Tables

Table B.1.1 Delineation of Each Zone

Zones	Topography	Hydro-geology	Khettaras
A	Located at the Gheris and Todrha river basins. Upstream of Zone A (Tinejdad area) is located between High Atlas and Anti Atlas. Downstream of Zone A (Jorf area) is composed of river deposits of the rivers Gheris and Todrha.	Khettaras are located in the quatenary aguifers, comprising of "recent quaternary", "middle quaternary" and "ancient quatenary". Groundwater moves in higher permeable layer of gravel. Lacustrine deposit limestone and silty soil is in low pearmeability of 10^{-4} cm/sec order.	There exist 137 khettaras, however productive khettaras are limited to 80 khettaras (58%). Khettaras are located along the Gheris and Todrha rivers, fan-shaped alluvial deposits downstream of Timkit and Tajighoust gorges and small tributaries of the north mountain range of Anti Atlas. A few khettras are located at the mountaneous area of the High Atlas (Assoul) and upstream of the Tadighoust gorge. Average discharge of 80 khettaras is 4.3 lit/sec.
B	Khettaras are located along the Bouanane river in the north-west area. Highest peak in this basin is Bourr (2,642m) and Ari-Oumsed (2,519m). The rivers Guir and Bouanane confluence at the south-east area of Zone B. Generaly composed of fan-shaped alluvial deposits of the rivers.	Garavelly river deposits has higher peameability ($k=1.5x10^{-2}$ cm/sec). Turonien limestone karst exists nest of upper Plio-Quatenary aquifers. Groundwater level in this layer is not stable.	Because of adequate rainfall amount comparing with other zones, 20 out of 24 khettaras are productive. Most of khettaras have been constructed in the river deposits. Collecting gallery has been applied to the khettara to gather riverbed flow of the Bouanane river. Average discharge of 18 khetatras is 9.9 lit/sec.
C	Khettaraa are located along the midstream of the Guir river. Boudenib area situates between High Atlas and Guir Hammada (Altitude 900 to 1,100m)	In Boudenib basin, Cretaceous formations and Quatenary deposits are recharged.	All khettaras are located at inundated area of the Guir river near Boudenib, and they are all productive. Average discharge of 18 khetatras is 11.6 lit/sec.
D	Many khettaras are located at right bank side of the Tafilalet plain (Fezna- Jorf area) in altitude of 800 to 850m. Right bank side is limited by Jbel Ougnate and straight elongated hills. Left bank side is called Marha, El Hajeb and El Hamda where is dried and desertificated.	Khettaras are located in the quatenary aguifers, comprising of "recent quaternary", "middle quaternary" and "ancient quatenary". Groundwater moves in higher permeable layer of gravel. Alluvium is partly very coarse so that it may form good layerd or lens-like groundwater passage.	Most of khettaras are located at the right side bank of the Gheris river. Groundwater recharge is accelerated through riverbed of the Gheris river and run-off from the north tributaries of the Anti Atlas mountain ranges. Only 21 khettaras (30%) are productive, while 48 khettaras have dried up, especially northern part of the Zone, e.g. Fezna and Jorf areas. It is assumed that transfering from khettara use to pump irrigation method may accerelate this phenomenon. Productive khettaras and those dried up are mixed in the southern part of the zone (Monkara, Krair, Bouya and Hannabou areas). Average discharge of 21 khettaras is 13.3 lit/sec.

Zones	Topography	Hydro-geology	Khettaras
E	Khettaras are located at right bank of the Gheris rivet, mid- downstream area of the Tafilalet plain. Altitude is between 740 to 780 m.	Khettaras are located in the quatenary aguifers, comprising of "recent quaternary", "middle quaternary" and "ancient quatenary". Groundwater moves in higher permeable layer of gravel.	There are 25 khettaras along the right side bank of the Gheris river within 10 km length. Mother wells of these khettaras are located near the mountain foot of the eatstern end of the Anti Atlas mountain ranges. Small tributaries of the rivers (wadi), Hanich and Bou Azgar supply groundwater through river deposits. Average discharge of 14 khettaras is 7.5 lit/sec.
F	Khettaras are located at downstream of the Ziz river and left bank of the Gheris rivet, mid-downstream area of the Tafilalet plain. The vast sand dune (Merzouga- Chebbi) area is along the Beida river. Alluvium deposits in the area with 4 to 5 km wide.	Khettaras are located in the quatenary aguifers, comprising of "recent quaternary", "middle quaternary" and "ancient quatenary". Groundwater from the Ziz and Gheris basins gathers in this area. As floods scaresly flowed down, subsurface flow has declained especially in the south area.	Khettaras located in Zone F are divided into two agroups according to their location. There are 36 khettaras in Risani area, however, most of them have dried up already. There exist 8 khettaras in the sand dune area, Merzouga and Taouz area. Average discharge of 11 khettaras is 2.3 lit/sec.
G	About 100 khettaras are scattered in the river basins of M'cissi, Regg, Ahssia and Tarhbalt. Northen part is the eastern and of Jbel Ougnate over 1,200 m altitude. West part has highest peak of J. Bou Tarsa (2,057m). This area is composed of some alluvial land in the gorge in teh downstream of Fezzou gorge. Ahssia river basin is divided into three (3) alluvial land (Lbel Achich, Rahiat and Jbel Amrharfi and Bouinagai. Tarhbalt river has the largest branch basin of the Maider river. The area os divided into three (3) alluvial land by two (2) mountain ranges.	Groundwater in Maider basin area were developped mainly in Pliocene-Quatenary area. In general, mountaneous area are composed of Pre-pliocene farmations, and their permeability is low and aquifer has not developped. Accordingly most of khettaras are located along the small tributaries to collect ruverbed flow. At where fissures have been developped together with faulted and sheared part, there is yield from these fissures.	Kherraas are located along the rivers, M'cissi, Regg and Ahssia and tributay of Assif Tinifit. Most of the khettaras located at the south of the national road (Rissani - Alnif - Zagora) were dried up due to continuous drought since 1997. Khettara discharge is seasonaly fluctuated, and adequate flow is observed mainly after flood occurs. Average discharge of 37 khettaras is 2.1 lit/sec.

Table B.2.1 Storage Records of Hassan Addakhil Dam

Storage records of Hassan Addakhil Dam (1971-2004)				
Campagnes Agricoles	Apports	Restitutions	Volume	Pruviometrie (Foum Zaabel)
	(Mm3)	(Mm3)	(Mm3)	(mm)
			36	204
1971/72	164	72	94	210
1972/73	189	126	131	272
1973/74	77	92	70	201
1974/75	189	92	139	254
1975/76	167	152	203	291
1976/77	187	205	134	176
1977/78	87	142	32	148
1978/79	104	86	29	66
1979/80	152	129	55	324
1980/81	31	73	7	107
1981/82	32	24	9	116
1982/83	16	10	11	122
1983/84	6	5	9	68
1984/85	14	4	12	149
1985/86	27	24	10	129
1986/87	39	31	10	122
1987/88	61	53	10	187
1988/89	184	113	67	206
1989/90	336	149	228	301
1990/91	153	166	181	255
1991/92	63	142	81	161
1992/93	23	73	17	93
1993/94	179	106	64	197
1994/95	94	79	63	142
1995/96	304	119	233	405
1996/97	106	143	150	126
1997/98	70	110	76	101
1998/99	30	23	43	73
1999/2000	70	60	29	170
2000/2001	28	5	17	80
2001/2002	95	26	62	148
2002/2003	32	54	21	n.a.
2003/2004	161	80	80	n.a.
	ORMVA/TF-Data			DRH-Data

Table B.2.2 Water Balance of Hassan Addakhil Dam

Water Balance of Hassan Addakhil Dam (2001-2003) Effective Storage: 350 Mm^3

Year	Month	Inflow	Outflow					Reserved Volume	
			Left Area	Right Area	New Settelement	Tafilalet Plain	Total		
		(Mm^3)	(Mm^3)	(Mm^3)	(Mm^3)	(Mm^3)	(Mm^3)	(Mm^3)	(%)
2001	September	2.695	0.000	0.000	0.000	0.000	0.000	17.302	5
	October	38.224	0.000	0.000	0.000	0.000	0.000	18.350	5
	November	1.276	0.732	0.083	0.043	0.000	0.858	55.207	16
	December	0.983	3.142	0.515	1.447	0.000	5.104	52.937	15
2002	January	0.838	0.288	0.000	0.000	0.000	0.288	48.182	14
	February	1.771	1.844	0.255	0.815	0.000	2.913	47.359	14
	March	1.305	2.501	0.576	0.844	0.000	3.920	44.621	13
	April	37.151	2.064	0.498	1.004	0.000	3.565	40.555	12
	May	6.247	3.347	0.267	1.088	0.000	4.702	72.582	21
	June	0.909	0.252	0.155	0.000	0.000	0.407	71.710	20
	July	1.654	2.719	0.596	1.231	0.000	4.546	61.930	18
	August	2.023	0.033	0.000	0.006	0.000	0.039	62.584	18
	Septenber	8.852	0.000	0.000	0.000	0.000	0.000	67.869	19
	October	3.277	3.286	0.639	1.292	25.816	31.033	38.074	11
	November	2.523	0.000	0.000	0.000	0.000	0.000	39.142	11
	December	0.766	0.000	0.000	0.000	0.000	0.000	38.579	11
2003	January	0.733	1.060	0.039	0.464	0.000	1.563	36.788	11
	February	0.761	1.913	0.417	0.520	0.000	2.850	33.481	10
	March	1.092	0.000	0.000	0.000	13.783	13.783	19.914	6
	April	0.981	0.000	0.000	0.000	4.486	4.486	13.529	4
	May	0.586	0.000	0.000	0.000	0.000	0.000	12.708	4
	June	0.376	0.000	0.000	0.000	0.000	0.000	11.531	3

Source: ORMVA/TF

Table B.2.3 Characteristic of Pump Stations Operated by Cooperatives and Associations

ORMVA/TF
SGR/BER/SP, Errachidia

No.	Location	Operation Cooperative/ Association	Date of installation	Inventory No		Charasteristic of well		Well diameter
					Puits/ Forage	P.T (m)	W.P (m)	Diameter (m)
1	Tighiouine	Amgaouiou	1983		F	94	19	0.5
2	Rahba Jdida	My Bouzid	1983	462100/186	P	45	25	1.62
3	Ait Taarabe	Rahmat Allah	1983	462100/187	F	45	22.7	0.45
4	Yazmourit	Al Kods	1983	462100/188	F	48	22.7	0.45
5	Sehb	El Massira	1983		P	25	9	
6	Oulad lhaj 1	El Massira	1983		F	155	14.3	
7	Oulad lhaj 2	El Massira	1983		P	35	20	
8	Targa	Mabrouka	1984	462100/270	P	50	20	
9	Beni M'halli	M'Daghra	1984	462100/211	F	167	60	
10	Sidi Bouabdillah	Sidi Boubed	1984	462100/234	F	80	*	
11	Oulad M'hamed	El Ward	1985	462100/213	F	80	30	
12	Taznukt	Al Jid	1983	462100/194	F	81	19.2	
13	Blaghma	Amal salih	1985	462100/218	P	28	8.5	
14	Douia 1	Bir Anzarane	1979		P	19	4	
15	Douia 2	douia	1983		P	28	8.5	
16	Amsed	Amsed	1989	462100/254	F	120		
17	Cité ORMVAT	Errachidia	1984		P	30		2
18	SEMVA 1	Errachidia	1956		P	50	19	
19	SEMVA 2	Errachidia	1985		P	30	25	
20	Zitoune	Errachidia	1989	462100/265	P	30		
21	Château direction	Errachidia	1999		P			
22	Parc 3 mars	Errachidia	1995		P			
23	SEMVA Rich	Rich	1987		P			
24	SP Tachakloute	Rich	1984	462100/266	P			
25	CMV Rich	Log/Rich	1995		P			
26	Coor.B.Tadjit	Beni Tadjit	1994		P			
27	Goulmima siège	Goulmima	*		F,P			
28	Logement direction	Errachidia	*		P	30	26.8	
29	SP.piscine	Errachidia	*		Piscine			
30	CMV Gourrama	Gourrama	1998	461100/387	P			
31	CMV Alnif	Alnif	1998	461100/243	P			
32	CMV Erfoud	Erfoud	1993	461100/303	P			
33	CMV Bouanane	Bouanane	2002		P			
34	Espace vert cité	Errachidia	2003		P	23		
		Points d'eau pour nomades						
35	Tradit	Talsint	1992	461100/276	P			
36	Lahmida	Talsint	1992	461100/274	P			
37	Lamniaa Lhamza	Bouanane	1990	462100/264	P			
38	Oued Belarbi	Bouanane	1992	462100/275	P			
39	Mariama	Talsint	1993	461100/306	P			
40	SEMVA 3	Errachidia	2003		F			

No.	Location	Operation Cooperative/ Association	Date of installation	Inventory No		Charasteristic of well		Well diameter
					Puits/ Forage	P.T (m)	W.P (m)	Diameter (m)
41	Amellagou Ksar	Amellagou	1988		P	42	30	2
42	Lahrouine	Lahrouine	1987		F	120	40	0.5
43	Tamaloute	Almou	1987		F	150	50	0.6
44	Azighame	Azaghar	1987		P	80	50	2
45	Tamtatouchte	Almou	1987	462100/225	P	80	50	
46	Ait Ayoub	Amellagou	1998		F			
47	Mellaab 1		1986		P	14	10.7	1.8
48	Mellaab 2	Al Fath	1990		P			
49	Izelf	IFRED	1998	462100/55	P			
	Lahrouche 1	Sidi Ali Ouloug	1984		P	45	7	1.5
50	Lahrouche 2		1987		F	120	7.5	0.7
51	Tazlaft	Assamar	1987	462100/228	P	35	11	1.6
52	Tafamdast	Gourrama	1998	461100/327	P	30		
53	AitYagoub	Gourrama	1987	462100/225	F	80		
54	Ait Yaakoub	Ass-Yagoub	1994	462100/312	F			
55	Al Fallah	Beni Tadjit	1980	462100/174-5	F			
56	Ghazouane	Talsint	1985	462100/191	P			
57								
58	Sighnis	Tadighoust	1985		F	120		
59	Toughza	Goulmima	1976		F	46	36	0.5
60	PROMAR	Boudnib	1996	462100/318	P	32		
61	Agdal	Imilchil	1983		P	18	5	1.4
62	Boutaghbalout	Imilchil	1983	462100/233	P	45	6	1.6
63	Bni Aich	Erfoud	1970	461100/289	P	28	8.5	1.6
64	Zaari	Erfoud	1970	461100/283	P	19	8	3x3
65	Chorfat Bahaj	Rissani	1970	461100/199	F	30	21	
66	Guiouaz	Rissani	1970	461100/272	F	22	19	
67	Jbil	Rissani	1970	461100/296	P	22	2.6	
68	Mezguida	Rissani	1970	462100/190	P	20	10	2.6
69	My Ali Cherif	Rissani	1970	461100/309	P	40	16.15	2
70	Sidi Boubker	Rissani	1970	461100/310	P	20	9.2	3
71	Achouria	Jorf	1972	461100/297	P	22	21	1.4
72	Bouya 4	Jorf	1972	461100/308	F	11	3.5	0.4
73	Bouya 5	Jorf	1972	461100/271	F	14	3.3	0.4
74	Ghouard 2	Jorf	1972		P	24.6	21.6	
75	Laghfouli	Jorf	1972	462100/278	P	26.73	24.95	1.6
76	Ksiba	Jorf	1972	461100/284	P	27.25	26.1	1.3
77	Sidi Majbar	Jorf	1991	462100/195	P	25.46	25.32	2.7
78	tassalht	Rich	2001		P			
79	Ighejd	Rich	2001		P			
80	Afardou 1	Errachidia	2001		F	100		14"
81	Afardou 2	Errachidia	2001		F	100		12"1/2
82	El Kheng 2	Errachidia	2001		F	120		12"1/4
83	M'daghra 1	Errachidia	2001		F	100		14"
84	Sahli 1	Boudenib	2001		F	100		14"
85	Labrouj	Erfoud	2002		P	13	1.7	
86	Hakou Zrikat 1	Zrikat	1999	461100/330				
87	Zrikat 2	Zrikat	2002		F	80		12"1/2

No.	Location	Operation Cooperative/ Association	Date of installation	Inventory No		Charasteristic of well		Well diameter
					Puits/ Forage	P.T (m)	W.P (m)	Diameter (m)
88	n.a.							
89	Marhaba	Goulmima	1994	Don chinois	P			
90	Emacira	Goulmima	1994	Don chinois	P			
91	Rebh	Goulmima	1994	Don chinois	P			
92	Al Wifac	Goulmima	1994	Don chinois	P			
93	Tiouanine	Goulmima	1994	Don chinois				
94	El Kheng 1	Errachidia	2001		F	120		14"
95	Gouim	El Kheng	2002		P	23.5		1.8
96	Taghyamt	Aoufous	2002		P	26		1.8
97	Titaf	M'daghra	2002		P	28		1.8
98	El Gara	Aoufous	2002		P	19.5		1.8
99	Ait Attou	Rich	2002		P	38.5		1.8
10	Mellaka	Rich	2002		P	20		1.8
101	Baknou	Rich	2002		P	20		1.8
102	Tamzaouroute	Beni Tadjit	2002		P	10.5		1.8
103	Bououdi	Assoul	2002		F	150		14"
104	Tamaksoute	Assoul	2002		F	81		14"
105	Hibous	Errachidia	2002		F	130		14",12",9"5/8
106	Zmimina 1	Errachidia	2002		F	130		9"5/8, 7"
107	Zmimina 2	Errachidia	2002		F	130		7"
108	Tallat/Targa	Errachidia	2002		F	122		12"1/2
109	Tafandast 2		2002		F	80		9"5/8
110	Imghi		2003		P	38.5		1.8
111	Bouizme		2003		P	47.6		
112	Oulas Amira		2002		F	120		12"1/4
113	Sehli 2		2002		F	200		13"1/4, 7"
114	Timzguid Asfla		2002		F	140		14", 12"1/4
115	M'Cissi		2002		F	120		12"1/4
116	Hakou Zrikat 2		2002		F	80		12"1/2
117	Ait Attou		2002		P	38.5		1.8
118	Taourirt	M'daghra	2003		P	35		1.6
119	Idmouma	Amellagou	2003		P	28.5		1.7
120	Zaouiat Aoufous	Aoufous	2003		P	25		1.7
121	Ighejd		2003		P	37.5		1.8
122	Ait Talb		2003		P	20		
123	P.R secteur A	Kheng/Amjouj	2002		F	140		12"1/4
124	P.R secteur B	Kheng/Tingubit	2002		F	100		12"1/4
125	Beni Tadjit ksar	Beni Tadjit	2002		F	100		12"1/4
126	R'Teb Zrikat	R'Teb Aoufous	2002		P	12.4		1.8
127	Tamaarkit	R'Teb Aoufous	2002		P	14		1.8
128	Almou/Ait Aissa	Beni Tadjit	2002		P	17		1.8
129	Ait Slimane	Amellagou	2002		P	22		1.8
130	Ait Brahim	Goulmima	2002		P	41		1.8
131	Zaouit Jdida		2002		P	12.4		1.8
132	Aarif		2002		P	11		1.7
133	Azzar		2002		P	16.1		1.7
134	Promar 2	Boudenib (goutte à goutte)	2002		P	22.3		1.7
135	Tine Ouzitini	M'daghra	2002		P	30.1		1.7
136	Tassalht 1 ksar		2001		P	37.5		1.8
137	Tassalht 2		2002		P	36		1.8
138	Outalamine		2005	461100/369-400	P	45		

Table B.2.4 Wells Data for Potable Water Supply

FR: Forage (Deep well), P: Puits (Shallow well), FE: Forage Electoric (Deep well with pump)

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
1	Erfoud	Arab Sebbah Ziz	Ain Ellatti	4035/57	FR	0.86	614,950	102,800	828.00	41	6.33	6/95	13900	9730
2	Erfoud	Arab Sebbah Ziz	Ain Ellatti	4034/57	FR	2.04	618,150	104,250	851.57	120	6.43	2/88	12968	9070
3	Erfoud	Arab Sebbah Ziz	Ain Ellatti	4033/57	FR	34.1	615,100	106,500	842.04	95	ART	5/88	11565	8090
4	Erfoud	Arab Sebbah Ziz	Hannabou	796/57	P		602,400	91,080	786.00	8.43	SEC	2/75		
5	Erfoud	Arab Sebbah Ziz	Hsasna	4101/57	FR	6	604,250	93,850	792.00	30	1	1/87	2475	1710
6	Erfoud	Arab Sebbah Ziz	Hsasna	7098/57	FR	29	604,100	94,000	791.00	100	2.88	1/87	26716	18700
7	Erfoud	Arab Sebbah Ziz	Ksar Lhaine	454/57	P		610,930	95,540	805.00			2/75	9600	
8	Erfoud	Arab Sebbah Ziz	Lahsasna 2	4100/57	FR		603,500	83,600	800.00	30	4.55	1/87	2475	1710
9	Erfoud	Arab Sebbah Ziz	Oued Nejjakh	4273/57	P		643,200	94,800	880.00	40.8	20.25	8/96	723	510
10	Erfoud	Arab Sebbah Ziz	Oued Zohra	4099/57	FR		609,500	85,750	780.00	55	34.07	1/87		
11	Erfoud	Arab Sebbah Ziz	Tizimi	3903/57	P		612,900	90,600	790.00	22	7.42	11/95	2400	1680
12	Erfoud	Arab Sebbah Ziz	Tizimi(puis Station)	871/57	P		607,510	91,860	791.00	18.6	5.8	2/75		
13	Erfoud	Arab Sebbah Ziz	Zoneain El Atti	4044/57	FR	8.33	622,600	102,600	875.00	100	27.18	2/90	2880	2010
14	Erfoud	Arab Sebbah Ziz	Zone Erfoud	4046/57	FR	1.06	604,100	92,800	785.00	151	2.32	2/90	8760	6130
15	Erfoud	Arab Sebbah Ziz	Zone Erfoud Ain Ati	4240/57	FR	8.37	619,400	104,500	853.00	73	6.1	3/90	6734	5340
16	Erfoud	Arab Sebbah Ziz	Zone Erfoud	4049/57	FR	5	604,600	91,500	792.00	34	8.07	2/90	3710	2590
17	Erfoud	Arab Sebbah Ziz	Zone Erfoud	4048/57	FR	1.22	604,400	92,930	792.05	37	27.75	2/90	5000	3500
18	Erfoud	Arab Sebbah Ziz	Zone Erfoud	4047/57	FR	4.24	604,320	92,900	792.00	50	3.87	2/90	2801	1960
19	Erfoud	Arab Sebbah Ziz	Zone Erfoud	4046/57	FR	1.06	604,100	92,800	785.00	151	2.32	2/90	8760	6130
20	Erfoud	Arab Sebbah Ziz	Bge.My Brahim	4101/57	P	8.76	604,250	93,850	792.00	31	0.6	10/87	2450	1770
21	Erfoud	Arab Sebbah Ziz	Hsasna	4100/57	FR		603,500	93,600	800.00	30	4.55	1/87	2475	1710
22	Erfoud	Fezna	El Achouria Jorf	4040/57	P	15.29	592,750	101,900	828.00	29.6	16.16	4/88	2020	1368
23	Erfoud	Fezna	Betha	3029/57	F.E		589,441	96,880	830.37	22	14.22	7/67	2650	
24	Erfoud	Fezna	Betha	3033/57	F.E		591,259	96,495	825.75	21	14.03	7/67	2780	
25	Erfoud	Fezna	El Ghouar Lorf	4304/57	FR	11.2	588,000	104,800	830.00	103	15.95	8/99	1270	889
26	Erfoud	Fezna	Fezna Jorf	4296/57	FR		587,500	104,600	830.00	152	SEC	6/99		
27	Erfoud	Fezna	Ouled Ghaneme	4302/57	FR		589,200	104,000	830.00	110	18.6	7/99	5900	4130
28	Erfoud	Fezna	Ain El Atti	4039/57	FR	1.99	590,350	114,300	892.00	91	16.25	6/88	1941	1350
29	Erfoud	Fezna	Ain El Atti	4038/57	FR	3.22	599,700	113,700	890.00	165	30.99	5/88	4391	3073
30	Goulmima	Tadighoust	Tadighoust	954/47	FE	36.13	540,900	136,825	1,118.00	354	16.01	11/91	2064	1440

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordination x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
31	Goulmima	Tadighoust	Mouy	1016/47	FR		540,100	136,300	1,112.00	130	19.5			
32	Goulmima	Tadighoust	Tadighoust	866/47	FR	2.27	550,400	138,800	1,125.00	116.7	67	3/83	7151	5000
33	Goulmima	Tadighoust	Tadighoust	867/47	FR	1.13	548,150	139,050	1,125.00	90.7	51.77	3/83	2554	1780
34	Goulmima	Tadighoust	Tadighoust	868/47	FR	2	542,450	135,350	1,094.53	30.7	19	3/83	3320	2340
35	Goulmima	Tadighoust	Tadighoust	869/47	FR	7	540,250	136,000	1,115.03	90.7	14.9	3/83		
36	Goulmima	Tadighoust	Tadighoust	870/47	FR	5.71	539,000	138,150	1,015.00	144.7	9.08	3/83		
37	Goulmima	Tadighoust	Tadighoust	871/47	FR	1.5	540,200	134,400	1,094.78	114.7	42.84	3/83	2043	1402
38	Goulmima	Tadighoust	Tadighoust	872/47	FR	4	539,750	129,150	1,057.40	72.7	15.75	3/83		
39	Goulmima	Tadighoust	Tadighoust	873/47	FR	4	542,100	128,000	1,075.00	62.7	9.8	3/83	2503	1720
40	Goulmima	Tadighoust	Tadighoust	775/47	P	10	540,300	136,600	1,100.00	20.9	14	3/83	2630	1841
41	Goulmima	Tadighoust	Tahamdount	1017/47	FR		542,650	145,200	1,200.00	69.6	26.18			
42	Goulmima	Tadighoust	Timazguite	800/47	FR	11.12	541,750	144,900	1,165.00	134	25.14	5/87		
43	Goulmima	Tadighoust	Talfraaute 1	1005/47	FR	2.5	535,100	132,000	1,120.00	128	35.05	10/00	718	500
44	Goulmima	Tadighoust	Talfraaute 2	1006/47	FR	10.53	534,850	132,450	1,140.00	171	26.57	3/01	1050	730
45	Goulmima	Tadighoust	Talfraaute 2	1613/38	FE	0.25	572,000	182,950	1,390.00	120	7.09	1/01	1036	720
46	Goulmima	Tadighoust	Amsed 1	916/47	FR	16.6	541,000	146,026	1,200.00	100.5	11.57	7/86		
47	Goulmima	Tadighoust	Amsed 2	917/47	FR	90	540,800	146,480	1,194.41	68	10	7/86		
48	Goulmima	Tadighoust	Tadighoust	912/47	FE	30.55	540,650	136,700	1,110.15	120	18	9/86	2835	1949
49	Goulmima	Gheris El Ouloui	AEP Haut Ghris	774/47	P	5.04	540,100	123,600	1,025.00	27.65	21.5	2/83	4668	3180
50	Goulmima	Gheris El Ouloui	Magamane	909/47	FR	9.45	539,800	124,400	1,026.87	69	8.35	4/86	2499	1700
51	Goulmima	Aghbalou N'Kerdouss	Igoudemane 1	987/47	FR	1	507,600	122,250	1,298.00	121	17.54	6/95	1550	1080
52	Goulmima	Aghbalou N'Kerdouss	Igoudemane 2	988/47	FR	9.86	508,000	121,850	1,295.00	121	25.12	6/95	930	650
53	Goulmima	Aghbalou N'Kerdouss	Igoudemane 3	989/47	FR	4.4	507,700	121,350	1,295.00	73	22.8	6/95	3220	2250
54	Goulmima	Aghbalou N'Kerdouss	Oued N'Tmagoust	2752/56	FR	20.9	596,300	117,050	1,270.00	100	5.96	6/95	2000	1400
55	Goulmima	Aghbalou N'Kerdouss	Taoudaate	1000/47	FE	10	510,295	129,500	1,425.00	150	13.09	5/00	1166	820
56	Goulmima	Aghbalou N'Kerdouss	Timkit 1	2749/56	FR		507,950	115,400	1,220.00	150		4/95		
57	Goulmima	Aghbalou N'Kerdouss	Timkit 2	2750/56	FR	7.66	508,500	115,200	1,222.00	175	35.26	4/95	2080	1450
58	Goulmima	Aghbalou N'Kerdouss	Timkit 3	2751/56	FR		0	0	0.00	200				
59	Goulmima	Aghbalou N'Kerdouss	Tourtit	2820/58	FE	3.93	498,345	116,700	1,480.00	122	32.09	10/98	2010	1400
60	Goulmima	Aghbalou N'Kerdouss	Tourtit A Arji 1	2753/56	FR	6.14	408,350	116,700	1,480.00	151	31.25	7/95	1100	

