of Modified Annual Requirement (C.I. All200%), MCM
Figure F.14.7	Water Requirement (C.I.200%, Drainage Suppl'ted, Ep=0.68) and Original Availability
Figure F.14.8	Water Requirement (C.I.200%, Drainage Suppl'ted, Ep=0.68) and Modified Availability
Table F.14.3	Summary of Peak Intake Volume based on Modified Penman Method at Representative Barrages
Figure F.14.9	Peak Discharge Required at Ralah Abbasee Intake, CUM/sec

Tables F.14.4 – F.14.16	DS C.I. 170%, Ep=0.66, Drainage not Supplemented
Figures F.14.10 – F.14.14	ditto
Tables F.14.17 – F.14.24	DS C.I. 170%, Ep=0.66, Drainage Supplemented
Figures F.14.15 – F.14.19	ditto
Tables F.14.25 – F.14.37	DS C.I. 170%, Ep=0.68, Drainage not Supplemented
Figures F.14.20 – F.14.24	ditto
Tables F.14.38 – F.14.45	DS C.I. 170%, Ep=0.68, Drainage Supplemented
Figures F.14.25 – F.14.29	ditto
Tables F.14.46– F.14.55	All C.I. 200%, Ep=0.66, Drainage not Supplemented
Figures F.14.30 – F.14.34	ditto
Tables F.14.56 – F.14.65	All C.I. 200%, Ep=0.66, Drainage Supplemented
Figures F.14.35 – F.14.39	ditto
Tables F.14.66 – F.14.75	All C.I. 200%, Ep=0.68, Drainage not Supplemented
Figures F.14.40 – F.14.44	ditto
Tables F.14.76 – F.14.85	All C.I. 200%, Ep=0.68, Drainage Supplemented
Figures F.14.45 – F.14.49	ditto
Tables F.14.86– F.14.98	Present Cropping, Ep=0.56, Drainage not Supplemented
Figures F.14.50 – F.14.54	ditto
Tables F.14.99 – F.14.106	Present Cropping, Ep=0.56, Drainage Supplemented
Figures F.14.55 – F.14.59	ditto
Tables F.14.107 – F.14.119	Present Cropping, Ep=0.66, Drainage not Supplemented
Figures F.14.60 – F.14.64	ditto
Tables F.14.120 – F.14.127	Present Cropping, Ep=0.66, Drainage Supplemented
Figures F.14.65 – F.14.69	ditto