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordinatio n x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
61	Goulmima	Aghbalou N'Kerdouss	Tourtit A Arji 2	2754/56	FR	0.18	408,800	116,450	1,460.00	73	26.9	7/95	3030	
62	Goulmima	Aghbalou N'Kerdouss	Igoudemane	996/47	FE	10.15	508,700	122,050	1,995.00	120.7	28.18	7/99	1264	
63	Goulmima	Mellaab	Mellaab 7	2735/56	FR	15.79	550,810	106,350	940.00	48	6.81	5/94	2480	1696
64	Goulmima	Mellaab	Mellaab	2721/56	FR	1.08	551,700	105,850	940.00	72	24.4	7/93	4290	2934
65	Goulmima	Mellaab	Mellaab	2722/56	FR		550,763	106,200	944.00	14.96	9.88	4/94	2470	1690
66	Goulmima	Mellaab	Ouin Igui	2814/56	P	7.04	570,200	86,700	1,050.00	25.25	6.15	1/98	702	491
67	Goulmima	Mellaab	Oukhit	2723/56	P	12.25	571,550	97,550	932.00	29.72	9	12/94	631	429
68	Goulmima	Mellaab	Puits Azakkour	2310/56	P	2.67	531,750	65,400	840.00	40.33	27.25	12/94	1179	825
69	Goulmima	Mellaab	Talghoumt	2809/56	P	2.85	562,750	93,785	1,065.00	50	14.13	9/97	1118	780
70	Goulmima	Mellaab	Talghoumt	2810/56	FR		556,450	96,250	1,040.00	62	6.4	10/97	700	490
71	Goulmima	Mellaab	Talghoumt 1	2724/56	FR	0.39	562,750	93,800	1,065.00	63	7.8	6/95	1251	855
72	Goulmima	Mellaab	Talghoumt 2	2725/56	FR		562,600	93,375	1,062.00	48	6.28	3/94	534	355
73	Goulmima	Mellaab	Taoutatote	2790/56	P	6.92	550,500	99,650	950.00	19	12	6/96	541	380
74	Goulmima	Mellaab	Tighramte 2	2813/56	FR		556,300	96,100	1,042.00	55	3.89	10/97	798	550
75	Goulmima	Mellaab	Tiyadouine	2732/56	FR		552,900	105,620	931.00	57	15.24	4/94	2500	1750
76	Goulmima	Mellaab	Touroug	2829/56	FR	1.27	565,450	107,350	896.00	140	7.1	2/99	6230	4360
77	Goulmima	Mellaab	Touroug 3	2830/56	FR	0.08	565,300	105,300	920.00	80	22	2/99	537	370
78	Goulmima	Mellaab	Touroug 3	2831/56	FR		565,000	107,350	900.00	97	10.65	12/99		
79	Goulmima	Mellaab	Amgane	2726/56	P	3.9	561,150	91,575	1,090.00	45.35	7.9	1/96	881	616
80	Goulmima	Mellaab	BGE. Akerouz	2048/56	P	11.49	550,900	106,250	935.00	19	8.71	12/87	1936	1334
81	Goulmima	Mellaab	Coop. Fath	2309/56	P	31.64	551,400	105,880	925.00	11.72	6.72	5/89	1834	1283
82	Goulmima	Mellaab	Imi Nikene 1	2811/56	FR		563,500	94,850	1,055.00	55	4.6	10/97	1033	720
83	Goulmima	Mellaab	Imi Nikene 2	2812/56	FR	1.57	563,400	94,600	1,053.00	55	3.77	10/97	497	340
84	Goulmima	Mellaab	Ait Oulhou	2727/56	P	5.4	556,175	95,700	1,040.00	23.5	5.08	12/95	1060	142
85	Goulmima	Mellaab	Dart Ighrane	2728/56	FR		559,230	104,680	928.00	48	8.46	4/94	630	407
86	Goulmima	Mellaab	Mellaab	2097/56	P	12.67	551,500	105,550	925.00	9	8.1	10/84	2369	1607
87	Goulmima	Mellaab	Mellaab	2175/56	P	26.25	551,425	105,650	932.30	12.6	9.15	12/87	2001	1360
88	Goulmima	Mellaab	Mellaab	2733/56	FR	3.55	552,300	105,600	932.00	63	12.92	4/94	3550	2428
89	Goulmima	Mellaab	Mellaab	2734/56	FR		550,800	106,350	940.00	18	6.52	4/94	2440	1676
90	Goulmima	Mellaab	Mellaab	2175/48	P		551,425	105,650	932.30	12.6				

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordination x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
91	Goulmima	Mellaab	Mellaab	2826/56	FE	9.75	550,756	106,206	944.00	90.6	16.58	5/99	1662	1160
92	Goulmima	Mellaab	Mellaab 1	2729/56	FR	15.52	550,750	106,200	944.00	51	10.06	4/94	2360	1660
93	Goulmima	Mellaab	Mellaab 2	2730/56	FR		551,430	106,300	948.00	48	11.2	4/94	2200	1505
94	Goulmima	Mellaab	Mellaab 3	2731/56	FR	0.1	551,000	105,400	938.00	72	17.18	4/94	1745	1193
95	Goulmima	Ferkla El Oulia	Ait Assem	2008/56	FR		533,250	101,150	1,008.00	27		7/86		
96	Goulmima	Ferkla El Oulia	Ait Assem	2008/47	FR		533,250	101,150	1,008.00	27		1/00		
97	Goulmima	Ferkla El Oulia	Ait Labzem	2739/56	FR	0.99	530,750	101,925	1,014.00	28	11.42	6/94	2580	1800
98	Goulmima	Ferkla El Oulia	Ait Labzem 1	273/56	FR		530,475	102,300	1,011.00	40	7.22	4/96	2310	1620
99	Goulmima	Ferkla El Oulia	Ait Labzem 2	2737/56	FR		532,000	103,350	1,001.00	20	6.43	6/94		
100	Goulmima	Ferkla El Oulia	Ait Labzem 3	2738/56	FR		528,750	103,500	1,021.00	31	1.89	6/94		
101	Goulmima	Ferkla El Oulia	Sidi Yahya	2740/56	P	3.23	532,750	101,050	1,006.00	46	24.73	11/94	1860	1316
102	Goulmima	Ferkla El Oulia	Tanguerfa	2045/47	FR		530,350	102,750	1,010.00	21	3	1/00		
103	Erfoud	M'cissi	Azag	2816/56	P		552,299	72,000	845.00	24.7	11.62	12/97	754	527
104	Erfoud	M'cissi	Imi N'lken	2812/56	FE	15	563,400	94,600	1,053.00	50	5.67	12/99	634	440
105	Erfoud	M'cissi	Boudib	348/65	P	2.56	550,650	52,700	717.00	44.5	7.49	12/94	619	885
106	Erfoud	M'cissi	Commun Rurale	2804/56	FR		555,300	69,650	815.00	39.92	31.19	1/97	925	647
107	Erfoud	M'cissi	Khettara lata mimouna	2771/56	FR	1.77	554,600	73,000	850.00	58	14.07	11/95	560	390
108	Erfoud	M'cissi	Boudib	1263/65	FR	2.12	551,400	52,350	725.00	120.4	14.3	9/99	4680	3270
109	Erfoud	M'cissi	Boudib 1	1262/65	FR	0.2	549,800	54,300	725.00	140	11.3	9/99	2050	1430
110	Erfoud	M'cissi	Boudib 2	1263/65	FR	2.12	551,400	52,350	725.00	120	13.9	9/99	4680	3270
111	Erfoud	M'cissi	Boudib 3	1264/65	FR		553,700	56,400	749.00	125		9/99		
112	Erfoud	M'cissi	Timerzit	2311/56	P	1.39	540,900	66,000	850.00	34	18.1	4/82	1440	1008
113	Erfoud	M'cissi	M'cissi	2825/56	FR	3.25	555,305	69,650	812.00	100	35.35	9/98	917	680
114	Erfoud	M'cissi	M'cissi	2453/56	FE	7.92	553,500	71,900	790.00	120	9.95	4/00	690	480
115	Erfoud	M'cissi	Boudib	348/65	P		550,650	52,700	717.00	7.4	4.74	4/80	1500	
116	Erfoud	M'cissi	Lagsiate 1	1277/65	FR		560,000	57,300	735.45	79	SEC	3/00		
117	Erfoud	M'cissi	Lagsiate 2	1278/65	FR		565,400	55,300	730.00	100	SEC	4/00		
118	Erfoud	M'cissi	Lahfira 1	1275/65	FR		555,900	24,450	665.00	60	31.85	3/00		
119	Erfoud	M'cissi	Lahfira 2	1276/65	FR		556,000	24,300	665.00	100	SEC	3/00		
120	Erfoud	M'cissi	Mimarighne 1	1270/65	FR		543,900	56,100	780.00	61	16.42	3/00		

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						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
121	Erfoud	M'cissi	Mimarighne 2	1271/65	FR		544,100	56,300	778.00	25	SEC	3/00		
122	Erfoud	M'cissi	Mimarighne 3	1272/65	FR		543,500	56,000	785.00	67	SEC	3/00		
123	Erfoud	M'cissi	Mimarighne 4	1273/65	FR		541,600	54,900	790.00	73	SEC	3/00		
124	Erfoud	M'cissi	Mimarighne 5	1274/65	FR		537,400	54,000	6.00	73	SEC			
125	Erfoud	M'cissi	M'cissi	2458/56	FE	4.88	555,300	69,650	812.00	150	43.46	4/00	1235	860
126	Erfoud	M'cissi	Boudib 1	347/65	P		549,900	52,950	719.00	36.28	9.11	9/81	3666	2500
127	Erfoud	M'cissi	Boudib 2	348/65	P		550,650	52,700	717.00	7.4	4.65	6/80	2460	
128	Erfoud	M'cissi	Boudib 3	349/65	FR		550,350	52,100	715.00	46	8.38	11/78	1093	773
129	Erfoud	M'cissi	Caid Rami	2769/56	FR	4.93	580,000	78,400	875.00	58	11.62	11/95	640	450
130	Erfoud	M'cissi	Caid Rami	2789/56	P	6.22	580,005	78,400	875.00	35	10.76	3/96	727	508
131	Erfoud	M'cissi	Fezzou 1	329/65	FR	0.05	547,200	38,800	689.00	85	15.72	10/78	1045	741
132	Erfoud	M'cissi	Fezzou 10	338/65	FR	0.001	554,650	25,400	664.00	29	25.68	11/78	34850	24350
133	Erfoud	M'cissi	Fezzou 11	339/65	FR	0.15	545,600	38,480	684.00	45	14.85	11/78	778	552
134	Erfoud	M'cissi	Fezzou 12	340/65	FR	0.1	546,250	39,800	692.00	76	15.22	11/78	963	683
135	Erfoud	M'cissi	Fezzou 13	341/65	FR	0.1	548,100	42,740	695.00	22	11.1	11/78	1614	1145
136	Erfoud	M'cissi	Fezzou 14	342/65	FR	0.2	548,750	42,720	696.00	35	12.1	11/78	2785	1975
137	Erfoud	M'cissi	Fezzou 15	343/65	FR	0.1	548,000	39,460	689.00	29	10.09	11/78	11450	8123
138	Erfoud	M'cissi	Fezzou 16	344/65	FR	0.05	547,640	43,580	697.00	31	12.02	11/78	4886	3465
139	Erfoud	M'cissi	Fezzou 17	345/65	FR	0.005	547,000	43,580	693.00	45	28.35	11/78	3080	2184
140	Erfoud	M'cissi	Fezzou 18	346/65	FR	0.01	545,860	37,300	694.00	70	34.45	11/78	4358	3090
141	Erfoud	M'cissi	Fezzou 2	330/65	FR	0.06	547,200	39,150	690.00	52	22.55	10/78	5269	3737
142	Erfoud	M'cissi	Fezzou 3	331/65	FR	0.7	546,950	39,000	691.00	40	18.3	10/78	6026	4274
143	Erfoud	M'cissi	Fezzou 4	332/65	FR	0.05	547,350	39,630	692.00	60	12	10/78	2725	1252
144	Erfoud	M'cissi	Fezzou 5	333/65	FR	0.05	547,380	38,330	688.00	65	29	10/78	9417	6679
145	Erfoud	M'cissi	Fezzou 6	334/65	FR	0.1	547,480	38,160	689.00	62	12.43	10/78	16420	11640
146	Erfoud	M'cissi	Fezzou 7	335/65	FR	0.15	547,300	38,150	689.00	63	12.36	11/78	12670	8984
147	Erfoud	M'cissi	Fezzou 8	336/65	FR	0.002	548,400	35,100	685.00	70	44.9	11/78	43300	30710
148	Erfoud	M'cissi	Fezzou 9	337/65	FR	0.06	548,100	36,490	686.00	50	22.91	11/78	8724	6187
149	Erfoud	M'cissi	Azag	2770/56	FR	3.25	552,300	72,000	845.00	61	9.85	11/95	760	530
150	Erfoud	M'cissi	Bouadil	2776/56	FR		554,650	81,700	975.00	57				

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						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
151	Erfoud	M'cissi	Fezou	895/65	P	1.52	546,100	39,060	700.00	40.62	17.78	5/11	1125	787
152	Erfoud	M'cissi	Taghrout	2772/56	FR		549,700	71,100	880.00	61	11.65	11/95	843	580
153	Erfoud	M'cissi	Boudnib	347/65	P	3.71	549,900	52,950	719.00	36.28	9.11	9/81	3666	2500
154	Erfoud	M'cissi	M'cissi	2177/56	P		553,900	69,700	825.00	39.75	19	1/87		
155	Erfoud	M'cissi	M'cissi	2177/48	P	4	553,900	69,700	825.00	39.75				
156	Erfoud	M'cissi	M'cissi 1	1556/56	FR		553,050	69,950	826.00	49	2.42	12/78	972	687
157	Erfoud	M'cissi	M'cissi 2	1557/56	FR		553,200	70,150	825.00	20	7	12/78	980	696
158	Erfoud	M'cissi	M'cissi 3	1558/56	P		554,050	69,600	819.00	43.7	10.53	4/80		
159	Erfoud	M'cissi	M'cissi 4	1559/56	FR		554,850	68,750	812.00	50	28.75	12/78	3330	2355
160	Erfoud	M'cissi	M'cissi 5	1560/56	FR		555,350	70,000	820.00	43	30	12/78	1064	753
161	Erfoud	M'cissi	Tamsermas	2777/56	FR		553,400	79,500	955.00	57	8.57	12/95	660	460
162	Erfoud	Alnif	Achbarou 23	1577/56	FR		529,540	61,560	832.00	8	SEC	1/79		
163	Erfoud	Alnif	Achbarou 24	1578/56	FR		529,190	61,625	840.00	18	SEC	1/79		
164	Erfoud	Alnif	Achbarou 25	1579/56	FR	0.15	529,230	62,520	845.00	20	4.54	1/79	790	560
165	Erfoud	Alnif	Achbarou 26	1580/56	FR	0.2	529,580	62,550	848.00	16	10.04	1/79	2616	1858
166	Erfoud	Alnif	Achbarou 27	1581/56	FR		529,710	63,060	853.00	23				
167	Erfoud	Alnif	Achbarou 28	1582/56	FR		529,820	61,600	835.00	10	SEC	1/79		
168	Erfoud	Alnif	Achbarou 29	1583/56	FR		529,650	71,715	838.00	20	16.42	1/79	923	655
169	Erfoud	Alnif	Achbarou coop 46	418/65	FR	1.6	525,400	59,050	885.00	31	15.32	1/79	365	613
170	Erfoud	Alnif	Achich Ait Yahya	1248/65	FR		505,600	30,500	860.00	73.5	11.17	10/97	1177	820
171	Erfoud	Alnif	Achich Ait Yahya	1247/65	FR		502,900	32,000	940.00	74.4	9.05	9/97		
172	Erfoud	Alnif	Achich Ait Yahya	1246/65	FR		505,100	32,200	940.00	80.33				
173	Erfoud	Alnif	Achich Ait Yahya	1245/65	FR		501,400	37,200	938.00	98.22	31.64	9/97		
174	Erfoud	Alnif	Achbarou 2	1566/56	FR	0.05	532,150	60,700	821.00	40	16.13	12/78	1661	1178
175	Erfoud	Alnif	Afrou Ait El ghazi	2714/56	FR	5.83	531,900	69,000	930.00	61	6.38	11/92	1050	730
176	Erfoud	Alnif	Ait Elhabib	1177/65	FR		520,600	59,100	889.00	55	14.61	11/92		
177	Erfoud	Alnif	Ait Elhabib	1178/65	FR		519,600	58,400	890.00	49	SEC	11/92		
178	Erfoud	Alnif	Ait Ben Said 1	1565/56	P		537,300	61,200	794.00	25.9	16.63	12/95	1050	1435
179	Erfoud	Alnif	Ait Elhabib	2711/56	FR		520,100	59,550	881.00	52	39.73	11/92		
180	Erfoud	Alnif	Ait Hammou	881/65	FR	4.47	534,100	57,300	798.00	60	7.78	5/89	728	500

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordinatio n x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
181	Erfoud	Alnif	Ait Hammou 11	393/65	FR	0.4	533,980	57,320	797.00	28	8.03	12/78	768	545
182	Erfoud	Alnif	Ait Hammou 6	388/65	FR	0.05	533,300	56,960	803.00	38	12.18	12/78	940	667
183	Erfoud	Alnif	Ait Hammou 7	389/65	FR	0.06	533,570	57,130	805.00	30		12/78	949	673
184	Erfoud	Alnif	Ait Lahabib	1177/65	P	1.6	520,600	59,100	889.00	38.9	20.3	8/93	1390	
185	Erfoud	Alnif	Ait Lahabib 31	1586/56	FR	0.2	520,000	59,700	888.00	45	45	1/79	1561	1107
186	Erfoud	Alnif	Ait Lahbib Taguelgoult	1261/65	FR	1.02	515,700	58,200	950.00	145	28.2	9/99	666	466
187	Erfoud	Alnif	Ait Lhbib 30	412/65	FR	0.15	520,700	59,300	881.00	26	10.15	1/79	933	661
188	Erfoud	Alnif	Ait Saadane 1	1123/65	FR		556,800	29,350	841.00	9.67	SEC	5/94		
189	Erfoud	Alnif	Ait Saadane 2	1124/65	FR		509,250	30,300	810.00	126	14.05	6/94	2400	1680
190	Erfoud	Alnif	Ait Saadane 3	1199/65	FR	3.96	512,100	29,700	798.00	149	10.46	6/94	1393	975
191	Erfoud	Alnif	Ait Saadane 4	1199/65	FE	2.57	512,000	29,700	798.00	109.18	7.75	4/95	1449	1014
192	Erfoud	Alnif	Ait Saadane 5	1200/65	FR		511,750	29,600	800.00	78	48.4	6/94	1876	1313
193	Erfoud	Alnif	Ait Saroud 4	386/65	FR	1	534,220	58,870	805.00	45		12/78	1766	1252
194	Erfoud	Alnif	Ait Sarroud 13	395/65	FR	0.5	533,980	58,460	804.00	35	9.34	12/78	818	580
195	Erfoud	Alnif	Ait Sarroud 5	387/65	FR		543,700	58,800	807.00	34	10.93	12/78	975	679
196	Erfoud	Alnif	Ait Sarrouds	879/65	FR	0.5	534,300	58,500	805.00	50	10.54	5/89	924	640
197	Erfoud	Alnif	Ait Sarrouds 2	880/65	FR		533,500	58,600	807.00	50	SEC	5/89		
198	Erfoud	Alnif	Ait Seerroud	879/65	P	6.81	534,300	58,500	805.00	39.85	4.76	5/90	1000	700
199	Erfoud	Alnif	Ait Zegane 1	361/65	FR		540,250	57,650	774.00	50	15.5	12/78	2713	1918
200	Erfoud	Alnif	Ait Zegane 2	362/65	FR		539,950	57,500	776.00	40	10.82	12/78	1143	808
201	Erfoud	Alnif	Ait Zegane 3	363/65	P		539,650	57,550	777.00	16.94	8.07	6/80	900	
202	Erfoud	Alnif	Alnif (17)	408/65	P		522,850	57,500	871.00	12.97	2.01	2/80	1100	
203	Erfoud	Alnif	Alnif 1	396/65	FR	0.18	521,300	56,100	872.00	50	6.97	4/78	935	661
204	Erfoud	Alnif	Alnif 1	2454/56	FR	13.72	523,200	58,100	870.00	88	9.02	1/00	1580	1100
205	Erfoud	Alnif	Alnif 10	404/65	FR	0.7	523,000	58,500	870.00	27.5	8.42	4/78	678	479
206	Erfoud	Alnif	Alnif 11	405/65	FR	0.2	522,650	58,400	872.00	42.3	11.3	4/78	1130	799
207	Erfoud	Alnif	Alnif 12	406/65	P	1.7	522,200	58,450	875.30	37	6.76	4/78	1853	1310
208	Erfoud	Alnif	Alnif 12	406/65	FR	12.38	522,200	58,450	875.00	39.9	11	2/89	1940	1358
209	Erfoud	Alnif	Alnif 13	1584/56	FR	0.2	522,950	60,350	874.00	14.7	7.4	4/78	1025	725
210	Erfoud	Alnif	Alnif 14	411/65	FR	0.5	521,850	59,500	873.00	17	7.22	4/78	608	430

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
211	Erfoud	Alnif	Alnif 15	1585/56	FR	0.03	521,750	60,350	875.00	18.4		4/78	852	603
212	Erfoud	Alnif	Alnif 16	407/65	FR	0.25	520,450	58,650	885.00	39	11.72	4/78	1010	714
213	Erfoud	Alnif	Alnif 17	408/65	FR	1.1	522,850	58,500	871.00	42	8.34	4/78	1027	726
214	Erfoud	Alnif	Alnif 18	409/65	FR		521,750	58,000	877.00	10	5.75	4/78	1237	875
215	Erfoud	Alnif	Alnif 2	2456/56	FR	9.37	525,100	60,700	900.00	98	24.68	2/00	1197	830
216	Erfoud	Alnif	Alnif 2	397/65	FR	0.9	521,950	56,050	868.00	36.6	5.91	4/78	989	699
217	Erfoud	Alnif	Alnif 3	398/65	FR	0.4	522,800	58,600	870.00	23.7	6.28	4/78	543	384
218	Erfoud	Alnif	Alnif 4	399/65	FR	0.25	523,550	56,600	871.00	16.9	8.9	4/78	960	679
219	Erfoud	Alnif	Alnif 5	400/65	FR	0.6	521,300	57,050	877.00	47	3.34	4/78	1096	775
220	Erfoud	Alnif	Alnif 6	401/65	FR	0.1	521,750	57,050	876.00	24.5	7.77	4/78	1183	837
221	Erfoud	Alnif	Alnif 7	410/65	FR	0.35	521,000	59,160	872.00	24	7.38	4/78	981	694
222	Erfoud	Alnif	Alnif 8	402/65	FR	0.08	521,000	57,800	884.00	24.4	7.55	4/78	894	632
223	Erfoud	Alnif	Alnif 9	403/65	FR		522,000	58,650	870.00	13	9.43	4/78	1193	844
224	Erfoud	Alnif	Alnif centre	1251/65	FR	1.23	521,600	58,100	885.00	80.4	6.3	6/96	2210	1540
225	Erfoud	Alnif	Alnif centre	2802/56	FR	2.62	521,600	58,100	885.00	80	8.18	8/98	760	530
226	Erfoud	Alnif	Alnif Oeust 41	413/65	FR	0.08	520,000	57,800	885.00	33	6.3	1/79	1816	1288
227	Erfoud	Alnif	Amgane	889/65	FR		547,400	57,500	751.00	60	SEC	6/89		
228	Erfoud	Alnif	Amgane	1182/65	FR		566,900	59,100	760.00	55	32.3	11/92		
229	Erfoud	Alnif	Amgane	1185/65	P	2.3	547,800	56,550	747.00	52.6	12.38	4/95	3012	2108
230	Erfoud	Alnif	Amgane 1	352/65	FR		547,400	57,200	752.00	40	39.88	11/78		
231	Erfoud	Alnif	Amgane 2	353/65	FR		547,400	57,550	751.00	34	6.1	11/78		
232	Erfoud	Alnif	Amgane 3	354/65	FR		547,400	58,000	750.00	40	1.6	11/78		
233	Erfoud	Alnif	Amgane 4	355/65	P		547,400	57,450	751.00	10.5	7.46	9/80	1230	
234	Erfoud	Alnif	Amgane 4	355/65	P		547,400	57,450	751.00	10.36				
235	Erfoud	Alnif	Ammar	2197/56	P	21.57	517,100	64,600	920.00	24.2	8.7	1/00	578	404
236	Erfoud	Alnif	Ammar 34	1589/56	FR	1.7	516,750	65,900	921.00	25		1/79	1341	951
237	Erfoud	Alnif	Azekour	2459/56	FE	5	531,200	61,800	822.00	130	15.4	6/00	696	490
238	Erfoud	Alnif	Azekour	2818/56	FR	8.05	531,300	61,700	819.00	40.3	10.23	7/98	973	650
239	Erfoud	Alnif	Azekour 18	1572/56	FR	0.025	531,200	61,680	819.00	18	14.14	1/79	1004	712
240	Erfoud	Alnif	Azekour 19	1573/56	FR	0.15	531,410	61,610	820.00	22	11.6	1/78	567	402

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
241	Erfoud	Alnif	Azekour 20	1574/56	FR	0.05	531,280	61,520	818.00	18	12.6	1/79	842	585
242	Erfoud	Alnif	Azekour 21	1575/56	FR	0.25	530,800	61,630	825.00	32	20.78	1/79	3358	2380
243	Erfoud	Alnif	BGE Achbarou	2176/47	P	0.97	529,550	62,050	830.00	25	16.13	2/87		
244	Erfoud	Alnif	College Alnif	876/65	P	1.47	521,250	59,650	890.00	27.9	17.87	5/88	3840	2680
245	Erfoud	Alnif	IMI Nouzrou	1173/65	FR	0.42	509,500	55,200	1,028.00	52	8.41	11/92	800	560
246	Erfoud	Alnif	IMI Nouzrou	1174/65	FR		509,000	54,800	1,035.00	49	11.92	10/92		
247	Erfoud	Alnif	IMI Nouzrou	1175/65	FR	2.77	508,700	55,100	1,030.00	39	11.15	10/92	720	500
248	Erfoud	Alnif	IMI Nouzrou	1176/65	P	4.89	508,703	55,100	1,030.00	50	14.01	5/94	710	497
249	Erfoud	Alnif	K. Toufassememe	2773/56	FR		542,300	75,700	978.00	91	11.29	11/95	675	470
250	Erfoud	Alnif	K. Ait Ben Said	2786/56	FR		537,700	61,400	790.00	85	23.17	12/95		
251	Erfoud	Alnif	K. Maghnia	2788/56	FR		531,200	60,603	820.00	100	12.2	1/96	2050	1430
252	Erfoud	Alnif	K. Ouihlan	2783/56	FR	3.99	543,650	65,150	801.00	70	14.33	12/95	1044	730
253	Erfoud	Alnif	K. Taallalt 1	1226/65	FR		536,250	55,800	795.00	100	15.3	1/96		
254	Erfoud	Alnif	K. Taallalt 2	1227/65	FR		536,600	57,300	795.00	150	15.96	1/96		
255	Erfoud	Alnif	K. Taallalt 3	1228/65	FR		536,400	55,000	785.00	79	15	1/96		
256	Erfoud	Alnif	K. Tassemamet	2774/56	FR	5.06	542,000	77,500	1,030.00	64	12.4	1/95	851	590
257	Erfoud	Alnif	K. Tiguirna	1229/65	FR		513,450	50,400	962.00	85	15.98	6/96		
258	Erfoud	Alnif	K. Timarzite	2781/56	FR		540,600	67,400	897.00	91	50.32	12/95		
259	Erfoud	Alnif	K. Timarzite	2782/56	FR	4.64	540,800	68,350	898.00	58	7.31	12/95	643	450
260	Erfoud	Alnif	K. A. Ben Said	2787/56	FR		537,250	61,100	790.00	90	13.9	1/96		
261	Erfoud	Alnif	K. Tachoufit	868/65	P		542,600	58,450	750.00	40.29	9.67	9/81	2169	
262	Erfoud	Alnif	K. Toughza	2745/56	FR	1.55	513,000	70,100	972.00	57	11.18	10/94	747	520
263	Erfoud	Alnif	KH. Alnif	2800/56	FR	4.62	520,100	60,850	882.00	60	8.87	6/96	846	590
264	Erfoud	Alnif	KH. Alnif	2801/56	FR	1.43	520,100	60,650	888.50	84	6.87	6/96	1128	780
265	Erfoud	Alnif	KH. Nouzreg 35	1590/56	FR	0.15	518,050	70,650	950.00	40	5.1	1/79	1088	771
266	Erfoud	Alnif	KH. Nouzreg 36	1591/56	FR	0.1	517,850	70,200	948.00	19	8.95	1/79	1005	895
267	Erfoud	Alnif	Akerouz	2455/56	FR	1.93	549,400	98,000	960.00	141	9.1	12/99	582	410
268	Erfoud	Alnif	Tiguima	1254/65	FR	7	511,750	53,950	1,002.00	128	20.57	5/99	816	570
269	Erfoud	Alnif	Maghnia	2791/56	FR	2.19	531,200	60,600	820.00	146	10.47	5/96	2430	1700
270	Erfoud	Alnif	Maghnia 14	1568/56	FR	0.05	532,180	60,300	818.00	35		12/78		

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordination x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
271	Erfoud	Alnif	Maghnia 3	1567/56	FR	0.7	532,140	60,520	819.00	40		12/78	1113	789
272	Erfoud	Alnif	Maghnia	2817/56	P	1.05	532,200	59,900	830.00	26	16.38	12/94	1428	990
273	Erfoud	Alnif	Mimarighene 1	356/65	FR		544,850	57,600	760.00	37	7.77	11/78	1075	760
274	Erfoud	Alnif	Mimarighene 2	357/65	P	20.29	544,450	57,100	762.00	30.5	10.29	12/78	2303	1629
275	Erfoud	Alnif	Mimarighene	898/65	P	1.38	544,350	57,000	780.00	40.6	11.48	4/89		
276	Erfoud	Alnif	Ouihlane	2717/56	FR	4.76	543,400	65,750	826.00	73	13.09	4/93		
277	Erfoud	Alnif	Ouihlane 1	1561/56	P		543,550	65,650	825.00	22.95	13.67	12/78	250	
278	Erfoud	Alnif	Ouihlane 2	1562/56	FR		543,500	65,450	822.00	40		12/78		
279	Erfoud	Alnif	Puits Achbarou	2176/56	P	1.85	529,550	62,050	830.00	31.9	9.47	12/94	730	484
280	Erfoud	Alnif	Taalalt 10	392/65	FR		536,550	55,900	794.00	41		12/78		
281	Erfoud	Alnif	Taalalt 9	391/65	FR		536,040	55,300	797.00	74		12/78		
282	Erfoud	Alnif	Tabourikt	881/65	P	6.54	534,100	57,300	798.00	44	5.32	2/90	741	520
283	Erfoud	Alnif	Tabourikt 12	394/65	FR	0.3	534,750	57,280	795.00	25	9.59	12/78	813	577
284	Erfoud	Alnif	Tabourikt 8	390/65	FR	0.05	534,280	56,000	798.00	35		12/78	882	626
285	Erfoud	Alnif	Tabourikt 1	882/65	FR		534,300	56,400	797.00	60	6.39	5/89		
286	Erfoud	Alnif	Tabourikt 2	883/65	FR		534,000	55,900	797.00	60	56.24	5/89		
287	Erfoud	Alnif	Tachaoufit	2832/56	FR		543,000	62,800	801.00	250	SEC	5/99		
288	Erfoud	Alnif	Tachaoufit 1	358/65	FR		543,450	58,500	765.00	46	7.45	12/78	1552	1804
289	Erfoud	Alnif	Tachaoufit 2	359/65	FR		543,300	58,150	762.00	49	8	12/78		
290	Erfoud	Alnif	Tachaoufit 3	360/65	P		543,350	57,950	760.00	7.86	6.36	6/80	1120	
291	Erfoud	Alnif	Tachaoufit	2833/56	FR		542,200	64,350	802.00	190		6/99		
292	Erfoud	Alnif	Tachaoufit 3	360/65	P		543,350	57,950	760.00	7.86	9.8	12/78	1243	1138
293	Erfoud	Alnif	Tachaoufit Nimialou 40	1595/56	FR	0.05	532,050	66,400	880.00	15	10.73	1/79	708	502
294	Erfoud	Alnif	Tagulgoult 45	417/65	FR	1.2	519,600	58,400	890.00	35	0.65	1/79	712	506
295	Erfoud	Alnif	Tajouhrate	2718/56	FR	1.01	542,200	68,300	875.00	103	22.66	2/93	1900	1330
296	Erfoud	Alnif	Tajouhrate 1	2784/56	FR	0.72	543,000	67,600	848.00	91	8.2	12/95	2750	1930
297	Erfoud	Alnif	Tajouhrate 2	2785/56	FE	28.33	542,400	68,100	860.00	112.23	16.67	5/96	3340	2330
298	Erfoud	Alnif	Tamrghoute	2457/56	FE		536,900	64,400	860.00	103	9.75	2/00	1048	730
299	Erfoud	Alnif	Tanout noumardoul 44	416/65	FR		516,300	56,550	935.00	50	25.7	1/79	561	398
300	Erfoud	Alnif	Tanout noumardoul	1269/65	FR		517,500	56,400	920.00	250	78.79	3/00		

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
301	Erfoud	Alnif	Tanout noumardoul	1179/65	P	2.82	518,500	56,100	908.00	64.4	14.53	4/95	1158	810
302	Erfoud	Alnif	Taoumart 39	1594/56	FR	1	532,200	67,950	908.00	25	5.21	1/79	942	668
303	Erfoud	Alnif	Taoumart	2792/56	FR	5.99	532,800	69,300	1,052.00	90	7.97	5/96	1098	760
304	Erfoud	Alnif	Taoumart 2	2797/56	FR	4.31	532,600	68,450	1,048.00	120	17.34	6/96	1507	1050
305	Erfoud	Alnif	Taoumart 3	2799/56	FR	4.53	532,050	68,400	885.00	90	29.16	6/96	2230	1560
306	Erfoud	Alnif	Tayachoute	1172/65	FR	0.81	510,900	45,800	907.00	55	6.86	4/93	1710	1197
307	Erfoud	Alnif	Taychout	1172/65	P	2.34	510,900	45,800	907.00	43.2	6.1	8/93	1520	
308	Erfoud	Alnif	Tiguirna 42	414/65	FR	0.05	513,000	50,000	940.00	37	3.72	1/79	961	681
309	Erfoud	Alnif	Tiguirna 43	415/65	FR	0.2	513,000	49,550	937.00	8	4.1	1/79	939	447
310	Erfoud	Alnif	Timarzite	2779/56	FR		541,300	67,500	895.00	121	22.68	12/95	688	480
311	Erfoud	Alnif	Timarzite	2719/56	FR	8.22	540,400	69,300	892.00	60	20.98	12/92	761	533
312	Erfoud	Alnif	Timarzite 1	2778/56	FR		541,550	67,350	860.00	60	SEC	12/95		
313	Erfoud	Alnif	Tinifift 37	1592/56	FR	0.9	524,600	72,250	1,007.00	25	5.51	1/79	498	353
314	Erfoud	Alnif	Tinifift 38	1593/56	FR	0.2	523,750	71,900	1,010.00	50	25.03	1/79	806	572
315	Erfoud	Alnif	Tizi N'iarfag	1180/65	P		515,900	58,500	939.00	19.2	12.26	9/98	1716	1200
316	Erfoud	Alnif	Tizi N'iarfag 32	1587/56	FR	0.016	518,650	60,900	896.00	43	16.69	1/79	1248	885
317	Erfoud	Alnif	Tizi N'iarfag 33	1588/56	FR	0.3	518,000	62,550	898.00	38	9.47	1/79	784	556
318	Erfoud	Alnif	Tizi N'tarfag	2712/56	FR	0.15	517,650	61,100	920.00	61	9.22	11/92	1030	720
319	Erfoud	Alnif	Tizi N'tarfag	2713/56	FR		518,450	59,850	905.00	67	2.47	11/92		
320	Erfoud	Alnif	Toufassamane	2775/56	FR	4.61	542,300	76,150	978.00	79	9.52	11/95	721	505
321	Erfoud	Alnif	Toufassamane	2720/56	FR	9.18	540,850	75,950	997.00	61	8.03	4/93	524	367
322	Erfoud	Alnif	Toughza	2798/56	FR	6.26	531,400	59,650	820.00	80	22.32	6/96	1877	1310
323	Erfoud	Alnif	Toughza 15	1569/56	FR	0.3	530,840	60,810	825.00	25	12.01	12/78	883	626
324	Erfoud	Alnif	Toughza 16	1570/56	FR	0.2	530,710	60,640	827.00	18	14.13	12/78	1004	712
325	Erfoud	Alnif	Toughza 17	1571/56	FR		531,020	60,620	826.00	43	SEC	1/79		
326	Erfoud	Hssaya	Achich (Ait yaaza)	1243/65	FR	3.6	508,550	33,450	900.00	54	12.6	09/97	980	690
327	Erfoud	Hssaya	Achich 1 Ait yahya	1238/65	FR		510,850	33,700	850.00	82	36	08/97	915	640
328	Erfoud	Hssaya	Achich 2 Ait yaaza	1239/65	FR	3.02	508,450	33,600	900.00	111	14.02	08/97	955	670
329	Erfoud	Hssaya	Achich 3 Aityaaza	1240/65	FR		508,300	34,300	900.00	80	22.25	08/97	1050	730
330	Erfoud	Hssaya	Achich 4 Ait yaaza	1241/65	FR		510,750	36,050	900.00	50	20.85	08/97	895	620

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordination x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
331	Erfoud	Hssaya	Achich Ait yahya	1248/65	FR		505,600	30,500	946.00	73	10.67	10/97	1177	820
332	Erfoud	Hssaya	Achich Ait yahya	1249/65	FR		506,100	30,200	850.00	30	8.92	10/97	1270	880
333	Erfoud	Hssaya	Achich Ait yahya	1253/65	P	2.44	505,600	30,650	846.00	27	8.33	07/99	1740	1030
334	Erfoud	Hssaya	Achich Ait yahya 1	1245/65	FR		501,400	37,200	838.00	98	31.42	09/97		
335	Erfoud	Hssaya	Achich Ait yahya 2	1248/65	FR		505,100	32,200	840.00	80		08/97		
336	Erfoud	Hssaya	Afrou Ait izzou	1247/65	FR		502,900	32,000	840.00	74	8.65	09/97		
337	Erfoud	Hssaya	Ait saadane	1136/65	P	1.55	513,200	19,800	780.00	37.6	14	08/93	3610	2300
338	Erfoud	Hssaya	Amoguer	1148/65	P	3.26	512,700	28,700	843.00	36.8	12.45	08/93	2750	
339	Erfoud	Hssaya	Battou	1139/65	P	2.3	516,000	12,250	770.00	50	20.65	12/92		
340	Erfoud	Hssaya	Kh Achich	1164/65	P	3.15	609,200	39,950	876.00	50.95	6.55	03/98		
341	Erfoud	Hssaya	Kh Ait Saadane	1237/65	FR	1.1	512,150	30,550	825.00	117	12.5	08/97	3380	2360
342	Erfoud	Hssaya	Kh EL Hazbane	1244/65	FR		610,900	13,300	823.00	50	6.7	09/97	950	660
343	Erfoud	Hssaya	Kh EL Hazbane	1236/65	FR		514,950	26,250	800.00	60	SEC	08/97		
344	Erfoud	Hssaya	Kh Tissamoumine	1242/65	FR		512,150	29,000	808.00	50	26.2	08/97	1376	960
345	Erfoud	Hssaya	Mejrane	1235/65	FR		522,700	550	730.00	50	6.9	08/97	2320	1620
346	Erfoud	Hssaya	Mejrane 1	1252/65	FR	17.8	527,455	6,255	715.00	72	6.86	12/98	2650	1880
347	Erfoud	Hssaya	Mejrane 2	1230/65	FR	0.1	528,150	4,750	705.00	73	8.05	06/97		
348	Erfoud	Hssaya	Mejrane 3	1231/65	FR		527,000	3,250	704.00	80	25	06/97		
349	Erfoud	Hssaya	Mejrane 4	1232/65	FR	306	526,600	3,450	703.00	140	8	06/97	5090	2863
350	Erfoud	Hssaya	Mejrane 5	1233/65	FR	8.7	572,450	6,250	715.00	71	6.17	06/97	2510	1750
351	Erfoud	Hssaya	EL Hazbane	1234/65	FR	2.54	527,600	4,350	705.00	70	12.68	07/97	5990	4190
352	Erfoud	Hssaya	Khing	1280/65	FR	8.7	591,300	25,350	849.00	150	21.11	5/00	1500	1050
353	Erfoud	Hssaya	Achich Ait Yahya	1279/65	FR	1.8	506,450	24,400	825.00	98	27.41	4/00	2400	1680
354	Erfoud	Hssaya	Achich Ait Yahya	1279/65	FE	14.7	506,450	24,400	825.00	98	27.41	4/00	1700	2428
355	Erfoud	Hssaya	Hazbane	1249/65	FR		506,100	30,200	850.00	30.48	9.4	10/97	1270	880
356	Erfoud	Hssaya	Hazbane	1243/65	FR	3.6	508,550	33,450	900.00	54.45	12.05	09/97	980	690
357	Erfoud	Hssaya	Khettara Achich	1267/65	FR		517,300	22,300	900.00	125.4	SEC	2/00		
358	Erfoud	Hssaya	Khettara Ait Hazbane	1288/65	FR	2.66	518,700	25,400	847.00	110	11.17	2/00	1174	820
359	Erfoud	Hssaya	Khettara Ait Hazbane	1237/65	FR	1.1	512,150	30,550	285.00	117.45	12.2	08/97	3380	2360
360	Erfoud	Hssaya	Khettara Ait Hazbane	1242/65	FR		512,150	29,000	809.00	50.45	26.7	08/97	1378	960

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
361	Erfoud	Hssaya	Khettara Ait Hazbane	1241/65	FR	0.13	510,750	36,000	900.00	50.45	21.3	08/97	895	620
362	Erfoud	Hssaya	Khettara Ait Hazbane	1240/65	FR		508,300	34,300	900.00	80.45	22.7	08/97	1050	730
363	Erfoud	Hssaya	Khettara Ait Hazbane	1239/65	FR	3.02	508,450	33,600	900.00	11.45	14.47	08/97	955	670
364	Erfoud	Hssaya	Khettara Ait Saadane	1238/65	FR		510,850	33,600	850.50	82.54	36.45	08/97	915	640
365	Erfoud	Hssaya	Khettara Tissmoumine	1236/65	FR		514,850	26,250	800.00	60.45	SEC	08/97		
366	Erfoud	Hssaya	Majrane	1244/65	FR		510,900	31,300	832.00	50.35	7.05	09/97	950	660
367	Erfoud	Hssaya	Majrane	1235/65	FR		522,700	550	730.00	50.45	7.38	08/97	2320	1620
368	Erfoud	Hssaya	Majrane	1252/65	FE	17.8	572,455	6,255	715.00	72	6.88	12/98	2650	1860
369	Erfoud	Hssaya	Majrane	1234/65	FR	2.54	527,600	4,350	705.00	70.45	17.13	07/97	5990	4190
370	Erfoud	Hssaya	Majrane	1233/65	FR	8.7	527,450	6,250	715.00	71.45	8.62	08/97	2510	1750
371	Erfoud	Hssaya	Majrane	1232/65	FR	3.6	526,600	3,450	703.00	140.45	8.45	08/97	4090	2863
372	Erfoud	Hssaya	Aachich Ait Iazza	1231/65	FR		527,000	3,250	704.00	90.45	26.35	08/97		
373	Erfoud	Hssaya	Aachich Ait Iazza	1230/65	FR	0.1	528,150	4,750	705.00	73.45	8.5	08/97		
374	Erfoud	Hssaya	Aachich Ait Iazza	1152/65	FR	0.26	510,100	32,850	845.00	72	14.84	09/92	1020	714
375	Erfoud	Hssaya	Achich Ait Yahya	1153/65	FR		501,200	32,000	835.00	52	20.6	09/92		
376	Erfoud	Hssaya	Achich Ait Yahya	1154/65	FR	14	510,400	33,300	843.00	55	8.25	09/92	806	560
377	Erfoud	Hssaya	Achich Ait Yahya	376/65	FR	0.04	503,050	32,800	880.00	25	14	01/79	1845	1304
378	Erfoud	Hssaya	Achich Ait Yahya	377/65	FR		505,850	33,100	875.00	25	SEC	01/79		
379	Erfoud	Hssaya	Achich Ait Yahya	1155/65	FR		504,150	33,250	875.00	52	44.44	09/92		
380	Erfoud	Hssaya	Achich Ait Yahya	1156/65	FR		504,400	33,250	874.00	55	15.22	09/92	3230	2260
381	Erfoud	Hssaya	Aachich Ait yahya	1157/65	FR		502,800	33,150	881.00	55	3.55	02/92		
382	Erfoud	Hssaya	Aachich Ait yahya	1170/65	FR		503,550	33,250	885.00	79	9.67	03/93		
383	Erfoud	Hssaya	Aachich AitYAZZA 1	384/65	FR	0.4	510,050	32,300	835.00	25	9.98	01/79	998	705
384	Erfoud	Hssaya	Aachich Ait yahya	1168/65	FR		510,050	36,450	827.00	55	6.42	02/93		
385	Erfoud	Hssaya	Aachich Ait yahya	1169/65	FR	0.89	501,100	36,650	828.00	61	4.58	02/93	6230	4380
386	Erfoud	Hssaya	Aachich Ait yahya 1	375/65	FR	0.016	501,100	33,050	880.00	48	8.5	01/79	6485	4586
387	Erfoud	Hssaya	Afrou	1136/65	FR	0.53	502,850	19,800	780.00	60	12.84	08/92	3180	2220
388	Erfoud	Hssaya	Afrou	1142/65	FR		513,200	20,750	775.00	55	28.23	08/92		
389	Erfoud	Hssaya	Afrou 1	369/65	FR	0.016	513,700	20,150	770.00	47	6.49	01/79	10475	7408
390	Erfoud	Hssaya	Afrou 1	369/65	FR		513,750	20,150	770.00	47				

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
391	Erfoud	Hssaya	Afrou 2	370/65	FR	0.033	513,750	20,350	772.00	30	6.1	01/79	2341	1655
392	Erfoud	Hssaya	Afrou 3	371/75	FR		513,000	20,550	775.00	22	3.44	01/79	2930	2072
393	Erfoud	Hssaya	Agueddem 1	299/65	FR	1	512,700	28,800	809.00	50.55				
394	Erfoud	Hssaya	Agueddem 12	314/65	FR		512,150	28,800	809.00	52	8	05/78	2025	1425
395	Erfoud	Hssaya	Agueddem 12	314/65	FR		512,150	28,800	809.00	52				
396	Erfoud	Hssaya	Agueddem 13	315/65	FR		512,100	28,650	815.00	37.5	8	05/78	1110	785
397	Erfoud	Hssaya	Agueddem 14	316/65	FR	0.05	511,350	28,100	820.00	49	8.57	05/78	8569	6080
398	Erfoud	Hssaya	Agueddem 15	317/65	FR	0.3	511,100	28,550	819.00	49	13.18	05/78	2195	1553
399	Erfoud	Hssaya	Agueddem 2	299/65	P		512,700	28,800	820.00	28.55	28.45	05/94	1300	810
400	Erfoud	Hssaya	Agueddem 3	300/65	FR		513,300	28,800	810.00	100	24.9	08/82	1067	755
401	Erfoud	Hssaya	Ait Kherdi	1135/65	FR	1.56	518,300	17,800	758.00	85	21.89		4200	2840
402	Erfoud	Hssaya	Ait Kherdi 1	367/65	FR		518,350	17,800	758.00	32	10.34	10/85	2557	1809
403	Erfoud	Hssaya	Ait Ouabid	1149/65	P	2.32	523,850	27,750	810.00	52	14.25		1992	1394
404	Erfoud	Hssaya	Ait Saadane 1	298/65	FR		512,650	27,750	810.00	21.2	SEC	05/78		
405	Erfoud	Hssaya	Ait Saadane 16	318/65	FR		513,300	28,800	810.00	49	14.05	05/78	1082	765
406	Erfoud	Hssaya	Ait Saadane 17	319/65	FR	0.15	514,900	28,250	798.00	37	9.44	05/78	2319	2347
407	Erfoud	Hssaya	Ait Saadane 4	306/65	FR	0.31	513,400	27,300	798.00	60	9.42	05/78	1814	1283
408	Erfoud	Hssaya	Ait Saadane 5	307/65	FR	0.07	512,400	27,400	810.00	50	15.36	05/78	1383	978
409	Erfoud	Hssaya	Ait Saadane 6	308/65	FR	12	513,200	27,590	800.00	41	14.47		2282	1714
410	Erfoud	Hssaya	Ait Saadane 6	308/65	FR		513,200	27,590	800.00	41		09/92		
411	Erfoud	Hssaya	Ait Saadane	1148/65	FR		521,700	29,700	770.00	72	12.64	05/78		
412	Erfoud	Hssaya	Amouduer	1139/65	FR	0.94	516,000	21,250	775.00	73	7.64		16.2	1130
413	Erfoud	Hssaya	Amouduer 1	305/65	FR	1.25	515,900	20,700	775.00	50	7.56	04/93	3084	2181
414	Erfoud	Hssaya	Anou Noussardoune	1150/65	FR	2.49	523,550	32,500	881.00	55	13.06		1820	1350
415	Erfoud	Hssaya	Battou 1	379/65	FR	0.09	509,600	39,300	870.00	34	21.27	01/79	1382	978
416	Erfoud	Hssaya	Bou Izghi	1151/65	FR	1.12	522,600	30,350	850.00	61	12.57	09/92	2850	1995
417	Erfoud	Hssaya	El Facht 1	892/65	P	9.98	526,300	13,700	745.00	43.7	8.68	04/89	2670	1870
418	Erfoud	Hssaya	El Facht 2	893/65	FR		526,300	14,700	747.00	50	13.2	04/90		
419	Erfoud	Hssaya	El Facht 1	303/65	FR	0.06	525,100	15,200	748.00	48.5	6.69	05/78	6756	4778
420	Erfoud	Hssaya	El Facht	304/65	FR	0.14	526,200	15,400	748.00	43	7	05/78	1892	1338

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage	Coordination			Well Depth	Drawn down	Date	Conductivity	SS Material
						(lit/sec)	x	y	z	(m)			US/cm	(mg/l)
421	Erfoud	Hssaya	El Hazbane	897/65	P	2.09	513,300	24,300	786.00	26.79	24.44	07/89	3100	2170
422	Erfoud	Hssaya	El Hazbane	301/65	FR	0.7	514,600	25,700	785.00	49.2	11.46	05/78	1940	1373
423	Erfoud	Hssaya	El Hazbane	890/65	FR	0.4	515,700	24,550	785.00	66	23.83	06/89	8420	589
424	Erfoud	Hssaya	El Hazbane	302/65	FR		515,700	25,600	780.00	68.6	24.5	05/78	1438	1017
425	Erfoud	Hssaya	El Hazbane	891/65	FR		515,500	23,200	780.00	60	SEC	06/89		
426	Erfoud	Hssaya	El Hazbane	302/65	FR		515,700	25,600	780.00	68.6				
427	Erfoud	Hssaya	Foum El Hazbane	1144/65	FR		516,200	27,000	792.00	55	10.66	09/92		
428	Erfoud	Hssaya	Foum El Hazbane	1145/65	FR		516,300	26,800	795.00	55	22.81	09/92		
429	Erfoud	Hssaya	Foum El Hazbane	1148/65	FR		515,300	26,500	791.00	61	10.79	09/92		
430	Erfoud	Hssaya	Foum El Hazbane	1147/65	P	2.22	517,500	27,300	800.00	50.05	11.38	11/95	3046	2132
431	Erfoud	Hssaya	Ihandar	1181/65	FR		549,950	56,400	748.00	61	48.89	11/92		
432	Erfoud	Hssaya	Ihandar	1135/65	FR	3.91	517,150	17,400	767.50	61	15.48	08/92	2350	1640
433	Erfoud	Hssaya	Ihandar	2715/65	FR		549,200	60,700	773.00	67	28.07	11/92		
434	Erfoud	Hssaya	Ihandar	1184/65	FR		548,450	57,400	762.00	55	SEC	11/92		
435	Erfoud	Hssaya	Ihandar	350/65	FR		548,800	57,050	749.00	34	14.78	11/78	1556	1100
436	Erfoud	Hssaya	Ihandar	368/65	FR	0.5	517,150	17,700	760.00	28	6.6	01/79	2485	1757
437	Erfoud	Hssaya	Ihandar	1183/65	FR		548,650	185,550	749.00	49	27.4	11/92		
438	Erfoud	Hssaya	Ihandar	350/65	FR		548,800	57,950	749.00	34				
439	Erfoud	Hssaya	Ihandar	368/65	FR		517,150	17,700	760.00	28				
440	Erfoud	Hssaya	Ihandar	351/65	P		548,600	58,000	749.00	25.55	7.62	06/80	1460	
441	Erfoud	Hssaya	K. Ait saadane	896/65	P	2.35	513,350	27,450	800.00	42	32.68	02/89	1687	1180
442	Erfoud	Hssaya	K .Battou	1162/65	FR		508,700	39,600	885.00	55	28.08	10/92		
443	Erfoud	Hssaya	K.Tarricht	1138./65	FR		515,750	20,050	773.00	55	SEC	08/92		
444	Erfoud	Hssaya	K.Tarricht	1137./65	FR		515,900	20,500	771.00	100				
445	Erfoud	Hssaya	KH.Achich 1	374./65	FR	0.1	511,300	30,900	810.00	34	9.2	01/79	1519	1074
446	Erfoud	Hssaya	KH.Battou	1163/65	FR		508,350	39,650	885.00	100	15.04	10/92		
447	Erfoud	Hssaya	KH.Battou	1164/65	FR	0.68	509,200	39,950	876.00	61	8.17	10/92	1490	1040
448	Erfoud	Hssaya	KH.Battou	1165/65	FR		511,150	37,650	849.00	8		10/92		
449	Erfoud	Hssaya	KH.Battou	1166/65	FR		510,100	38,400	860.00	55	24.74	10/92		
450	Erfoud	Hssaya	KH.Battou	1167/65	FR		509,750	37,900	857.00	55	22.73	10/92		

	Cercle	Commun	Location	No IRE	Well Type	Test Dischrage (lit/sec)	Coordination x	y	z	Well Depth (m)	Drawn down	Date	Conductivity US/cm	SS Material (mg/l)
451	Erfoud	Hssaya	KH.Battou	1160/65	FR		509,800	37,800	858.00	55	SEC	10/92		
452	Erfoud	Hssaya	KH.Battou	1161/65	P	2.42	510,250	8,050	858.00	22.77	8.8	09/95	1398	978
453	Erfoud	Hssaya	KH.Battou	378/65	FR	0.22	510,350	37,950	880.00	34	8.97	01/79	1819	1287
454	Erfoud	Hssaya	Khing	1140/65	FR		508,550	25,500	803.00	79	5.25	08/92	1100	770
455	Erfoud	Hssaya	Khing	1141/65	FR		509,250	24,600	798.00	71.61	SEC	08/92		
456	Erfoud	Hssaya	Khing	1143/65	FR	0.48	509,250	23,850	800.00	73	15.27	08/92	1330	930
457	Erfoud	Hssaya	Khing	372/65	FR	0.06	509,250	23,350	780.00	43	27.61	01/79	1717	1215
458	Erfoud	Hssaya	Khing	373/65	FR	0.05	507,900	25,300	800.00	28	1.9	01/79	912	645
459	Erfoud	Hssaya	Louk Amane	1159/65	FR		498,950	43,500	1,088.00	67	16.93	02/93	820	570
460	Erfoud	Hssaya	Louk Amane	1158/65	FR	5.19	498,900	44,400	1,100.00	73	12.17	02/92	880	680
461	Erfoud	Hssaya	Mejrane 1	365/65	FR	1.4	528,150	4,800	710.00	35	6.5	01/79	5057	3576
462	Erfoud	Hssaya	Mejrane 1	385/65	FR		528,150	4,800	710.00	35				
463	Erfoud	Hssaya	Mejrane	1171/65	FR	11.54	527,400	6,600	725.00	55	9.25	04/93	2580	1800
464	Erfoud	Hssaya	Mejrane 1	1131/65	FR		527,900	4,800	710.50	60	9.65	07/92		
465	Erfoud	Hssaya	Mejrane 2	1132/65	FR	13.57	527,600	2,800	702.00	100	3.13	04/93	2100	
466	Erfoud	Hssaya	Takacha	1133/65	FR	2.84	521,400	6,500	725.00	75	11.37	07/92	2600	1860
467	Erfoud	Hssaya	Tazegzouet 10	312/65	FR	0.6	515,100	29,300	805.00	34	6.2	05/78	4720	3338
468	Erfoud	Hssaya	Tazegzouet 11	313/65	FR	0.11	515,300	20,950	815.00	49	5.06	05/78	4213	2979
469	Erfoud	Hssaya	Tazegzouet 9	311/65	P		515,300	28,450	798.00					
470	Erfoud	Hssaya	Tazegzouet 7	309/65	FR	0.06	513,150	29,650	823.00	100	38.64	04/78	5916	4184
471	Erfoud	Hssaya	Tazegzouet 8	310/65	FR	0.02	513,600	28,500	800.00	55	37.73	05/78		
472	Erfoud	Hssaya	Tazegzouet 9	311/65	FR	1.25	515,300	28,450	798.00	31	6.42	05/78	4315	3052
473	Erfoud	Hssaya	Tifaksite	894/65	P	17.68	523,600	4,600	747.00	41	10.12	04/89	3370	2360
474	Erfoud	Hssaya	Tissamoumine	1130/65	FR	20	522,580	150	731.00	69	ART	07/92	2460	1720
475	Erfoud	Hssaya	Tissamoumine 1	388/65	FR	0.2	523,200	50	730.00	58	6.6	01/79	2773	1861

Source: Mission 1, ELABORATION DU SCHEMA DIRECTEUR POR L'AMELIORATION DE L'APPROVISIONNEMENT EN EAU POTABLE DES POPULATIONS RURALES DE LA PROVINCE D'ERRACJIDIA (January, 2003)

Table B.3.1 Discharge Measurement of 30 Khettaras

(1/3)

Zone	June 2003				September 2003				February 2004			
No.	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)
A11	0	0.8	36.4%		0	1.41	46.2%		0	2.1	56.8%	
	450	1.9	86.4%	1.1	450	2.4	78.7%	0.99	450	3.7	100.0%	1.6
	900	2.2	100.0%	0.3	900	3.05	100.0%	0.65	900	2.4	64.9%	-1.3
A41	0	0.8	6.1%		0	2.07	14.8%		0	2.7	19.3%	
	1,000	1.9	14.5%	1.1	500	6.72	48.1%	4.65	500	3.9	27.9%	1.2
	2,400	13.1	100.0%	11.2	1,000	14	100.0%	7.25	1,000	12.9	92.1%	9
					1,700	13.4	96.1%	-0.54	1,700	13.4	95.7%	0.5
					2,400	12.6	90.1%	-0.85	2,400	14	100.0%	0.6
A50	0	3.4	26.8%		0	1.63	15.5%		0	0	0.0%	
	1,216	9.2	72.4%	5.8	608	4.94	47.0%	3.31	608	6.3	100.0%	6.3
	1,700	12.7	100.0%	3.5	1,216	10.5	100.0%	5.57	1,216	5.3	84.1%	-1
					1,458	7.79	74.1%	-2.72	1,458	5.6	88.9%	0.3
					1,700	7.45	70.9%	-0.34	1,700	5.4	85.7%	-0.2
A74	0	6.6	100.0%		0	2.5	29.3%		0	12.3	67.2%	
	660	1.3	19.7%	-5.3	660	8.52	100.0%	6.02	660	18.3	100.0%	6
	1,320	0.8	12.1%	-0.5	1,320	7.44	87.3%	-1.08	1,320	17.7	96.7%	-0.6
A106	0	1.3	50.0%		0	1.98	45.5%		0	4.7	49.5%	
	380	2.6	100.0%	1.3	380	4.35	100.0%	2.37	380	9.5	100.0%	4.8
	880	2.4	92.3%	-0.2	880	2.93	67.4%	-1.42	880	7.2	75.8%	-2.3
A113	0	7.5	42.9%		0	6.13	35.6%		0	9.4	42.2%	
	500	13.8	78.9%	6.3	500	16.9	97.9%	10.73	500	22.3	100.0%	12.9
	1,000	17.5	100.0%	3.7	1,000	17.2	100.0%	0.36	1,000	17.9	80.3%	-4.4
B6	0	0.8	14.8%		0	2.33	38.7%		0	0	0.0%	
	350	3.3	61.1%	2.5	350	4.52	75.1%	2.19	350	8.2	100.0%	8.2
	700	5.4	100.0%	2.1	700	6.02	100.0%	1.5	700	6.6	80.5%	-1.6
B17	0	2.3	9.5%		0	3.39	17.3%		0	5.9	18.6%	
	850	24.2	100.0%	21.9	425	19.1	97.4%	15.68	425	21.9	69.1%	16
	1,700	20.7	85.5%	-3.5	850	16	81.9%	-3.04	850	24.3	76.7%	2.4
					1,275	19.6	100.0%	3.55	1,275	29.8	94.0%	5.5
					1,700	19.3	98.6%	-0.28	1,700	31.7	100.0%	1.9
C2	0	8.7	32.3%		0	1.96	7.4%		0	4.8	13.4%	
	1,200	26.9	100.0%	18.2	600	26.4	100.0%	24.44	600	35.8	100.0%	31
	2,420	20.4	75.8%	-6.5	1,200	19.2	72.7%	-7.2	1,200	33	92.2%	-2.8
					1,810	17.3	65.5%	-1.91	1,810	33	92.2%	0
					2,420	16.4	62.2%	-0.88	2,420	26.5	74.0%	-6.5
C6	0	4.8	22.2%		0	22.5	94.5%		0	7.6	31.1%	
	1,800	21.6	100.0%	16.8	900	23.8	100.0%	1.3	900	24	98.4%	16.4
	3,200	17.6	81.5%	-4	1,800	23.8	99.9%	-0.03	1,800	24.4	100.0%	0.4
					2,500	23.1	97.0%	-0.69	2,500	19.9	81.6%	-4.5
					3,200	20.3	85.4%	-2.76	3,200	21.5	88.1%	1.6

Zone	June 2003				September 2003				February 2004			
No.	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)
D34	0	7	100.0%		0	3.45	100.0%		0	3.3	25.6%	
	3,200	5.2	74.3%	-1.8	1,600	1.61	46.7%	-1.84	1,600	12.8	99.2%	9.5
	5,900	3.6	51.4%	-1.6	3,200	1.1	31.9%	-0.51	3,200	12.9	100.0%	0.1
					4,550	0	0.0%	-1.1	4,550	6.9	53.5%	-6
					5,900	0	0.0%	0	5,900	7.2	55.8%	0.3
D37	0	26.3	100.0%		0	19.7	100.0%		0	23.4	100.0%	
	3,500	20.7	78.7%	-5.6	1,750	17.7	90.1%	-1.95	1,750	20.3	86.8%	-3.1
	5,700	15	57.0%	-5.7	3,500	17.5	88.8%	-0.25	3,500	18.7	79.9%	-1.6
					4,600	17.8	90.2%	0.27	4,600	16.6	70.9%	-2.1
					5,700	16.5	83.7%	-1.28	5,700	17.8	76.1%	1.2
D47	0	4	20.4%		0	3.18	32.7%		0	2.3	14.7%	
	3,000	19.6	100.0%	15.6	1,500	7.64	78.6%	4.46	1,500	12.3	78.8%	10
	5,970	7.8	39.8%	-11.8	3,000	7.34	75.5%	-0.3	3,000	15.6	100.0%	3.3
					4,485	9.72	100.0%	2.38	4,485	11.6	74.4%	-4
					5,970	6.78	69.8%	-2.94	5,970	9.2	59.0%	-2.4
D54	0	23.1	100.0%		0	27.1	98.8%		0	27.6	100.0%	
	3,640	21.9	94.8%	-1.2	1,820	27.4	100.0%	0.33	1,820	24.6	89.1%	-3
	6,340	20.7	89.6%	-1.2	3,640	23.1	84.1%	-4.35	3,640	21.2	76.8%	-3.4
					4,990	21.6	78.8%	-1.47	4,990	20.2	73.2%	-1
					6,340	21.3	77.8%	-0.27	6,340	19	68.8%	-1.2
D58	0	30	83.8%		0	31.1	95.6%		0	21.3	71.0%	
	1,500	35.8	100.0%	5.8	750	32.5	100.0%	1.44	750	25.7	85.7%	4.4
	5,000	24.9	69.6%	-10.9	1,500	29	89.3%	-3.49	1,500	28.4	94.7%	2.7
					3,250	29.3	90.2%	0.32	3,250	30	100.0%	1.6
					5,000	22.9	70.5%	-6.4	5,000	25.3	84.3%	-4.7
D64	0	6.8	61.8%		0	11.7	82.5%		0	4.3	31.9%	
	3,100	11	100.0%	4.2	1,550	14.2	100.0%	2.48	1,550	13.5	100.0%	9.2
	6,500	5	45.5%	-6	3,100	9.74	68.7%	-4.44	3,100	10.7	79.3%	-2.8
					4,800	7.66	54.0%	-2.08	4,800	9.6	71.1%	-1.1
					6,500	6.09	42.9%	-1.57	6,500	5.1	37.8%	-4.5
E8	0	7.9	19.8%		0	35	89.1%		0	28	80.7%	
	3,542	40	100.0%	32.1	1,771	28.3	72.2%	-6.65	1,771	31.5	90.8%	3.5
	5,566	39.3	98.3%	-0.7	3,542	33.2	84.6%	4.86	3,542	34.7	100.0%	3.2
					4,554	39.2	99.8%	6	4,554	31.7	91.4%	-3
					5,566	39.3	100.0%	0.06	5,566	30.9	89.0%	-0.8
E14	0	33	65.3%		0	34.2	65.6%		0	33	56.8%	
	2,200	46.3	91.7%	13.3	1,100	50.2	96.3%	16.01	1,100	58.1	100.0%	25.1
	4,200	50.5	100.0%	4.2	2,200	52.2	100.0%	1.93	2,200	43.5	74.9%	-14.6
					3,200	51.7	99.1%	-0.46	3,200	44.5	76.6%	1
					4,200	49.1	94.2%	-2.58	4,200	47.7	82.1%	3.2
E15	0	6.4	91.4%		0	5.28	100.0%		0	3.3	62.3%	
	2,250	7	100.0%	0.6	1,125	0	0.0%	-5.28	1,125	5.3	100.0%	2
	4,550	0	0.0%	-7	2,250	0	0.0%	0	2,250	0	0.0%	-5.3
					3,400	0	0.0%	0	3,400	0	0.0%	0
					4,550	0	0.0%	0	4,550	0.6	11.3%	0.6
E16	0	9.9	67.3%		0	13.3	87.6%		0	19.9	73.2%	
	2,300	14.7	100.0%	4.8	1,150	15.2	100.0%	1.89	1,150	27.2	100.0%	7.3
	4,034	14.7	100.0%	0	2,300	14	92.3%	-1.17	2,300	17.3	63.6%	-9.9
					3,167	14	92.4%	0.01	3,167	15.3	56.3%	-2
					4,034	13.4	88.1%	-0.65	4,034	14.8	54.4%	-0.5

Zone	June 2003				September 2003				February 2004			
No.	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)	Length (m)	Discharge (l/s)	Proportion (%)	Variation (l/s)
F24	0	0	0.0%		0	0	0.0%		0	0	0.0%	
	2,400	2	100.0%	2	2,400	1.71	100.0%	1.71	2,400	0.8	100.0%	0.8
	6,100	0	0.0%	-2	6,100	0	0.0%	-1.71	6,100	0	0.0%	-0.8
F38	0	2.5	100.0%		0	2.6	71.4%		0	1.8	64.3%	
	1,500	1.8	72.0%	-0.7	750	3.64	100.0%	1.04	750	2.8	100.0%	1
	3,700	0	0.0%	-1.8	1,500	2.75	75.5%	-0.89	1,500	2.1	75.0%	-0.7
					2,600	2.35	64.6%	-0.4	2,600	1.9	67.9%	-0.2
					3,700	1.79	49.2%	-0.56	3,700	1.1	39.3%	-0.8
G4	0	0	0.0%		0	2.38	35.5%		0	0.1	3.4%	
	1,000	2.6	100.0%	2.6	500	3.2	47.7%	0.82	500	1.8	62.1%	1.7
	2,700	1.5	57.7%	-1.1	1,000	6.36	94.8%	3.16	1,000	2.9	100.0%	1.1
					1,850	6.71	100.0%	0.35	1,850	2.5	86.2%	-0.4
					2,700	4.02	59.9%	-2.69	2,700	2	69.0%	-0.5
G53	0	0.5	100.0%		0	0	0.0%		0	1.9	100.0%	
	250	0	0.0%	-0.5	250	5.22	100.0%	5.22	250	1.5	78.9%	-0.4
	2,450	0	0.0%	0	2,450	2.6	49.8%	-2.62	2,450	1.2	63.2%	-0.3
G55	0	1.4	35.9%		0	4.53	30.0%		0	7.3	73.0%	
	500	3.3	84.6%	1.9	500	12.2	81.0%	7.7	500	10	100.0%	2.7
	1,100	3.9	100.0%	0.6	1,100	15.1	100.0%	2.87	1,100	8.4	84.0%	-1.6
G59	0	0			0				0	2.1	45%	
	300	0	0%	0	300	0	0%	0	300	4.7	100%	2.6
	800	0	0%	0	800	0	0%	0	800	1.8	38%	-2.9
G63	0	1.3	92.9%		0	7.48	70.8%		0	5.5	55.6%	
	500	1.4	100.0%	0.1	500	10.6	100.0%	3.08	500	9.9	100.0%	4.4
	1,100	1	71.4%	-0.4	1,100	5.55	52.6%	-5.01	1,100	7.4	74.7%	-2.5
G64	0	5.1	100.0%		0	14.7	36.7%		0	4.5	78.9%	
	1,200	3.4	66.7%	-1.7	600	40.2	100.0%	25.44	600	4.3	75.4%	-0.2
	2,200	2	39.2%	-1.4	1,200	31.2	77.6%	-9	1,200	4.6	80.7%	0.3
					1,700	31.6	78.6%	0.42	1,700	5.7	100.0%	1.1
					2,200	33.2	82.5%	1.55	2,200	2.6	45.6%	-3.1
G83	0	3.7	100.0%		0	13	100.0%		0	0		
	2,400	3.44	93.0%	-0.26	1,200	9.5	72.9%	-3.54	1,200	0	0%	0
	5,000	0	0.0%	-3.44	2,400	4.67	35.8%	-4.83	2,400	0	0%	0
					3,700	0	0.0%	-4.67	3,700	0	0%	0
					5,000	0	0.0%	0	5,000	0	0%	0
G87	0	7.8	87.6%		0	13.7	57.2%		0	6.8	100.0%	
	1,400	8.9	100.0%	1.1	1,400	23.6	98.6%	9.93	1,400	0	0.0%	-6.8
	3,460	6.2	69.7%	-2.7	2,430	24	100.0%	0.33	2,430	0	0.0%	0
					3,460	19.7	82.2%	-4.27	3,460	0	0.0%	0

Table B.4.1 List of khettaras Rehabilitated under PDRT

Name of khettara	Commune rurale	Rehabilitation Work (m)				Total Cost	Observations
		Construction	Reprofing	Extension	Total		
FIDA							
Ouled Ali	Oued N'aam	450	3,500	---	3,950.00	370,770.00	
Jdida	Oued N'aam	335	1,750	---	2,085.00	314,990.00	
Jdida Belhoucine	Sifa	793	3,075	---	3,868.00	262,848.00	
Haroun	Rissani	---	5,020	---	5,020.00	250,473.00	
Ramila Ait Amma	Taouz	330	710	---	1,040.00	270,173.00	
Tajouhart	Alnif	300	3,500	100	3,900.00	231,141.00	
Tazoulate	M'cissi	443	1,620	---	2,063.00	275,195.00	
Fouk Tlat	Alnif	1,112	1,500	---	2,612.00	350,900.00	
Diba Ksiba	Ferkla Soufli	550	600	---	1,150.00	297,099.00	
El Hassania Tilouin	Gheris soufli	540	2,120	---	2,660.00	275,399.40	
Ait Yakoub	Beni Tadjit	1,600	---	280	1,880.00	145,607.40	
Agoumad	Beni Tadjit	---	800	---	800.00	135,670.60	
Idmouma Ouinigui	Amellago Mellaab	900	---	---	900.00	357,060.00	
Ighzer Imi Nouzrou	Sifa Alnif	940	---	---	940.00	312,370.00	
Tilouin	Bas Gheris	400	---	---	400.00	199,663.00	
Ait Ben Omar	Bas Gheris	150	---	---	150.00	299,987.00	
Jdida Krair	Bas Gheris	1,000	---	---	1,000.00	236,275.00	REGIE
Boushabia	Jorf	1,000	---	---	1,000.00	274,970.00	
M'cissi Tamazant	M'cissi Taouz	1,700	---	---	1,700.00	579,245.00	
Ait Boubker	Talsint	450	---	---	450.00	199,151.00	
Kdia Ait Yakoub	Hssia	500	---	---	500.00	250,002.00	
Taourirt	Aghbalou	---	200	---	200.00	179,959.00	
Tizi Alnif	Alnif	1,200	---	---	1,200.00	193,446.00	
Jdida Boudenib	Oued N'aam	200	---	---	200.00	399,963.00	
Lalla Mimouna	M'cissi	320	---	---	320.00	194,600.00	
Oukhit	Mellaab	200	---	---	200.00	300,000.00	
Saidia Ghannamia Lihoudia Laaguilia Lakdima	Jorf A Seb Gheris Sifa Sifa	400	980	177	1,557.00	852,200.00	
Ait Belahcen	Gheris Ouloui	17	---	---	17.00	200,000.00	
Ksibia Azag	Sifa M'cissi	250	---	---	250.00	438,750.00	
Achouria Omaria Lahloua Lagrinia	Jorf et Arrab Sebbah Gheris	5,370	1,100	---	6,470.00	1,961,700.00	
Taghrout	M'cissi	370	---	---	370.00	1,300,000.00	
Azag	M'cissi	50	---	---	50.00		
Bouadil	M'cissi	840	---	---	840.00		
Ait Lahbib	Alnif	260	---	---	260.00		REGIE
Timarzit	Alnif	200	---	---	200.00		+
Taoumart	Alnif	720	---	---	720.00		VOLONTARIAT
Tassamant	Alnif	500	---	---	500.00		
Kdima Sifa	Sifa	1,320	---	---	1,320.00		

El Bour	Sifa	700	---	---	700.00		
Mharzia	Sifa	700	---	---	700.00		
Laglaglia	Sifa	---	50	120	170.00		
Total		27,110	26,525	677	54,312.00	11,909,607.40	

Name of khettara	Commune rurale	Nature des travaux (m)				Total Cost	Observations
		Construction	Reprofing	Extension	Total		
BID							
Laglalia Jdida Belhoucin Laaguilia Lakdima Bouria Ighzer	Sifa	---	620	150	770.00	595,000.00	Entreprise
El Hajoui Douimniaa Chouater	Ain Chouater	2,400	---	---	2,400.00	3,581,700.00	
Total		2,400	620	150	3,170.00	4,176,700.00	

Source: SER, ORMVA/TF

Table B.4.2 Rehabilitation Works by ORMVA/TF

No.	Khettaras	Commune Rurale	Rehabilitation Works
1992			
1	OUGNAT	MELLAAB	curage sur 1100 ml
2	OUKHIT	MELLAAB	curage sur 8700 ml
3	OUINIGUI	MELLAAB	curage sur 500 ml
4	TALGHOUMT	MELLAAB	curage sur 500 ml
5	AGHROUD	MELLAAB	curage sur 300 ml+ construction 12 puits
6	TAGHIA	FERKLA OULIA	extension sur 144 ml
7	KHAMSSINE	FERKLA SOUFLI	Extension sur 81 ml
8	LAAOUINA	GHERIS SOUFLI	curage 1060 ml + mur protection sur 71 ml+ construction sur 60 ml
9	AGOUDIM	AMELLAGOU	curage sur 600 ml+ construction 2 bassins
10	OUKHALEK	AMELLAGOU	curage 400 ml + construction puits de visite
11	KHING	HSSIA	Curage sur 2000 ml et construction sur 526 ml
12	TACHOUFIT	ALNIF	Curage sur 2230 ml et construction sur 650 ml
13	AIT HAMMOU	ALNIF	Curage sur 700 ml + construction sur 517 ml
14	AGOUDIM	HSSIA	Curage sur 1716 ml + construction sur 1350 ml
15	AIT MOCH OUCHARFA	ALNIF	Extension sur 50 ml
16	LAKDIMA TAOMART	ALNIF	Extension sur 120ml
17	GAIZ	ALNIF	Curage sur 550 ml+ construction sur 200 ml
18	TASSAMAMT	ALNIF	Extensions ur 50 ml
19	TIGUIRNA	ALNIF	Construction sur 200 ml
20	AMMAR	ALNIF	Construction sur 300 ml
21	LAKDIMA BOUDIB	ALNIF	Curage sur 530 ml et construction sur 470 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1993			
1	IGOURGUIT	AGHBALOU	Construction sur 120 ml+ couverture sur 100 ml+ bassin
2	TAOURIRT	AGHBALOU	construction sur 43 ml+ revetement sur 360 ml
3	AMR OUBASSOU ET TILILA	MELLAAB	Terrassement sur 870 ml + construction sur 270 ml
4	AKEROUZ	MELLAAB	curage et reprofilage sur 1300 ml
5	OJE ET OULKHALEK	AMELLAGOU	curage sur 200 ml+ mur de protection sur 70 ml
6	AIT MY LMAMOUN	FERKLA SOUFLI	construction sur 150 ml+ curage sur 450 ml
7	AIT OULGHAM	FERKLA SOUFLI	Construction et couverture sur 250 ml+ curage sur 750 ml.
8	RAMLIA	SIFA	Construction sur 700 ml
9	JDIDA LHAJ LMADANI	SIFFA	Construction sur 400 ml
10	OUASTANIA	A.S. GHERIS	Construction sur 820 ml
11	LAGRINIA	A.S.GHERIS	Construction sur 500 ml
12	MOSTAFIA	A.S.GHERIS	Construction sur 1250 ml
13	SOUIHLA	JORF	Construction sur 800 ml
14	BOUSHABIA	JORF	Construction sur 445 ml
15	EL OURRA	JORF	Construction sur 2735 ml
16	LOUJARCHIA	B.M.SIJILMASSA	Construction sur 800 ml
17	SAIDANIA	B.M.SIJILMASSA	Construction sur 400 ml
18	EL HASSOUNIA	B.M.SIJILMASSA	Construction sur 950 ml

19	HAROUN	RISSANI	Construction sur 250 ml
20	TALAABAST	TAOUZ	Construction sur 450 ml
21	EL BAGAA	TAOUZ	Construction sur 850 ml
22	RAMLIA AIT HAMMOU	SIDI ALI	Construction sur 1240 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1994 - 1995			
1	OULED ALI	OUED N'AAM	construction of 500 ml +Curage de 2500 ml
2	JDIDA	OUED N'AAM	construction de 300ml + curage de 1000 ml
3	TINIFIFT	ALNIF	Construction et couverture sur 410 ml
4	IMINOUZROU	ALNIF	Extension sur 100 ml
5	JDIDA BELHOUCINE	SIFA	Construction de 500ml + curage sur 1600 ml
6	HAROUNE	RISSANI	Extension sur 100 ml + curage sur 3000 ml
7	RAMLIA AIT AMAR	TAOUZ	Construction de 500 ml + reprofilage sur 2000 ml
8	TAJOUHART	ALNIF	Extension sur 100 ml+ construction sur 300 ml + reprofilage sur 250 ml
9	TAZOULAIT	M'CISSI	Reprofilage de 5000 ml+ construction sur 1000 ml
10	FOUK TALITAT	ALNIF	Construction de 300 ml+Curage de 100 ml
11	DIBA ET KSIBA	FERKLA SOUFLA	Construction de 300 ml+ Curage de 500 ml
12	EL HASSANIA TILOUINE	GHERIS SOUFLI	Construction de 150 ml +Curage et reprofilage de 860 ml
13	AIT DAOUD IYOUB	BENI TADJIT	Curage et reprofilage de 3800 ml
14	AGMAD	BENI TADJIT	Curage et reprofilage de 800 ml
15	EL HASSOUNIA	B.M. SIJILMASSA	curage sur 500 ml
16	TAGHIA	AGHBALOU	Construction sur 60 ml
17	LHAJ ALLAL	SIFA	construction sur 250 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1996			
1	IMAKHZEN TILOUINE	GHERIS OULOUI	Curage sur 300 ml+ construction sur 80 ml et galerie sur 200 ml
2	AIT BEN OMAR	FERKLA SOUFLA	Reprofilage et curage sur 110 ml+ construction sur 1020 ml
3	TAGHIA	GHERIS OULOUI	construction +couverture sur 63 ml
4	AIT SAID	GHERIS OULOUI	Construction +couverture sur 50 ml+ revetement seguia sur 200 ml
5	DAR OUMARIA JDIDA	FERKLA SOUFLA	Construction bassin 20x14 + seguia sur 200 ml
6	MAAMRIA	GHERIS SOUFLI	Construction et couverture sur 180 ml
7	TAZOULAIT	HSSIA	Construction sur 1980 ml
8	TAJOUHART	ALNIF	Extension sur 16 ml
9	TIZI	ALNIF	Construction sur 680 ml
10	OUL N'TMAYOUST	AGHBALOU	Reprofilage sur 200 ml et construction sur 635 ml
11	M'CISSI	M'CISSI	Construction et couverture sur 325 ml
12	KDIMA AIT YAHYA	HSSIA	Extension sur 56 ml et construction sur 334 ml
13	TOUGHZA ROUSIA	ALNIF	Construction sur 200 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1997			
1	HAROUNE	RISSANI	Construction sur 200 ml
2	JDIDA LHAJ MADANI	SIFA	Construction sur 325 ml
3	OUKHIT	MELLAAB	Construction bassin 15x15 +seguia sur 1140 ml
4	BENI OUZIEM	OUED NAAM	Construction sur 125 ml
5	AIT MY HACHEM	BENI-TADJIT	Construction sur 200 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1998			
1	M'BARKIA FOUGANIA	JORF	Construction sur 677 ml
2	LOUARIA	JORF	Construction sur 810 ml
3	AIT LAHBIB	ALNIF	Construction sur 267 ml et protection sur 103 ml
4	HASSI LABIED	TAOUZ	Construction sur 30 ml et couverture sur 450 ml
5	TALAABAST	TAOUZ	Construcion sur 600 ml et couverture sur 1200 ml
6	AMI AHMED	MELLAAB	Construction bassin 17x11 et seguia sur 300 ml
7	IZILF	FERKLA SOUFLA	Reprofilage sur 25 ml + abri pour SP
8	MALHIA	SFALALT	Construction sur 308 ml et construction ouvrage de vidange.
9	AACHICH	HSSIA	Construction sur 915 ml
10	LALLA MIMOUNA	M'CISSI	Construction et couverture sur 320 ml
11	JDIDALHAJ MADANI	SIFA	Ouverture sur 280 ml et construction et couverture sur 182 ml
12	EL BAGAA	TAOUZ	Construction sur 180 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
1999			
1	TOUGHACH	FERKLA OULOUI	Construction sur 50 ml + bassin
2	LAAOUINA,TIZERT	GHERIS SOUFLI	Construction sur 280 ml + bassin
3	OUTALAMINE	AMELLAGOU	Construction sur 105 ml
4	TASKOUNTITE	AMELLAGOU	Construction siphon sur 20 ml+ seguia sur 35 ml
5	OUKHIT	MELLAAB	Construction sur 70 ml
6	IGHRANE	MELLAAB	Construction sur 800 ml
7	OUINIGUI	MELLAAB	Construction sur 680 ml
8	LAHCEN	OUED N'AAM	Construction sur 400 ml
9	TIMARZIT	ALNIF	Construction de 250 ml
10	TABOURIKT	ALNIF	Construction de 250 ml
11	IMZILNE	ALNIF	Construction de 250 ml
12	AIT BEN SAID	ALNIF	Construction de 250 ml
13	M'CISSI	ALNIF	Construction de 250 ml
14	AZAG	ALNIF	Construction de 250 ml
15	TINIFIFT	ALNIF	Construction de 250 ml
16	TAOMART	ALNIF	Construction de 250 ml
17	KHING	ALNIF	Construction de 250 ml
18	MEJRANE	ALNIF	Construction de 250 ml
19	AGOUDIM	AMELLAGOU	Construction sur 76 ml
20	BAKKASSIA	FERKLA SOUFLI	Construction seguia sur 100 ml
21	MAKHZEN	GHERIS SOUFLI	Construction seguia sur 300 ml
22	IZILF	FERKLA SOUFLI	Construction sur 120 ml
23	AIT SAID	FERKLA OULOUI	Construction sur 50 ml
24	RBAIYA	FERKLA SOUFLI	Construction sur 100 ml + bassin

25	TALAABAST	TAOUZ	Construction de 300 ml
26	TABOUMIAT	TAOUZ	Construction de 300 ml
27	EL BAGAA	TAOUZ	Construction de 280 ml
28	KDIMA SIFA	SIFA	Construction de 300 ml
29	JDIDA LHAJ MADANI	SIFA	Construction de 300 ml
30	SOUIHLA OULED GHANEM	JORF	Construction de 300 ml
31	KDIMA BOUDNIB	OUED N'AAM	Construction de470 ml
32	HAROUNE	RISSANI	Construction de 300 ml
33	OUGHROUD	MELLAAB	Construction sur 60 ml
34	AIT M'HAMED	FERKLA OULOUI	Construction sur 215 ml
35	AZAG N'OUCHEN	FERKLA OULOUI	Construction sur 50 ml
36	HASSI LABIED	TAOUZ	Construction sur300 ml
37	TAMARIGHT	TAOUZ	Construction sur300 ml
38	IKHF N'OUMERDOUL	SIDI ALI	Construction sur600 ml
39	AGAROUM	RISSANI	Construction sur 250 ml
40	LOAJARCHIA	B.M.SIJILMASSA	Construction sur250 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
2000			
1	AZAG NOUCHEN	FERKLA -OULIA	Construction et couverture sur 111 ml
2	TAKACHA	H'SIA	Construction sur300 ml
3	BATTOU	H'SIA	Construction sur300 ml
4	EL HAZBANE	H'SIA	Construction sur300 ml
5	BOUADIL	M'CISSI	Construction sur300 ml
6	AGOUMAD	M'CISSI	Construction sur250ml
7	IMINOUZROU	ALNIF	Construction sur300ml
8	TIGUERNA	ALNIF	Construction sur300 ml
9	AMMAR	ALNIF	Construction sur300 ml
10	JDIDA KRAIR	A. S. GHERIS	Construction sur300 ml
11	CHARCHMIA	A. S. ZIZ	Construction sur300 ml
12	HAJ EL MADANI	SIFA	Construction sur300 ml
13	HASSI LABIED	TAOUZ	Construction sur300 ml
14	JAMJAMA	JORF	Construction sur450 ml
15	TAMARIGHT	TAOUZ	Construction sur300 ml
16	AGAROUM	RISSANI	Construction sur250 ml
17	LOUJARCHIA	B. M. SIJILMASSA	Construction sur250 ml
18	LAKBIRA	OUED NAAM	Construction sur200 ml
19	TAOUZ	OUED NAAM	Construction sur150 ml
20	OULED ALI	OUED NAAM	Construction sur300 ml
21	BENI OUZIEN	OUED NAAM	Construction sur250 ml
22	LAKDIMA	A.S.GHERIS	Construction sur600 ml
23	LALLA MIMOUNA	M'CISSI	Construction sur830 ml
24	TAGHROUT	M'CISSI	Construction sur 894 ml
25	AACHICH	H'SIA	Construction sur 864 ml
26	AIT YAHYA	H'SIA	Construction sur 1254 ml
27	TAZAGZOUT	H'SIA	Construction sur 385 ml

28	HAROUNE	RISSANI	Construction sur 225 ml
29	LAKBIBIA	B.M'HAMED	Construction sur 423 ml
30	TAMAZANT	TAOUZ	Construction sur 423 ml
31	TAMAGOURTE	FERKLA -SOUFLA	Construction sur 450 ml
32	EL MOCHE	FERKLA -SOUFLA	Construction sur 260 ml
33	LAAYOUNE	FERKLA -SOUFLA	Construction sur 200 ml
34	MY EL MAMOUN	FERKLA -SOUFLA	Construction sur 400 ml
35	LAKDIMA	FERKLA -SOUFLA	Construction sur 250 ml
36	OUSTANIA	A.SEBBAH-GHERIS	Construction sur 250 ml
37	FOUGANIA	A.SEBBAH-GHERIS	Construction sur 250 ml
38	TAGELGOULT	ALNIF	Construction sur 250 ml
39	BEGAA	TAOUZ	Construction sur 160 ml
40	TALAABAST	TAOUZ	Construction sur 160 ml
41	HASSI LABIED	TAOUZ	Construction sur 150 ml
42	TABOUMIAT	TAOUZ	Construction sur 160 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
2001			
1	AMMAR	ALNIF	Construction sur 300 ml
2	TIGUIRNA	ALNIF	Construction sur 300 ml
3	IMINOUZROU	ALNIF	Construction sur 300 ml
4	TABOUAMART	ALNIF	Construction sur 300 ml
5	M'CISSI	M'CISSI	Construction sur 300 ml
6	BOUADIL	M'CISSI	Construction sur 300 ml
7	AGOUMAD	M'CISSI	Construction sur 300 ml
8	TAKACHA	HSSIA	Construction sur 300 ml
9	EL HAZBANE	HSSIA	Construction sur 300 ml
10	TISSAMOUMINE	HSSIA	Construction sur 300 ml
11	LITAMA	FERKLA -SOUFLA	Construction sur 1188 ml
12	AIT MY LMAMOUN	FERKLA SOUFLA	Construction sur 400 ml + bassin 15x11
13	LAKDIMA AIT MAAMER	FERKLA SOUFLA	Construction sur 440 ml + bassin 15x15
14	My LHOUSSAINE	FERKLA SOUFLA	Construction sur 890 ml+ bassin 10x8
15	TORBA	OUED NAAM	Consruction et Curage de 1 500 ml

No.	Khettaras	Commune Rurale	Rehabilitation Works
2002			
1	TAMARIGHT ET TAMAZNAT	TAOUZ	Construction sur150 ml
2	HAROUNE	RISSANI	Construction sur200 ml
3	EL ALAOUIYA	A. S. Gheris	Construction sur350 ml
4	JDIDA	A. S. Gheris	Construction sur480 ml
5	EL HAZBANE	Hssia	Construction sur600 ml
6	TAKACHA ET TISSAMOUMINE	Hssia	Construction sur400 ml
7	LITAMA	FERKLA -SOUFLA	Construction sur900 ml

8	OUKHIT	MELLAAB	Construction sur 700 ml
9	AGHROUD	MELLAAB	Construction sur 600 ml
10	ATTI KAIDA	FERKLA SOUFLI	Construction sur 1040 ml
11	LAAOUINA	GHERIS SOUFLI	Construction sur 960 ml
12	TORBA	OUED NAAM	Construction et Curage sur 1 500 ml
13	AGOUDIM	FERKLA -OULIA	Construction sur 850 ml

Table B.4.3 Rehabilitation Works under Japanese Small Scale Grant Aid Program

Name of Khettaras	Commune Rural	Construction Works	Cost	Year
Tighfert （Irrigation area 40ha） （Actual irrigation area 10ha） （Discharge 6 lit/sec）	Ferkia Oulia	Enlargement of gallery and coverage 1,000m Rehabilitation of shafts 40m interval Rehabilitation of water tapping site	DH475,060	2002
Ighzer （Irrigation area 20ha） （Actual irrigation area 4ha） （Discharge 2 lit/sec）	Sifa	Enlargement of gallery and coverage 500m Rehabilitation of shafts 40m interval	DH477,690	2002
Lagrinia （Irrigation area 60ha） （Actual irrigation area 15ha） （Discharge 6 lit/sec）	Hannabou	Base of gallery 200m Rehabilitation of damaged portion 50m Rehabilitation of shafts 40m interval Enlargement of gallery and coverage 200m	DH469,455	2002
Souihla Ouled Ghanem （Irrigation area 100ha） （Actual irrigation area 30ha） （Discharge 10 lit/sec）	Jorf	Enlargement of gallery and coverage 200m Rehabilitation of shafts 40m interval Irrigation canal 1,500m	DH454,047	2002
Talaabast （Irrigation area 25ha） （Actual irrigation area 7ha） （Discharge 5 lit/sec）	Taouz	Enlargement of gallery and coverage 500m Rehabilitation of shafts 50m interval	DH488,250	2002
Toufassamame （Irrigation area 50ha） （Actual irrigation area 6ha） （Discharge 3 lit/sec）	Alnif	Construction of regulating basin Enlargement of gallery and coverage 500m Rehabilitation of shafts 40m interval	DH497,330	2002
Bakassia （Irrigation area 50ha） （Actual irrigation area 25ha） （Discharge 8 lit/sec）	Ferkla Soufla	Enlargement of gallery and coverage 400m	DH498,900	2004
Agoumad （Irrigation area 400ha） （Actual irrigation area 10ha） （Discharge 20 lit/sec）	Beni Tadjit	Rehabilitation of gallery 800m Rehabilitation of shafts	DH495,770	2004
Almou Chorfa （Irrigation area 100ha） （Actual irrigation area 50ha） （Discharge 10 lit/sec）	Beni Tadjit	Rehabilitation of gallery 850m Irrigation canal rehabilitation 1,000m Rehabilitation of shafts	DH500,000	2004
Lakdima Bouya （Irrigation area 150ha） （Actual irrigation area 25ha） （Discharge 9 lit/sec）	Jorf	Rehabilitation of gallery 300m Construction of gallery 450m Rehabilitation of shafts	DH550,000	2004
Jdida Taoumart （Irrigation area 60ha） （Actual irrigation area 30ha） （Discharge 2 lit/sec）	Alnif	Rehabilitation of gallery 300m Dredging of gallery 1,000m Rehabilitation of shafts	DH629,750	2004
Timarzit （Irrigation area 100ha） （Actual irrigation area 15ha） （Discharge 3 lit/sec）	Alnif	Rehabilitation of gallery 1,000m Rehabilitation of shafts	DH577,200	2004

Source: RAPPORT D'ACHEVEMENT DES TRAVAUX DE REHABILITATION DES KHETTARAS ENTREPRISES DANS LE CADRE DU DON JAPONAIS, ORMVA/TF

Table B.6.1 General Features of Proposed Dam Sites (1/2)

Area		Proposed site	Distribution of rock foundation		Geological structure (Dam axis)	Riverbed slope	Foundation strength	Permeability
Ahassia	Alnif		Left bank	Sandstone and slate alternation of strata Talus deposit (toe of slope)	Bedding/strike: about E-W, dip: about 10°S crack/high-angle crack(mainly over 60°) interval of crack/about 3～4m	about 1/200	There are very few weathered zone at the both banks, therefore there are very few weathered zone at the river bed. It is suitable for the dam foundation, but low angle bed may become sliding surface to a concrete gravity dam, it needs detailed geological survey during a design.	It may exist high permeable layer along the bed and crack. If these high permeable layer may link from the upstream to the downstream, the leakage from the basement increases.
			Riverbed	River bed deposit (sand and gravel) thickness:about 20m				
			Right bank	Sandstone and slate alternation of strata Talus deposit (toe of slope)				
Fezzou (1/4)		Most upstream	Left bank	Volcanic rocks(basaltic). Talus deposit (toe of slope)	Depositional surface/strike:about ENE-WSW, dip:about 10° SES (right bank: dip slope, left bank: anclinal slope) Crack/high-anglecrack(mainly over 60°) Interval of crack/about 10m	about 1/100	There are very few weathered zone around the dam axis. It is suitable for dam foundation, but low angle bed may become sliding surface to a concrete gravity dam, it needs detailed geological survey during a design.	It may exist high permeable layer along the bed, depositional surface and crack. If these high permeable layers may link from the upstream to the downstream, the leakage from the basement increases.
			Riverbed	River bed deposit (sand and gravel)				
			Right bank	Volcanic rocks (basaltic). Talus deposit (toe of slope)				
Fezzou (2/4)		Midstream	Left bank	Volcanic rocks (basaltic)-sandstone and slate alternation of strata	Mainly volcanic rocks (basaltic), and parting sandstone and shale alternation of strata. Bedding and depositional strata/strike: about E-W, dip: about 10°S	about 1/100	- ditto -	It may exist high permeable layer along the bed and crack. If these high permeable layers may link from the upstream to the downstream, the leakage from the basement increases.
			Riverbed	River bed deposit (sand and gravel)				
			Right bank	Volcanic rocks(basaltic)-sandstone and slate alternation of strata				

Area		Dam crest length and height	Reservoir	Evaluation
Ahassia	Alnif	Dam crest length: about 200m, Dam height: maximum 30m (for a geomorphic condition)	Dam axis is located in narrow gorge and its immediately upstream is so wide that adequate storage capacity is ensured. Upstream about 1km from the dam axis, elevation of the right bank becomes low. Therefore, it may need the auxiliary dam to maximize storage capacity.	Since the dam site is located at narrow gorge and geologically composed of outcrops of a hard rock at the both abutment. It may be no problem of rock strength for the dam foundation. Upstream about 1km from the dam axis, right bank becomes low altitude, therefore, it may need the auxiliary dam. Large sediment flow may occurs due to its wider catchment area.
Fezzou (1/4)	Alnif	Dam crest length: about 150m, Dam height: maximum 20m (for a geomorphic condition)	Dam axis is located in narrow gorge and its immediately upstream is so wide that adequate storage capacity is ensured. There are houses and farmlands in the reservoir area, therefore settlement is required. There is a confluence with relatively large tributaries at 200 m upstream of the dam axis.	Narrow river section is advantageous for dam construction in terms of small works volume as well as lower dam construction. Since the right bank is thin ridge, grouting is necessary to mitigate seepage through several fissures. There are houses and farmlands in the reservoir area These houses may have to move for dam construction.
Fezzou (2/4)	Alnif	Dam crest length: about 200m, Dam height: maximum 20m (for a geomorphic condition)	It may have a small reservoir capacity because the proposed dam axis is located at the narrow section of the river and talus deposits has thickly accumulated in the reservoir area . There is a basin divide upstream few 100m from the dam axis. Therefore, it may be small reservoir area.	The dam site is disadvantageous due to a small storage capacity in the reservoir.

Note: Dam height: Distance between dam crest and the lowest point of existing riverbed surface, not from the lowest point of excavated foundation

Table B.6.1 General Features of Proposed Dam Sites (2/2)

Area		Proposed site	Distribution of rock foundation		Geological structure (Dam axis)	Riverbed slope	Foundation strength	Permeability
Fezzou (3/4)	Alnif	Midstream	Left bank	Sandstone and slate alternation of strata	Bedding/strike: about E-W, dip: about 10°N Crack/high-angle crack (mainly over 60°) Interval of crack/about 3～4 m	about 1/100	There are very few weathered zone at the both bank, therefore there is very few weathered zone at the riverbed. It is suitable for the dam foundation, but low angle bedding may become sliding surface for a gravity dam, so detailed geological survey is necessary during the design.	It may exist high permeable layer along the bed and crack. If these high permeable layers may link from the upstream to the downstream, the leakage from the basement increases. The right bank is the thin ridge, it may become easily the leakage line.
			Riverbed	River bed deposit (sand and gravel)				
			Right bank	Sandstone and slate alternation of strata				
Fezzou (4/4)	Alnif	Most downstream	Left bank	Sandstone and slate alternation of strata	Bedding/strike: about E-W, dip: about 10°N Crack/high-angle crack (mainly over 60°) Interval of crack/about 3～4 m	about 1/100	- ditto -	- ditto - The left bank is the thin ridge, it may become easily the leakage line.
			Riverbed	River bed deposit (sand and gravel)				
			Right bank	Sandstone and slate alternation of strata				
Tanguerha	Ferkla Soufla	Midstream	Left bank	Sandstone and slate alternation of strata Bedding: anclinal slope	Bedding/strike: about WNW - ESE, dip: about 10°NEN Crack/high-angle crack (mainly over 60°) Interval of crack/about 0.1～0.3 m	about 1/100	There are very few weathered zone at the both bank, therefore there is very few weathered zone at the riverbed. It is suitable for the dam foundation, but low angle bed may become sliding surface to a concrete gravity dam, it must need detailed geological survey at the design.	It may exist high permeable layer along the bed and crack. If these high permeable layers may link from the upstream to the downstream, the leakage from the basement increases. The left bank is the thin ridge, it may become easily the leakage line.
			Riverbed	River bed deposit (sand and gravel)				
			Right bank	Sandstone and slate alternation of strata Bedding: dip slope				

Area		Dam crest length and height	Reservoir	Evaluation
Fezzou (3/4)	Alnif	Dam crest length: about 150m, Dam height: maximum 20m (for a geomorphic condition)	It may have a small reservoir capacity because the proposed dam axis is located at the narrow section of the river.	It may be no problem of rock strength for the dam foundation. The right bank is the thin ridge, it may become easily the leakage line. Grouting or other countermeasures such as blanket method (covering with impervious materials).
Fezzou (4/4)	Alnif	Dam crest length: about 200m, Dam height: maximum 20m (for a geomorphic condition)	Dam axis is located in narrow gorge and its immediately upstream is so wide that adequate storage capacity is ensured. Upstream about several hundreds meters from the dam axis, left bank become low altitude. Therefore, It may need the auxiliary dam.	It may be no problem of rock strength for the dam foundation. Upstream about several hundreds meters from the dam axis, left bank become low altitude. Therefore, It may need the auxiliary dam. The left bank is the thin ridge, it may become easily the leakage line.
Tanguerfa	Ferkla Soufla	Dam crest length: about 300～400m Dam height: maximum 10m (for a geomorphic condition)	There is a large scale river (wadi) upstream of the reservoir area. The altitude of wadi is lower than the proposed dam crest. Therefore, the height of dam may be less than 10m. There are many small scale relief in the reservoir area, so it have to be removed to avoid uneven strength or uneven settlement of the dam body either gravity or fill type dams. Upstream from the dam axis, left bank become low altitude. Therefore, it may need the auxiliary dam.	The both banks are like a peneplain, and it has a wide bed width at the dam axis. There is a large scale wadi upstream of the reservoir area. The altitude of wadi may be lower than the dam axis. To secure storage capacity of the reservoir, it may need the auxiliary dam around the reservoir. In case no auxiliary dam is constructed, the height of dam may be 10 m in maximum. Therefore it may be a regulating dam or recharge type dam site rather than a reservoir type dam site.

Note: Dam height: Distance between dam crest and the lowest point of existing riverbed surface, not from the lowest point of excavated foundation

Table B.6.2 Field Investigation Data on Khettaras located at Jorf - Hannabou Areas

No	Khettara		Coordination		Latitude			Longitude			Depth (m)
		Presence of water	X	Y	°	'	"	°	'	"	
1	Jdida	☐oui ■non ☐n'est pas sur	005 85 132	001 04 787	31	32	150	4	30	351	9.6
2	n.i.	☐oui ■non ☐n'est pas sur	005 85 234	001 04 418	31	31	950	4	30	791	
3	Bouya	☐oui ■non ☐n'est pas sur	005 84 465	001 04 472	31	31	986	4	30	642	
4	Tarbouya	☐oui ■non ☐n'est pas sur	005 83 966	001 04 251	31	31	869	4	30	958	
5	Zmitia	☐oui ■non ☐n'est pas sur	005 83 787	001 04 124	31	31	800	4	31	73	
6	El Hamria	☐oui ■non ☐n'est pas sur	005 83 696	001 04 107	31	31	792	4	31	130	
7	El Assria	☐oui ■non ☐n'est pas sur	005 83 611	001 03 704	31	31	574	4	31	184	
8	El Yayouia	☐oui ■non ☐n'est pas sur	005 82 504	001 03 557	31	31	500	4	31	837	
9	Charkia	☐oui ■non ☐n'est pas sur	005 83 359	001 03 582	31	31	509	4	31	347	
10	Diabia	☐oui ■non ☐n'est pas sur	005 82 486	001 02 917	31	31	153	4	31	900	
11	El Bahmouya	☐oui ■non ☐n'est pas sur	005 83 486	001 03 603	31	31	520	4	31	266	
12	Jdida	☐oui ■non ☐n'est pas sur	005 83 512	001 03 410	31	31	416	4	31	250	
13	Essadkia	☐oui ■non ☐n'est pas sur	005 83 830	001 01 672	31	30	474	4	31	59	
14	Lahloua	■oui ☐non ☐n'est pas sur	005 89 506	000 98 649	31	28	812	4	27	4910	17
15	Lambarkia	☐oui ■non ■n'est pas sur	005 89 954	000 98 542	31	28	501	4	27	2100	16.7
16	Issaouia	■oui ☐non ☐n'est pas sur	005 90 397	000 98 910	31	28	948	4	26	9270	17.5
17	Jdida koudia	☐oui ■non ☐n'est pas sur	005 88 404	000 99 850	31	29	467	4	28	1800	15.5
18	Kdima jorf	☐oui ■non ☐n'est pas sur	005 88 522	001 00 213	31	29	661	4	28	1010	
19	Saidia	■oui ☐non ☐n'est pas sur	005 90 104	001 00 665	31	29	899	4	27	1020	18
20	Issaouia	■oui ☐non ☐n'est pas sur	005 90 264	001 00 796	31	29	969	4	27	0	17.5

No	Khettara	Presence of water	Coordination		Latitude			Longitude			Depth (m)
			X	Y	°	'	"	°	'	"	
21	n.i.	■oui □non □n'est pas sur	005 89 633	001 00 807	31	29	978	4	27	3990	18.5
22	Lambarkia	■oui □non □n'est pas sur	005 89 326	001 00 834	31	29	994	4	27	5900	17.5
23	Boushibia	□oui ■non □n'est pas sur	005 87 671	001 00 968	31	30	74	4	28	6370	16
24	El Ouria	□oui ■non □n'est pas sur	005 87 948	001 01 568	31	30	399	4	28	459	14
25	Idrissia	□oui ■non □n'est pas sur	005 86 804	001 01 611	31	30	428	4	29	181	
26	n.i.	□oui ■non □n'est pas sur	005 85 536	001 01 951	31	30	618	4	29	978	
27	Issmailia	□oui ■non □n'est pas sur	005 85 008	001 02 046	31	30	670	4	30	311	
28	Ezzarga	□oui □non □n'est pas sur	005 87 041	001 00 739	31	29	954	4	29	36	
29	El Baghdadia	□oui ■non □n'est pas sur	005 86 823	001 01 434	31	30	331	4	29	170	18
30	Lakbira	□oui □non ■n'est pas sur	005 87 763	001 01 713	31	30	477	4	28	575	
31	Labrikia	□oui ■non □n'est pas sur	005 89 268	001 01 428	31	30	816	4	27	626	17
32	El Mostafia	■oui □non □n'est pas sur	005 99 444	000 91 516	31	25	65	4	21	261	14.6
33	El Alouia	□oui ■non □n'est pas sur	005 96 226	000 92 965	31	25	701	4	23	283	14
34	Grinia	□oui □non ■n'est pas sur	005 95 322	000 93 306	31	25	888	4	23	537	15.5
35	Mdinia	□oui ■non □n'est pas sur	005 95 778	000 93 454	31	25	969	4	23	562	
36	Kdima	■oui □non □n'est pas sur	005 95 500	000 93 821	31	26	169	4	23	737	17
37	Oustania	□oui □non ■n'est pas sur	005 95 351	000 93 993	31	26	263	4	23	329	16.5
38	Fougania	■oui □non □n'est pas sur	005 95 414	000 94 269	31	26	412	4	23	790	16.5
39	n.i.	■oui □non □n'est pas sur	005 95 565	000 94 395	31	26	481	4	23	693	12.5
40	n.i.	■oui □non □n'est pas sur	005 96 485	000 94 541	31	26	553	4	23	111	15.6

No	Khettara	Presence of water	Coordination		Latitude			Longitude			Depth (m)
			X	Y	°	'	"	°	'	"	
41	Barhoumia	☐oui ☐non ■n'est pas sur	005 95 235	000 95 274	31	26	957	4	23	896	
42	Kdima Krair	■oui ☐non ☐n'est pas sur	005 94 815	000 95 176	31	26	906	4	24	158	7
43	Jdida Krair	■oui ☐non ☐n'est pas sur	005 94 584	000 95 063	31	26	345	4	24	307	17.3
44	Kdima bouya	■oui ☐non ☐n'est pas sur	005 93 833	000 95 877	31	27	290	4	24	737	17
45	Jdida bouya	■oui ☐non ☐n'est pas sur	005 93 837	000 96 067	31	27	303	4	24	770	17
46	El Glaglia	■oui ☐non ☐n'est pas sur	005 99 357	000 84 791	31	22	885	4	21	342	12
47	Hadj Allal	■oui ☐non ☐n'est pas sur	005 99 563	000 88 820	31	23	441	4	21	203	13
48	Cherchmia	■oui ☐non ☐n'est pas sur	005 99 717	000 88 837	31	23	481	4	21	103	14.5
49	Laksibia	☐oui ■non ☐n'est pas sur	005 99 619	000 89 925	31	24	38	4	21	162	13
50	Lihoudia	■oui ☐non ☐n'est pas sur	005 99 825	000 89 595	31	24	21	4	21	32	16
51	Kdima sifa	■oui ☐non ☐n'est pas sur	006 00 125	000 89 523	31	23	818	4	20	848	15.5
52	Ramlia	■oui ☐non ☐n'est pas sur	006 00 476	000 88 464	31	23	243	4	20	632	12.8
53	Jdida sifa	☐oui ■non ☐n'est pas sur	006 01 674	000 86 494	31	22	172	4	19	890	
54	Ighzer	■oui ☐non ☐n'est pas sur	006 01 585	000 86 257	31	22	44	4	19	947	9

Note: n.i. not identified at field

Figures

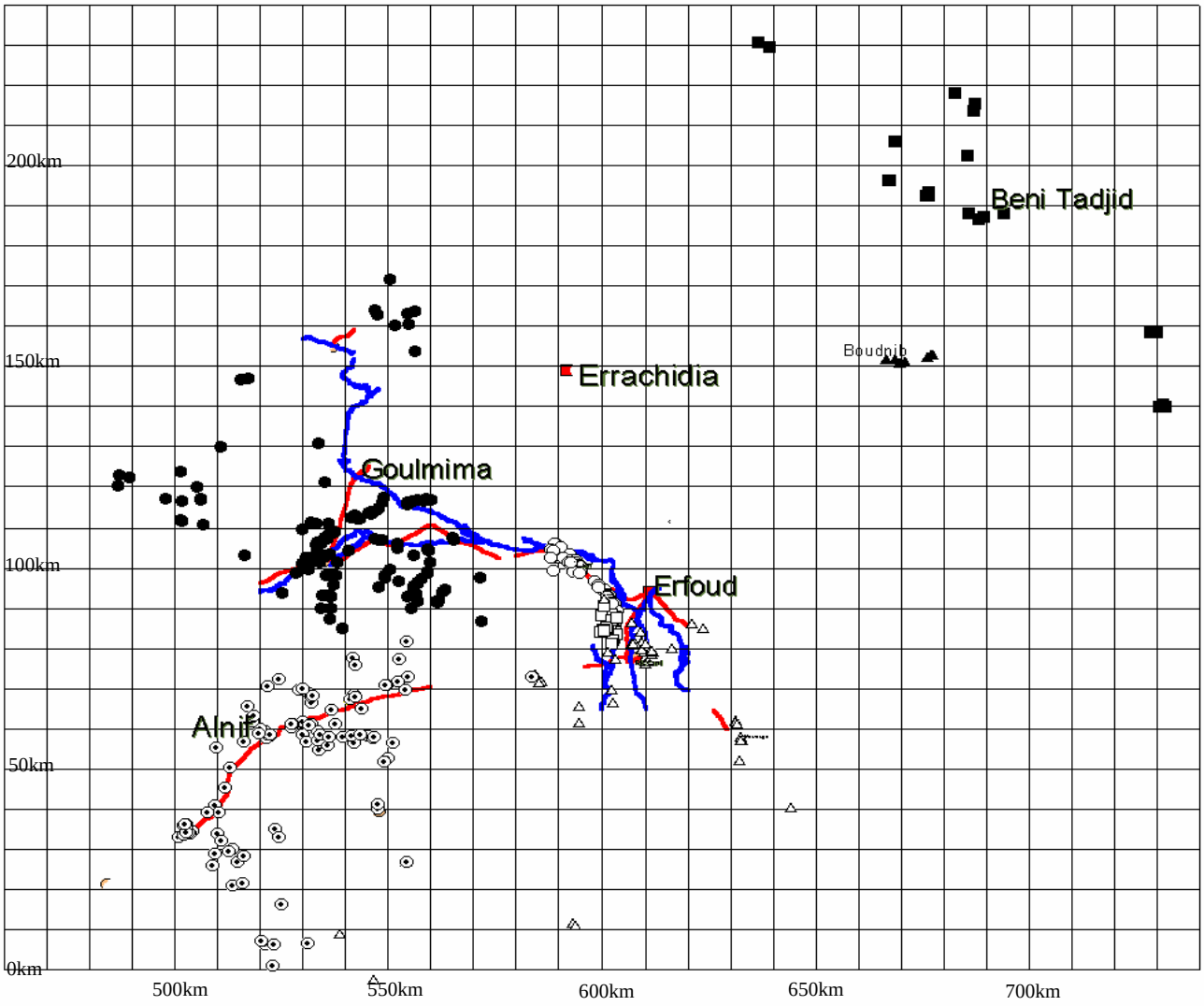

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Figure B.1.1

Distribution of Khettaras

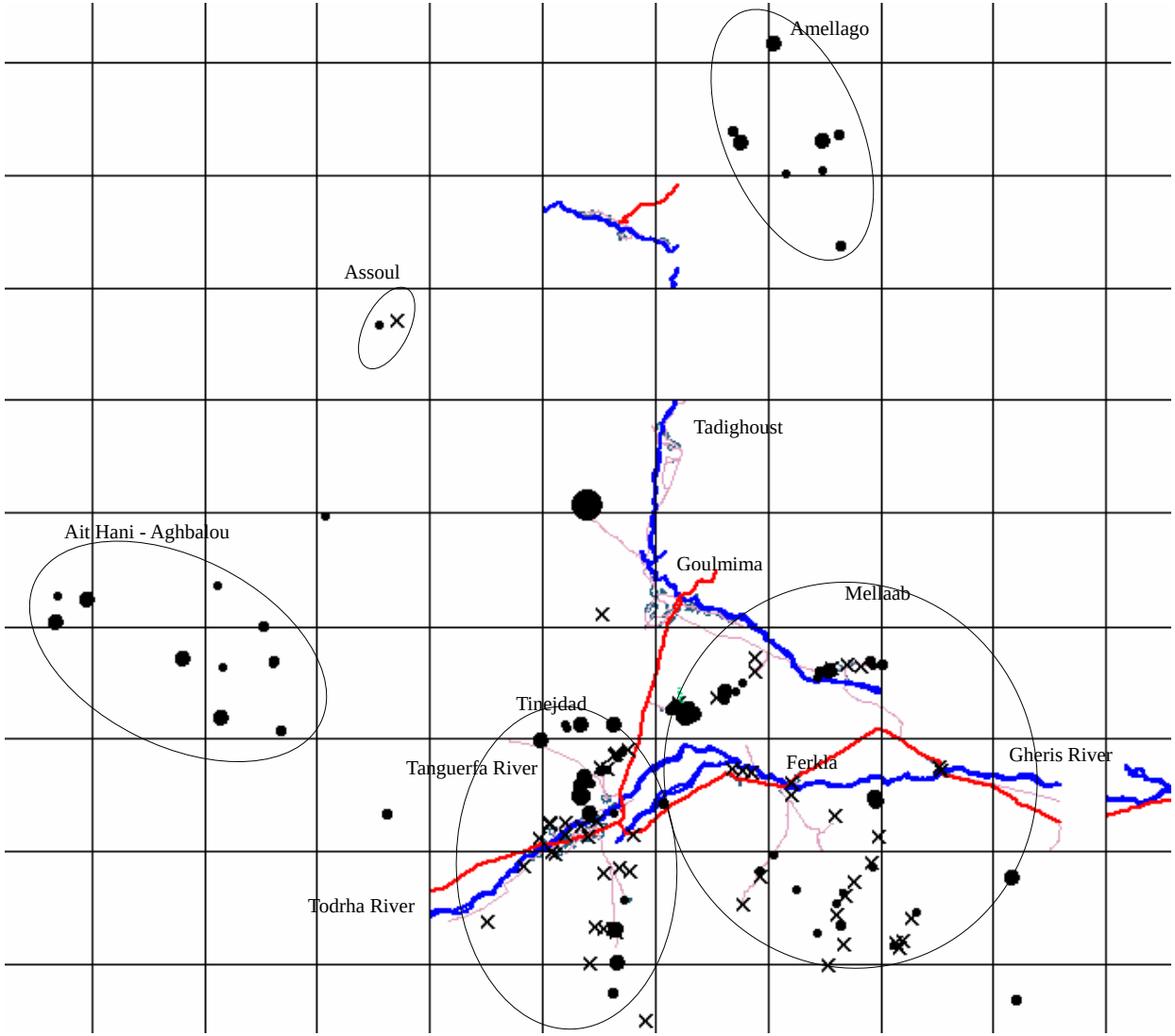

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Figure B.1.2

Khettara Discharge (Zone A)

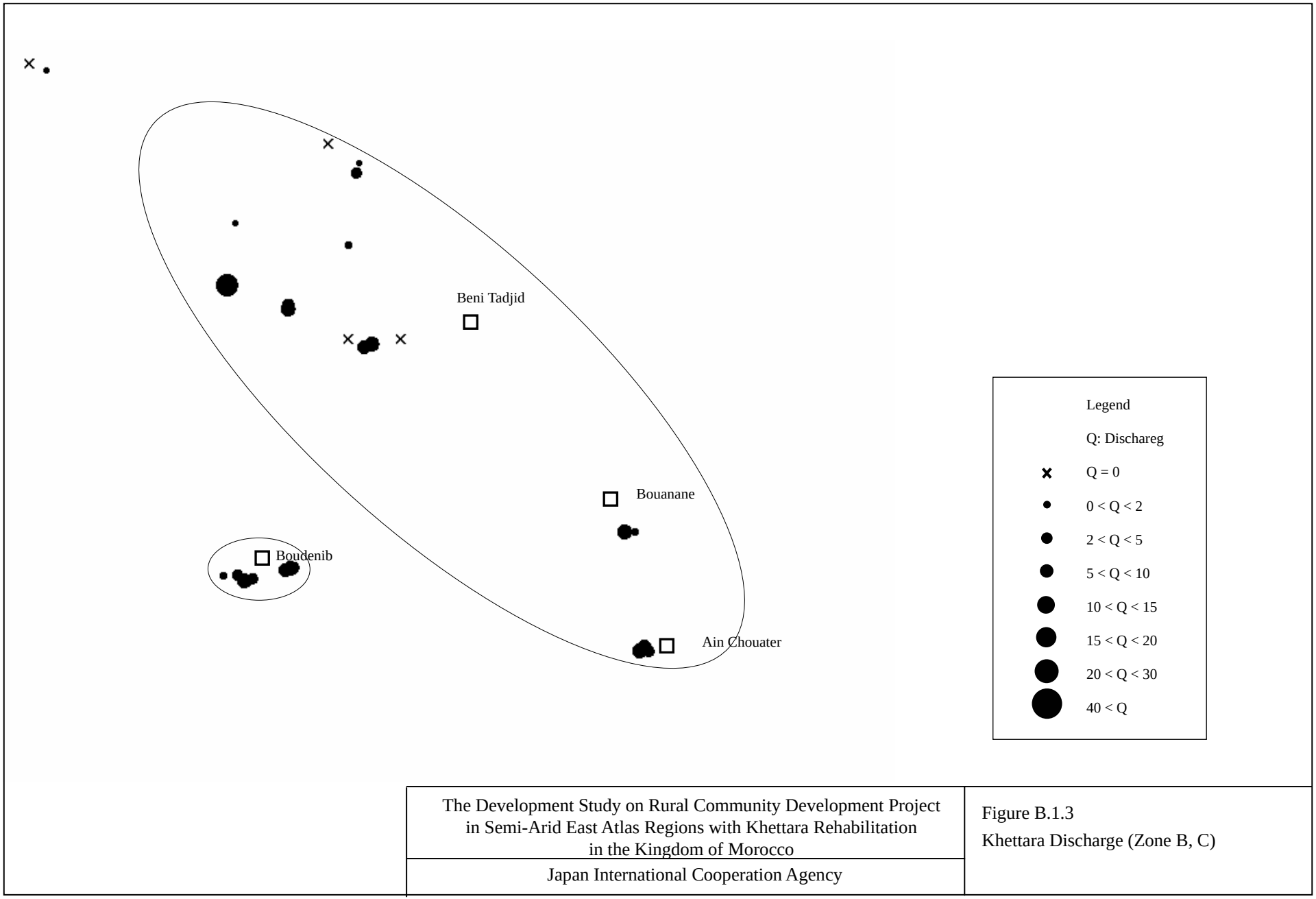

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Figure B.1.3
Khettara Discharge (Zone B, C)

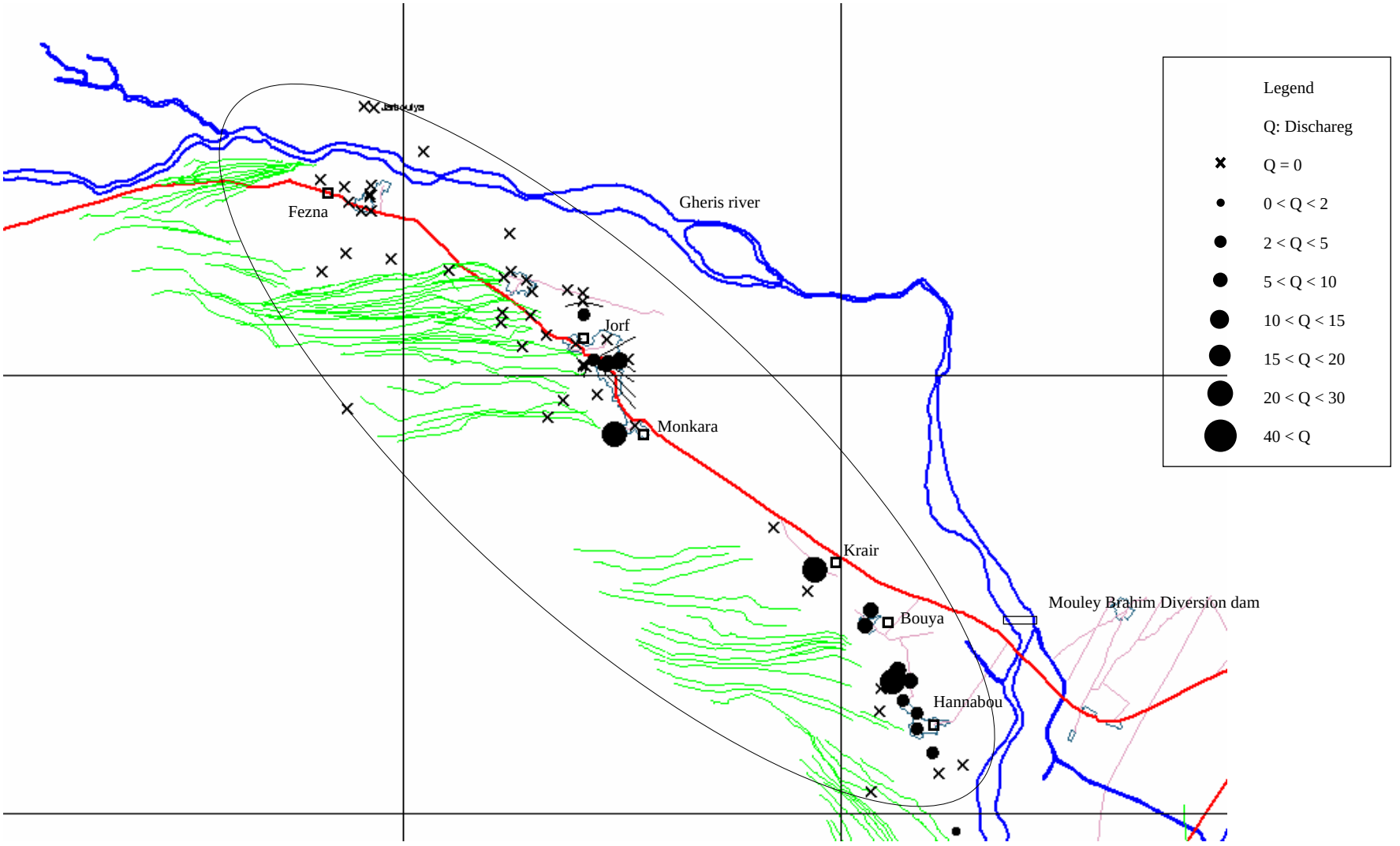

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Figure B.1.4
Khettara Discharge (Zone D)

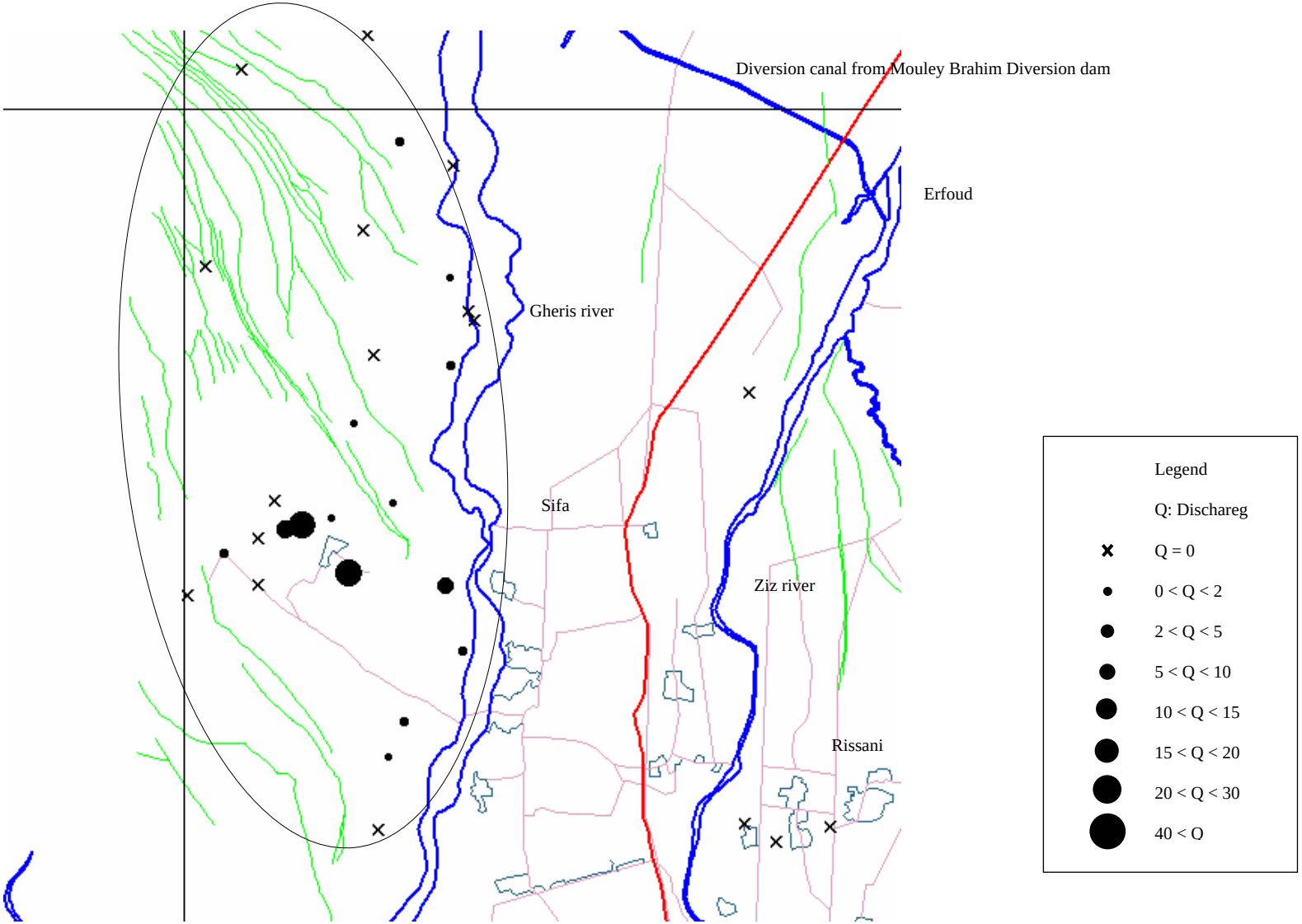

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Figure B.1.5
Khettara Discharge (Zone E)

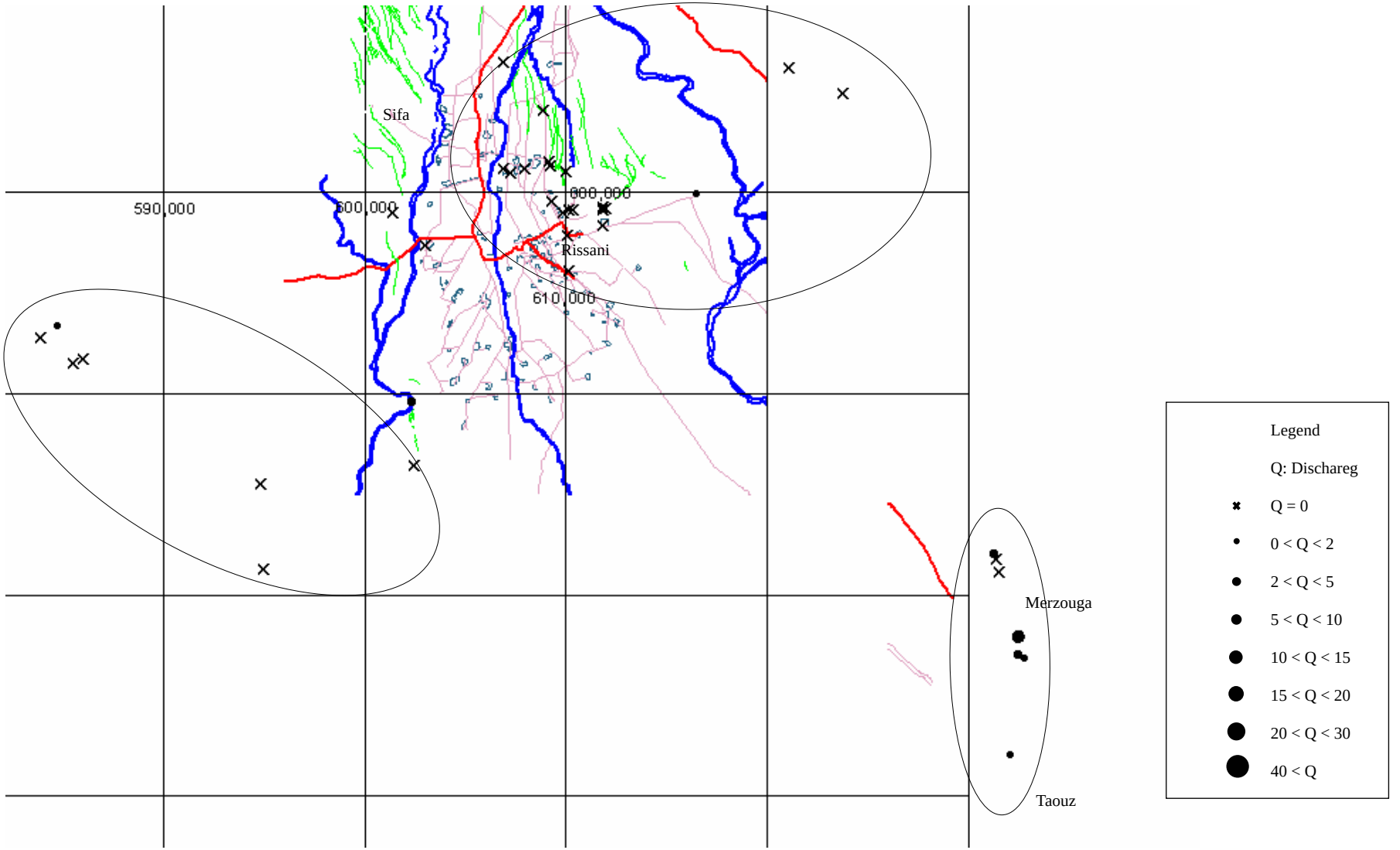

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Figure B.1.6
Khettara Discharge (Zone F)

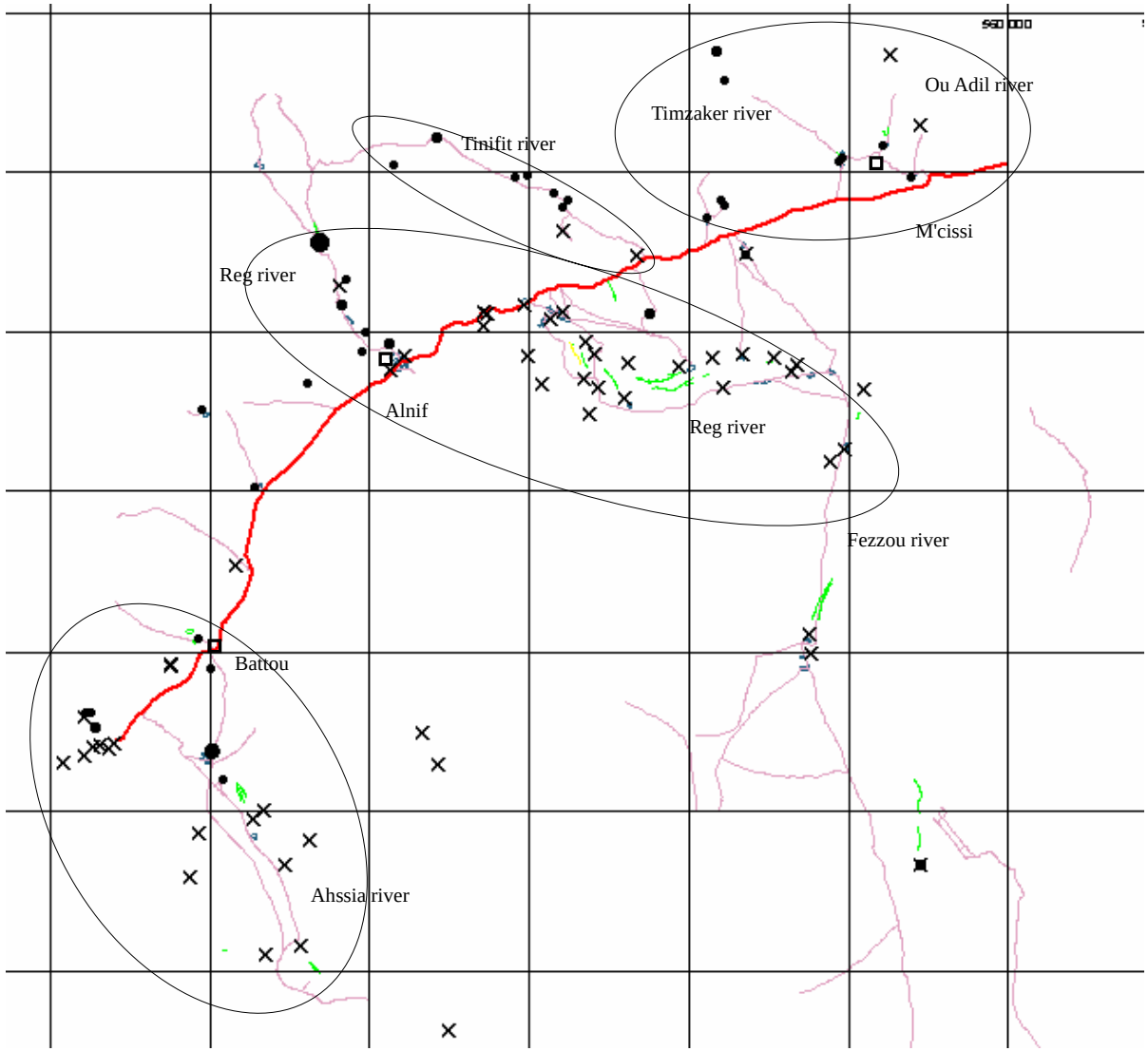

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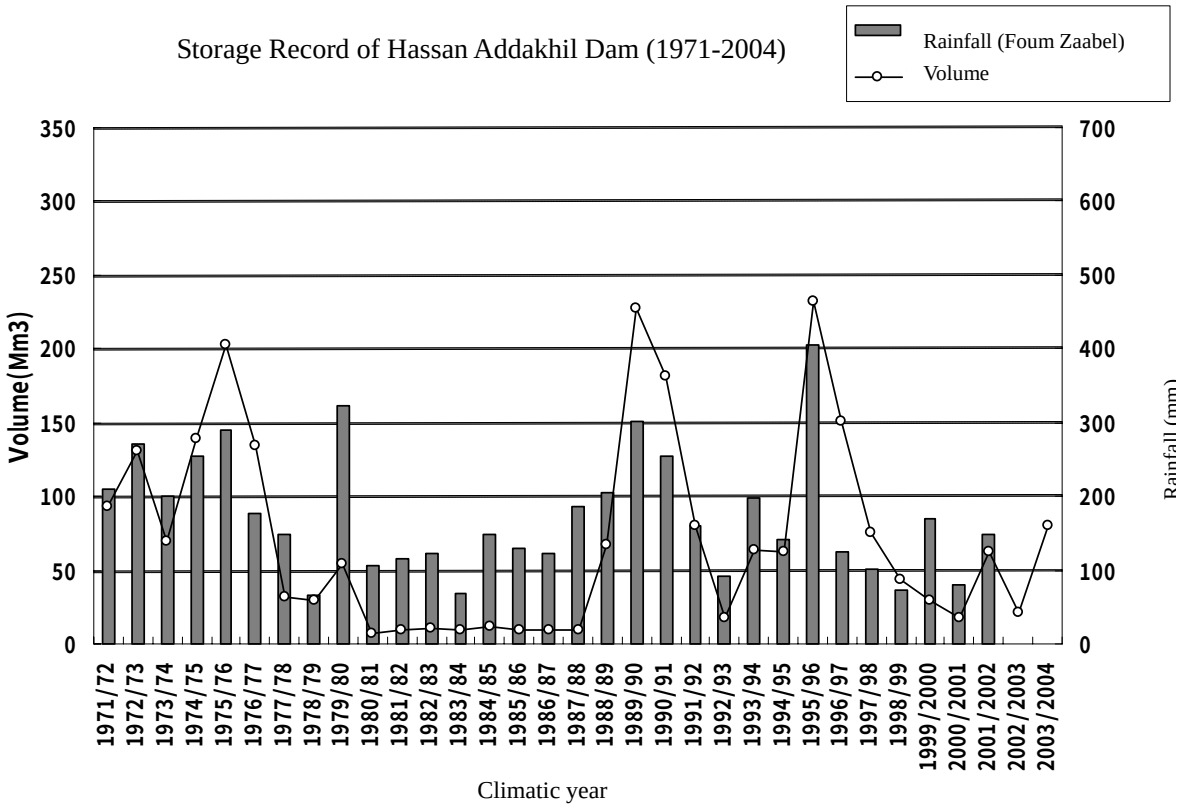
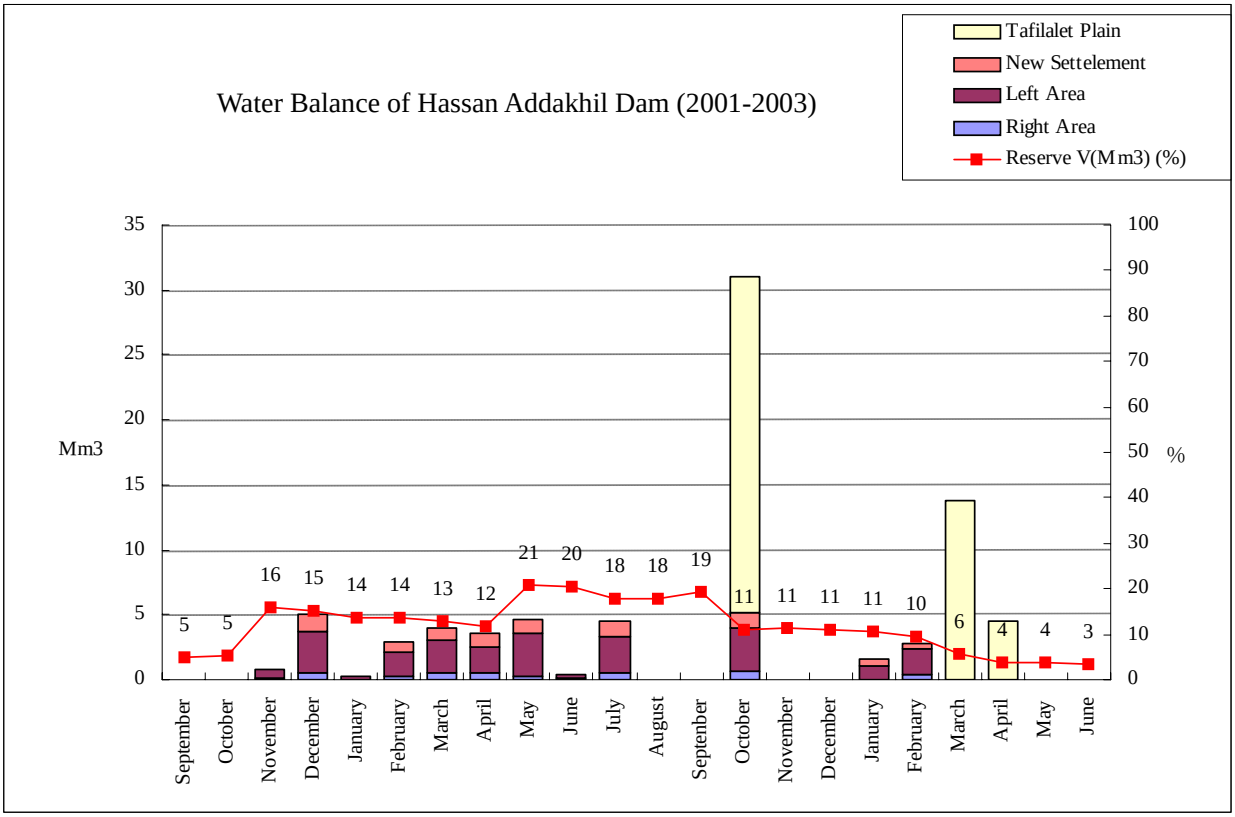
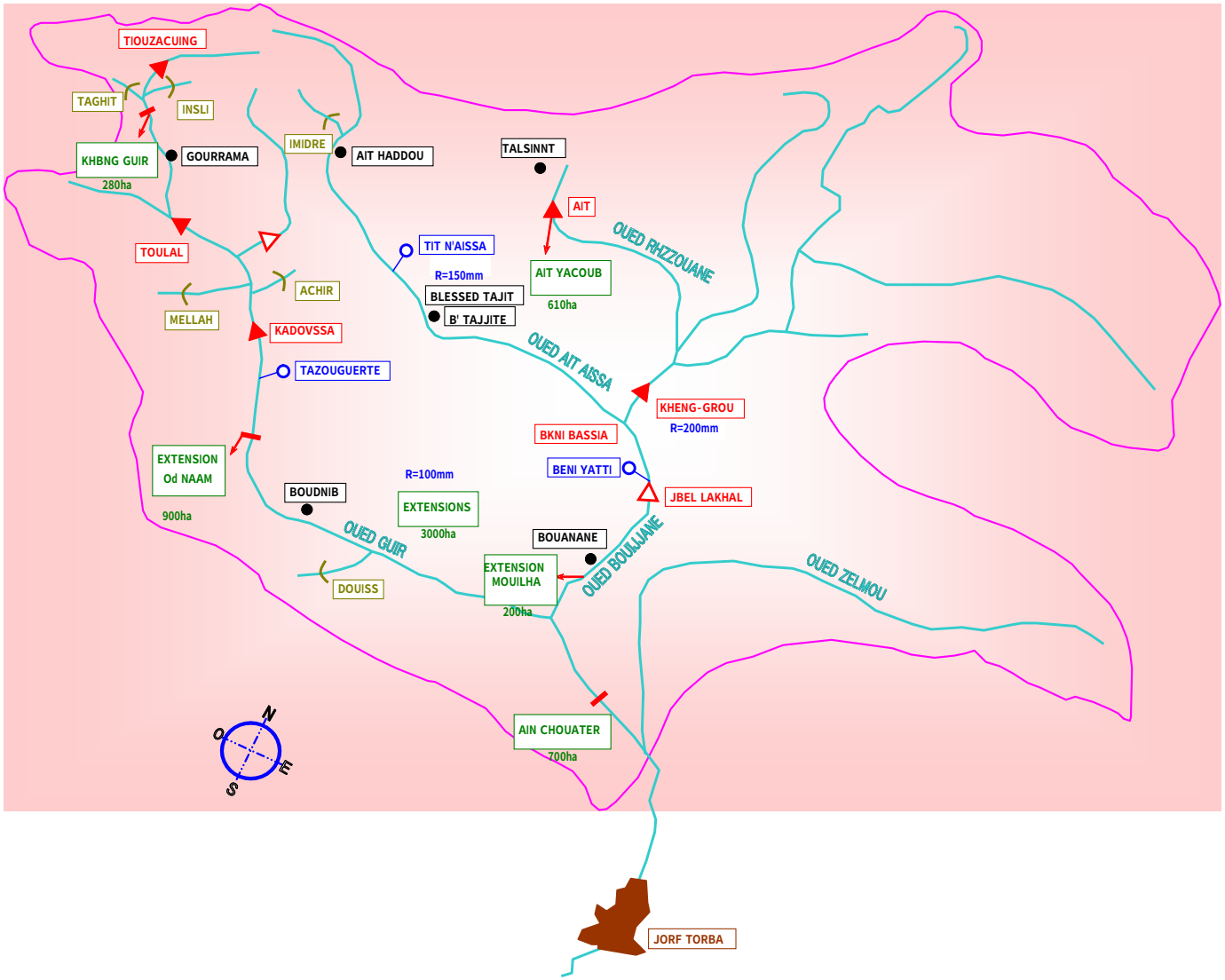
Figure B.1.7
Khettara Discharge (Zone G)





The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.2.1 Storage Records of Hassan Addakhil Dam
Japan International Cooperation Agency	



River Basins of Guir and Ait Aissa

Legend

- Diversion weir
- Diversion site (constructed)
- Diversion site (plaind)
- Small diversion weir
- Hydrologic station

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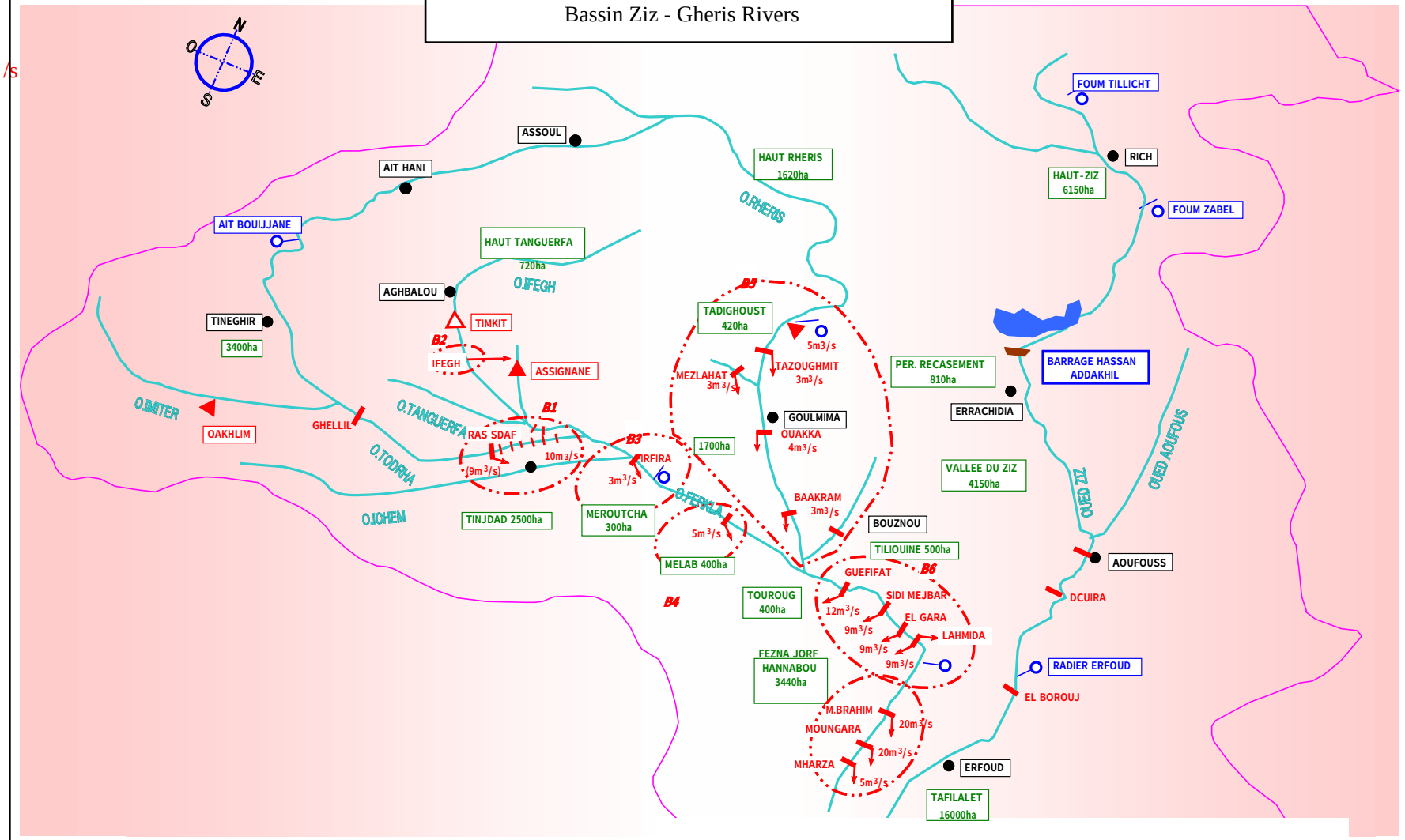
Figure B.2.2
Schematic Diagram (River Basins of Guir and Ait Aissa Rivers)



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Japan International Cooperation Agency

Figure B.2.3
Schematic Diagram (River Basins of Ziz and Gheris Rivers)

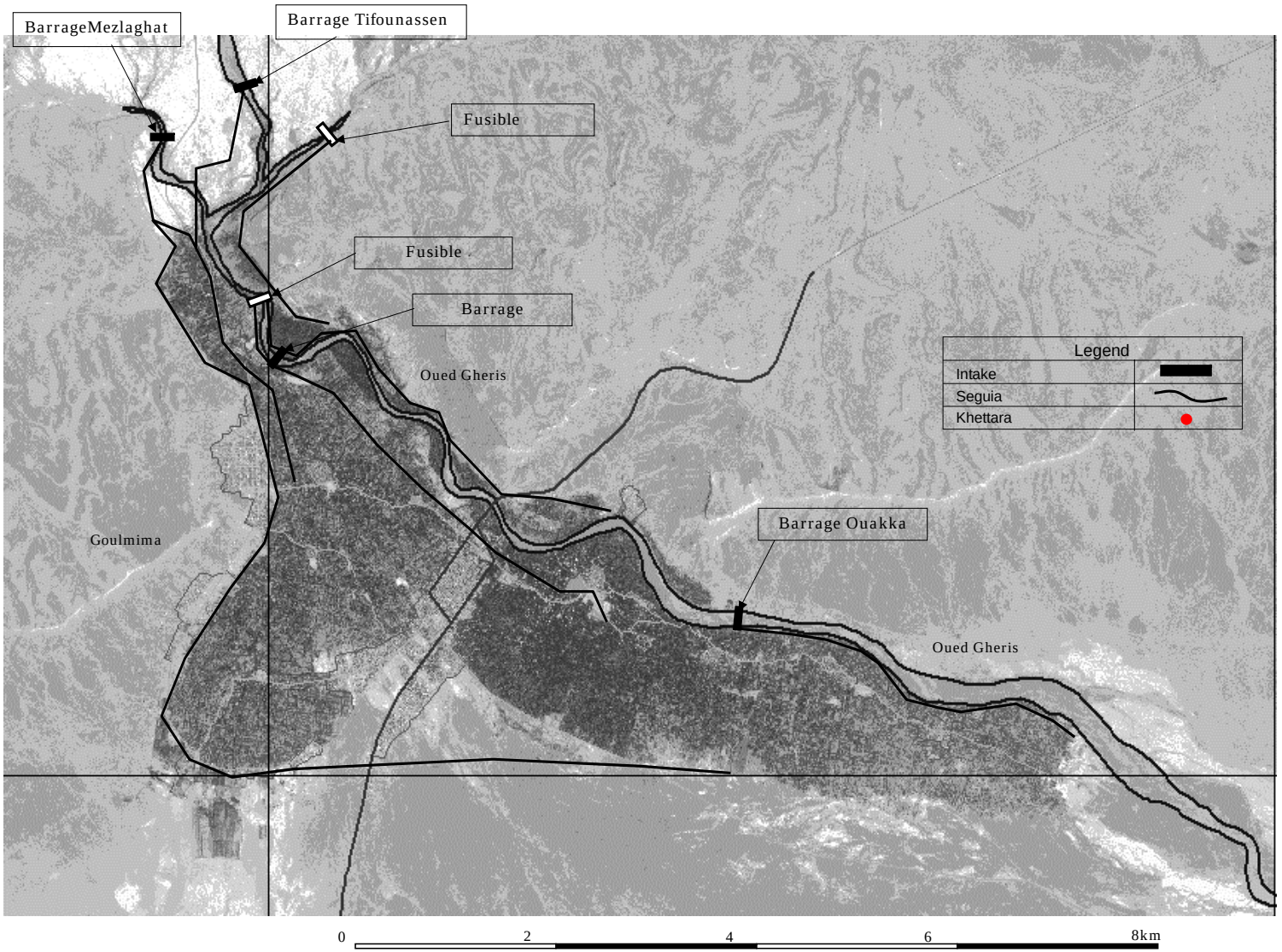

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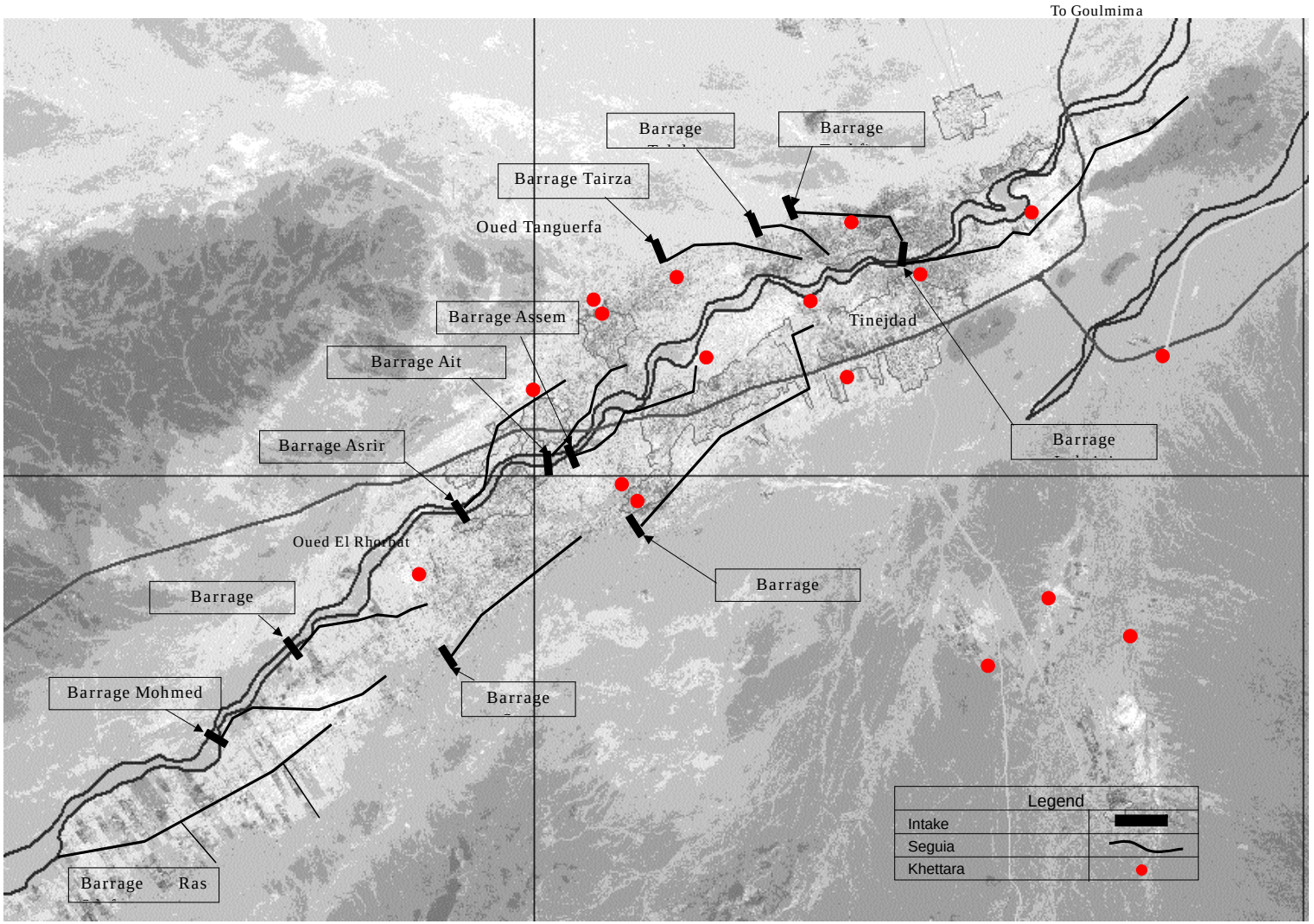
Figure B.2.4
Diversion System in Goulmima Area



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.2.5 Diversion System in Tinejdad Area
Japan International Cooperation Agency	

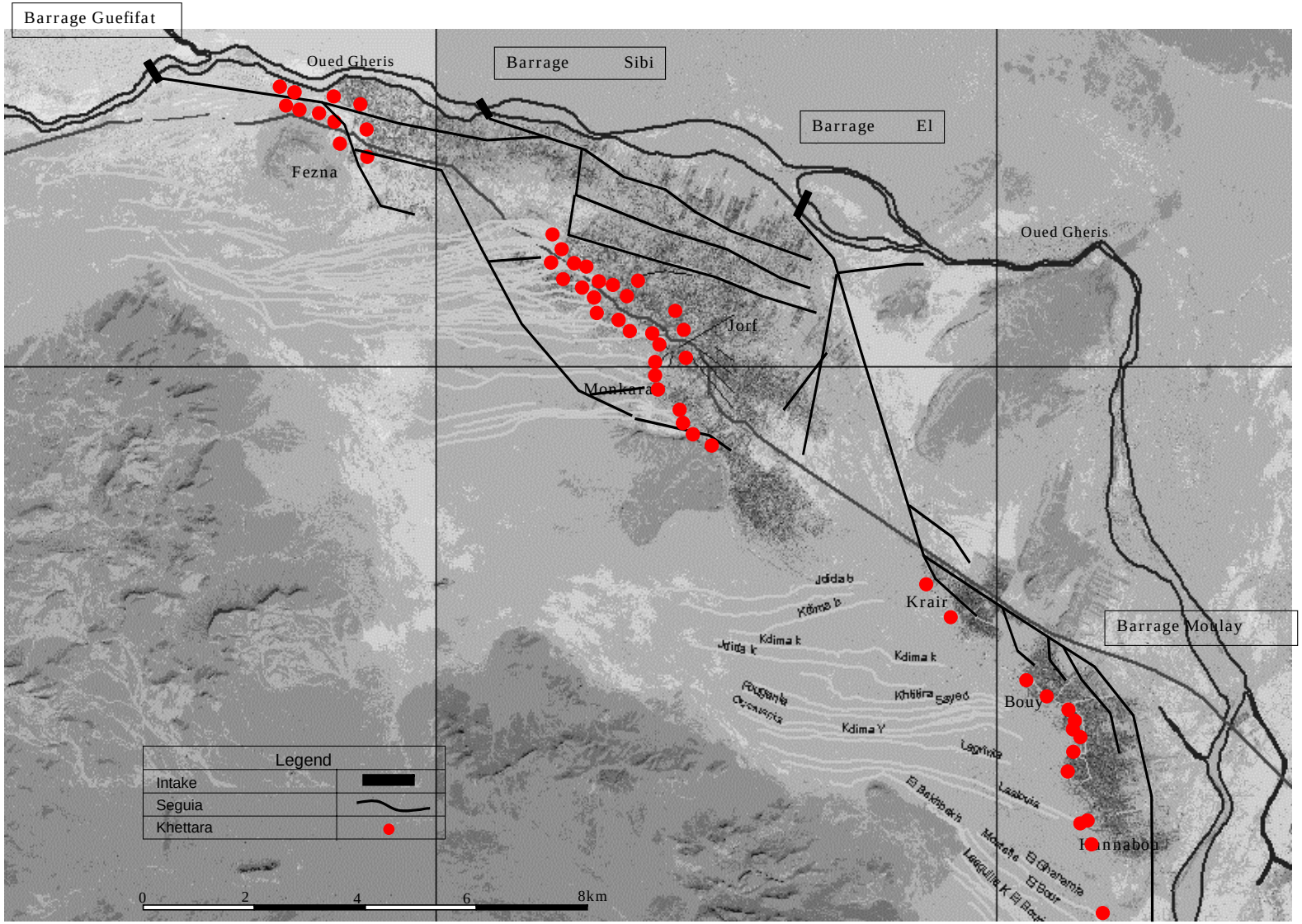


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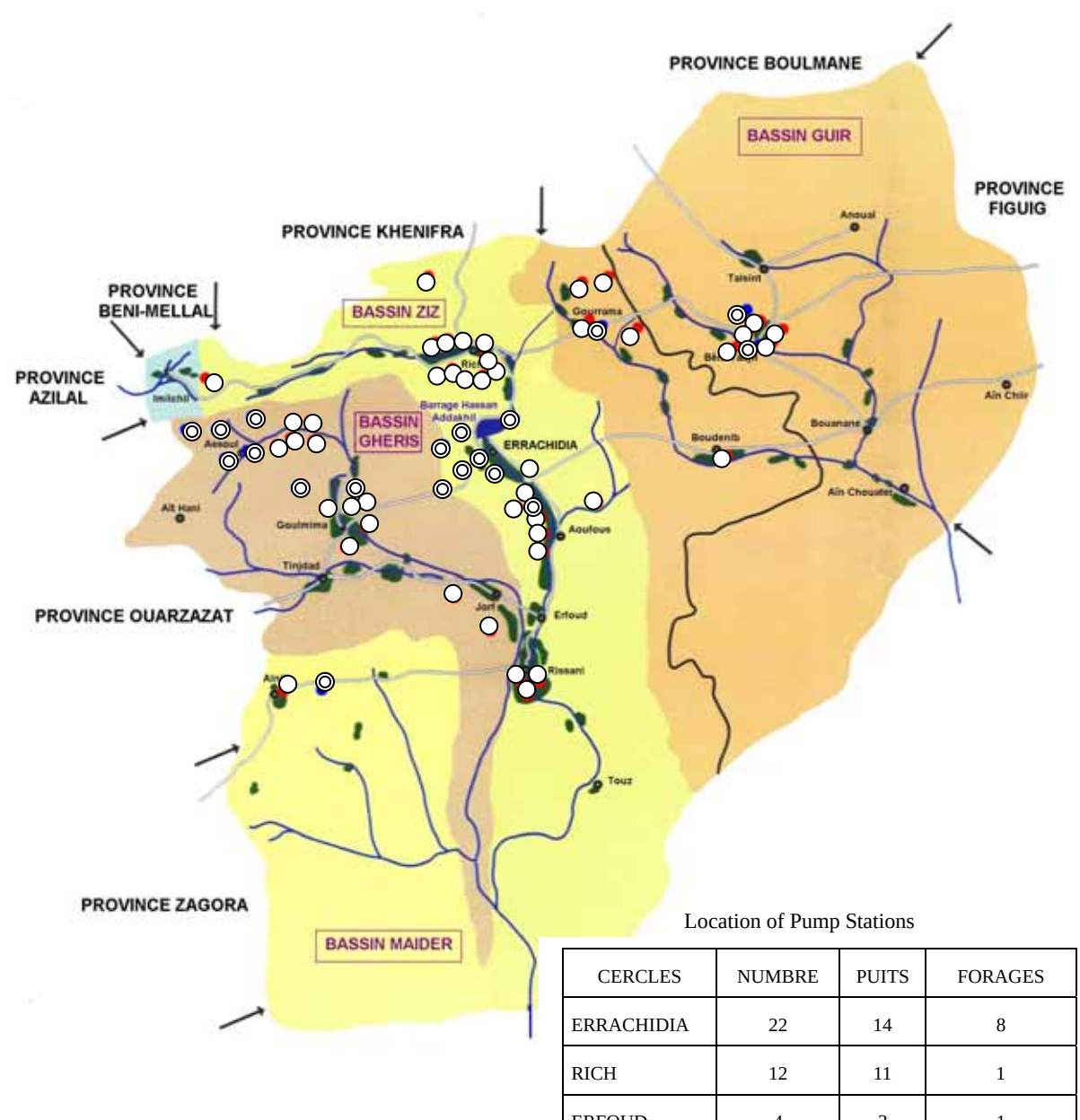
Figure B.2.6
Diversion System in Jorf Area



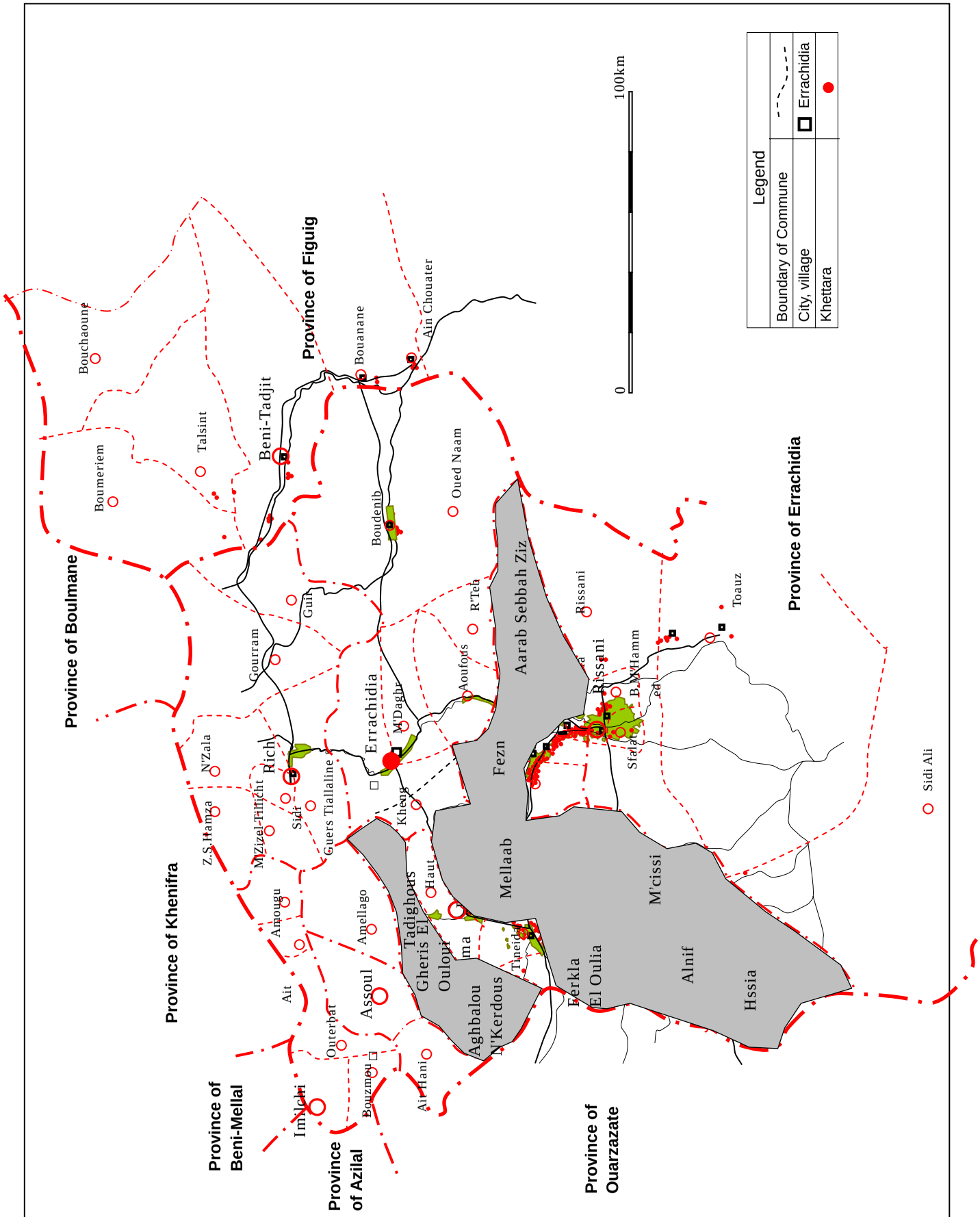
Location of Pump Stations

CERCLES	NUMBRE	PUITS	FORAGES
ERRACHIDIA	22	14	8
RICH	12	11	1
ERFOUD	4	3	1
RISSANI	3	3	0
GOULMIMA	7	5	2
ASSOUL	10	5	5
IMILCHIL	1	1	0
BENI TADJIT	7	6	1
TOTAL	66	48	18

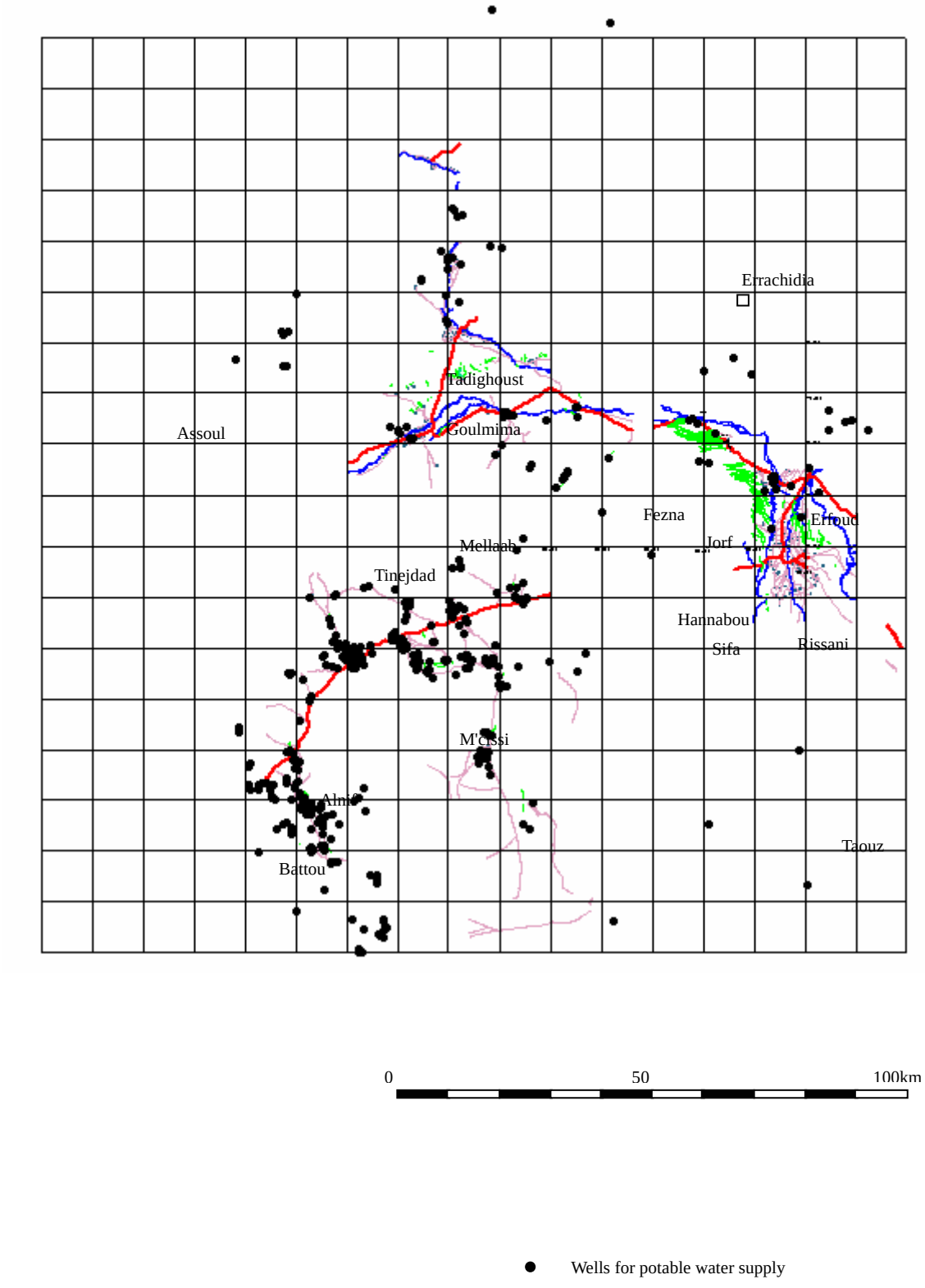
○ PUITS

◎ FORAGE

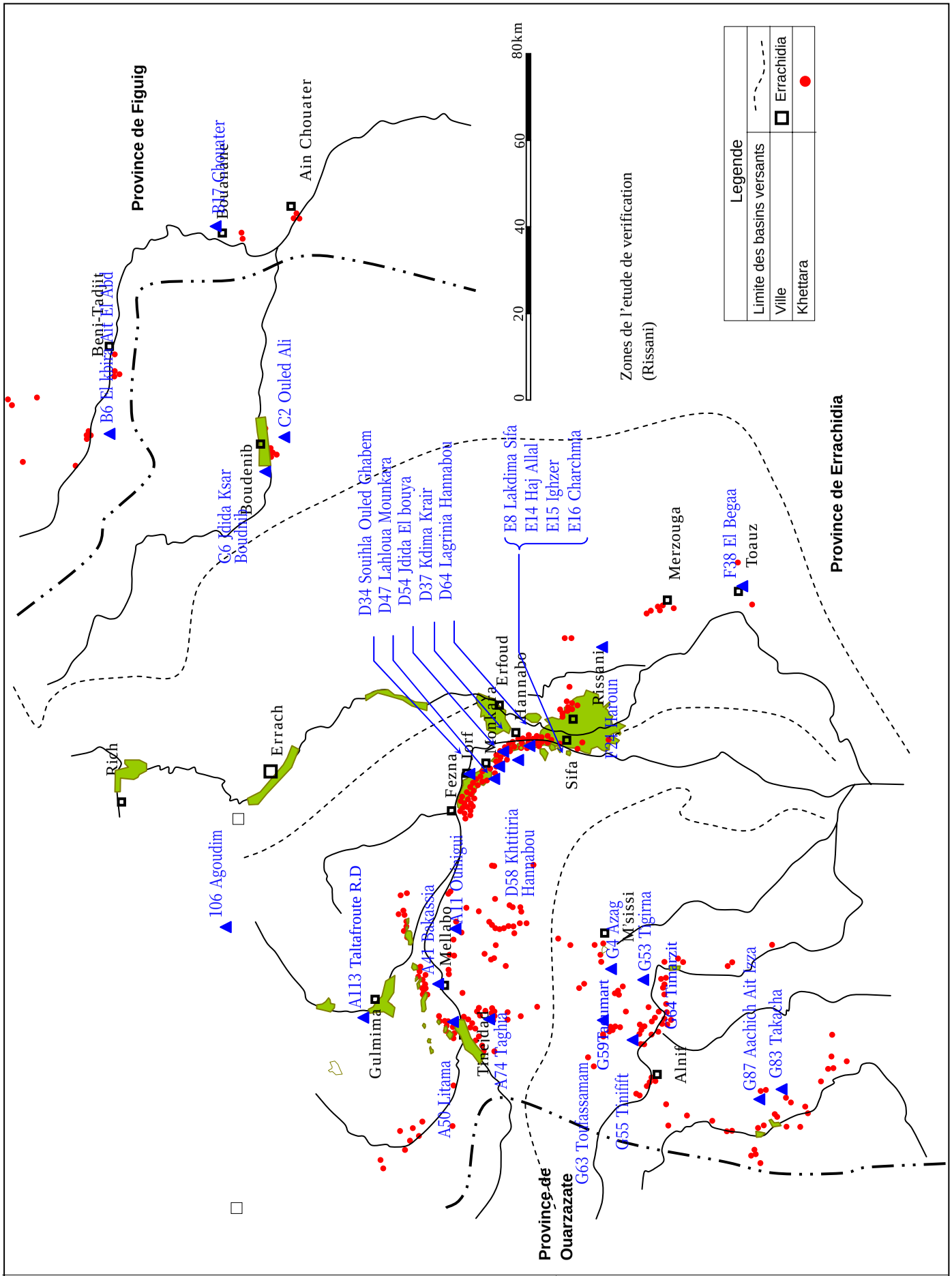
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.2.7 Communal Pump Stations constructed under PDRT
Japan International Cooperation Agency	



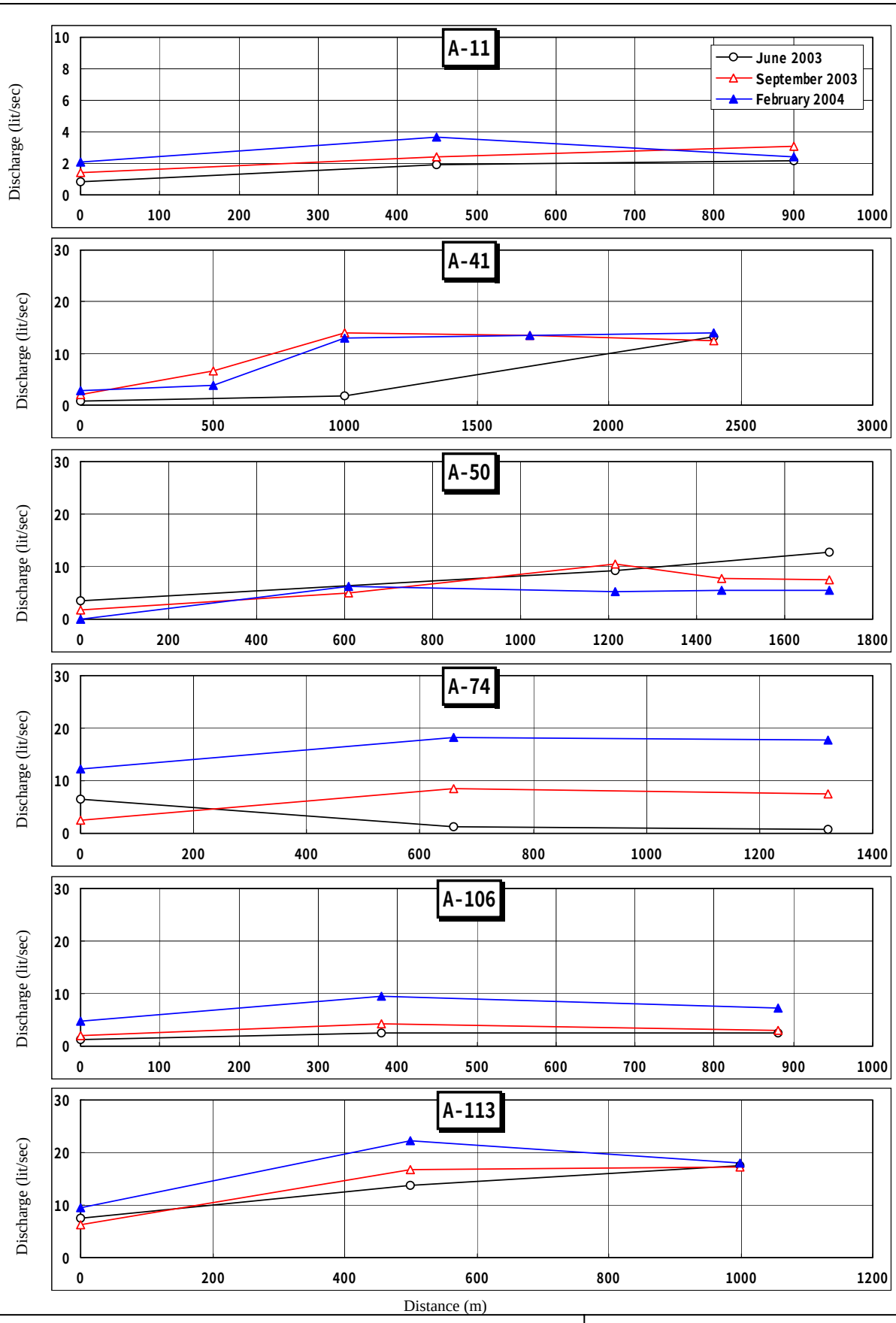
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.2.8 Study Area for Pump Location (Potable use)
Japan International Cooperation Agency	



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.2.9 Wells for Potable Water Use
Japan International Cooperation Agency	



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.3.1 Location of Khettaras for Discharge Measurement
Japan International Cooperation Agency	



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.3.2 (1) Discharge Measurement of 30 Khettaras
Japan International Cooperation Agency	

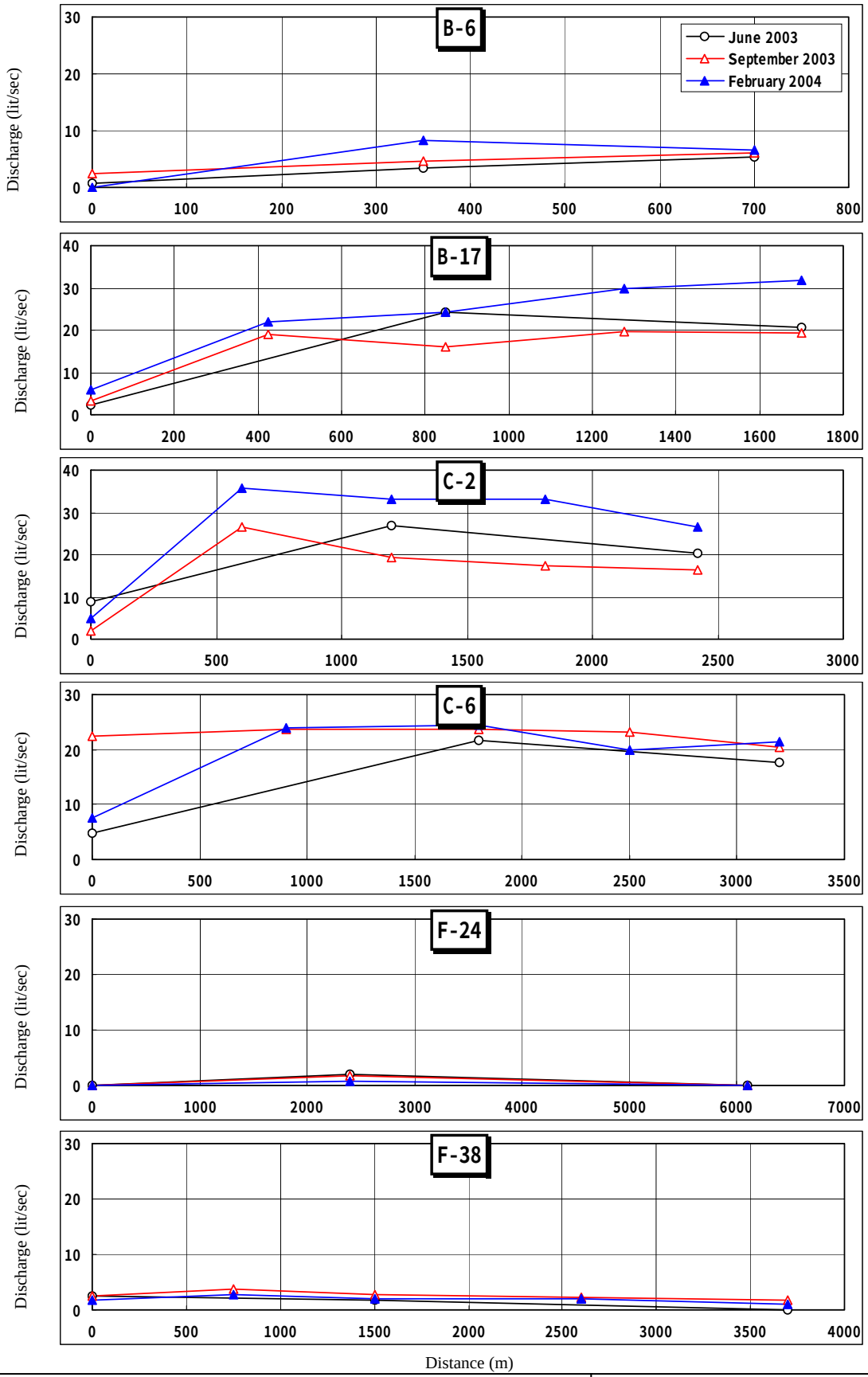


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Figure B.3.2 (2)
Discharge Measurement of 30 Khettaras

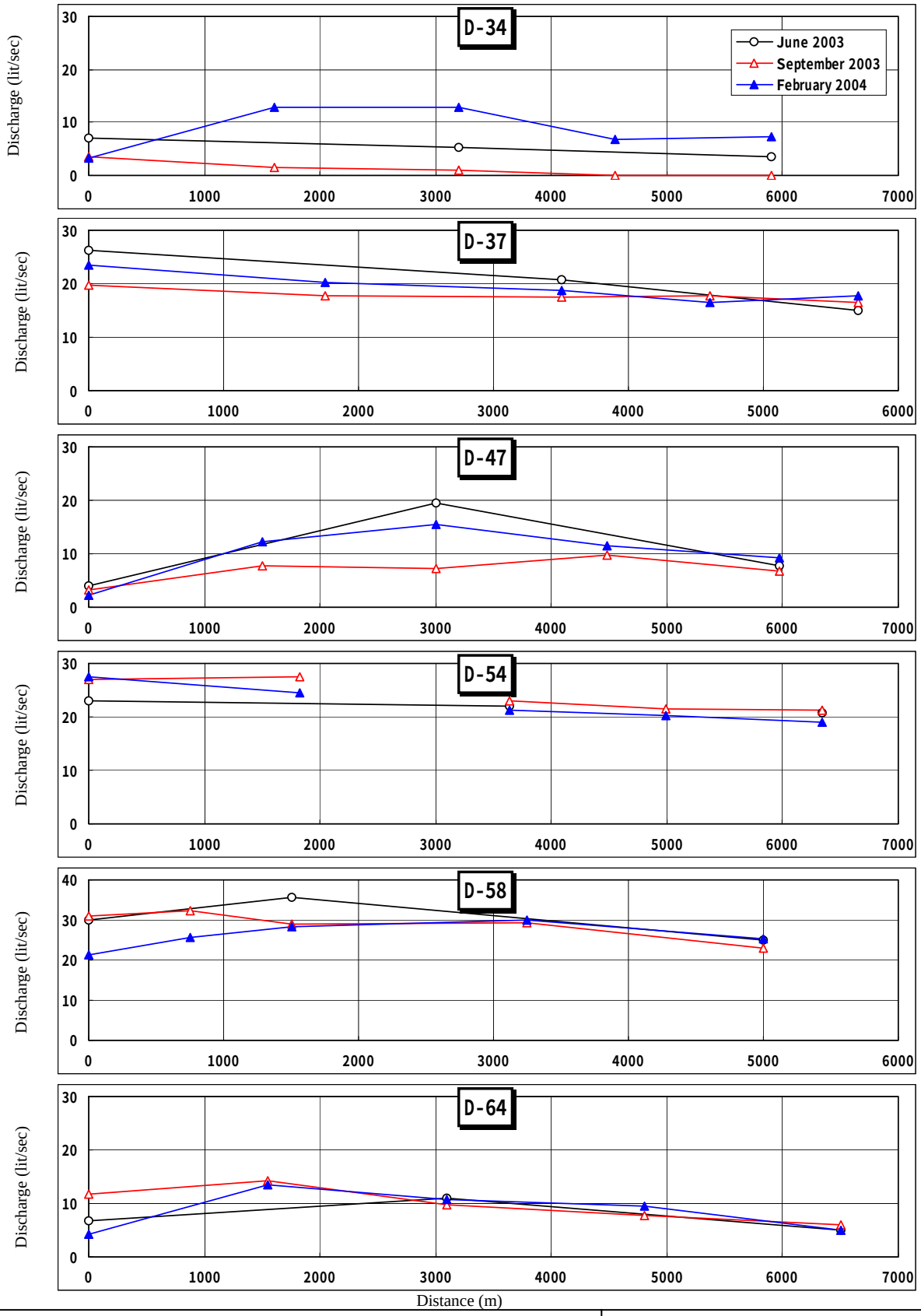

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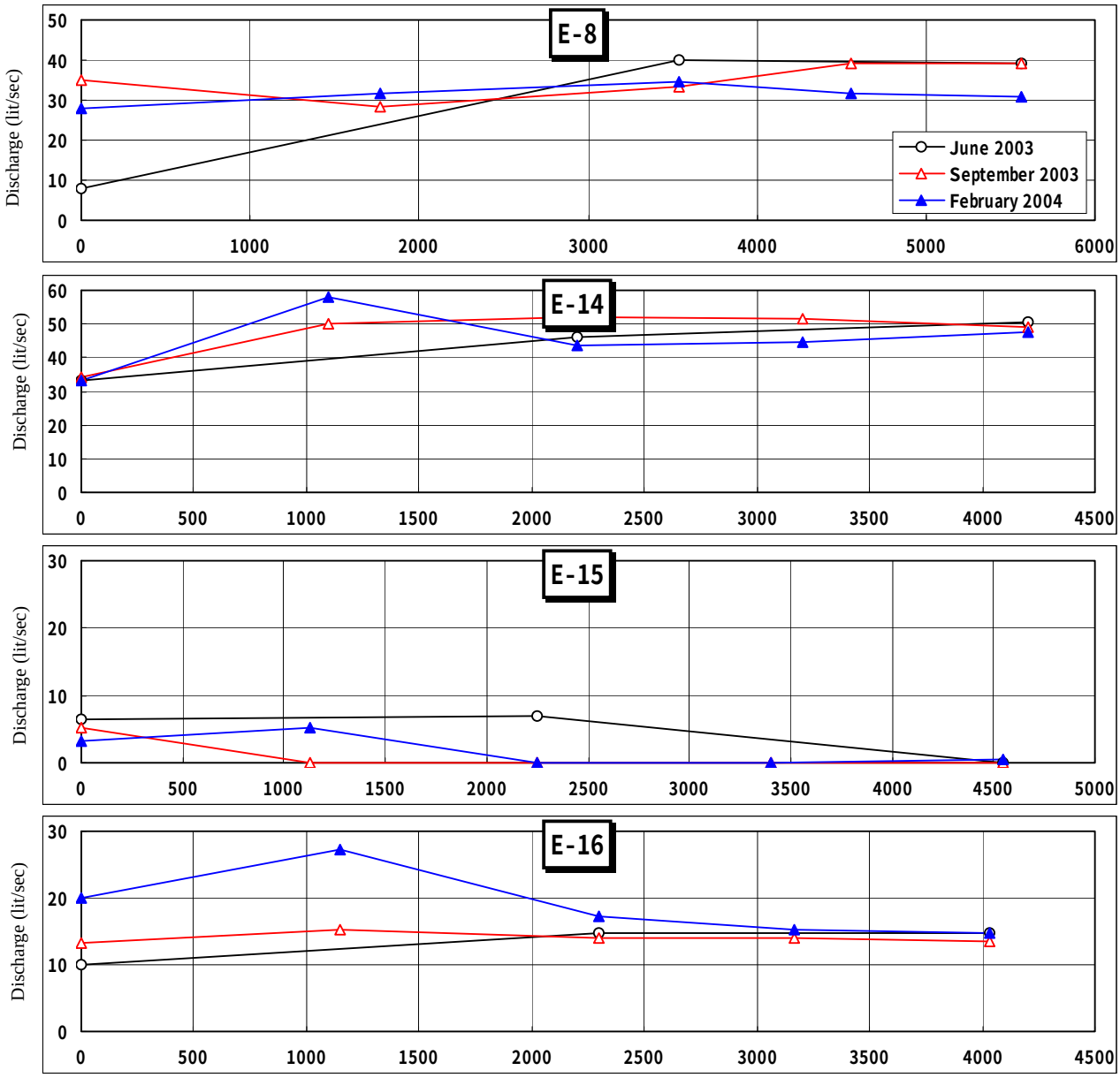
Figure B.3.2 (3)
Discharge Measurement of 30 Khettaras



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.3.2 (4) Discharge Measurement of 30 Khettaras
Japan International Cooperation Agency	

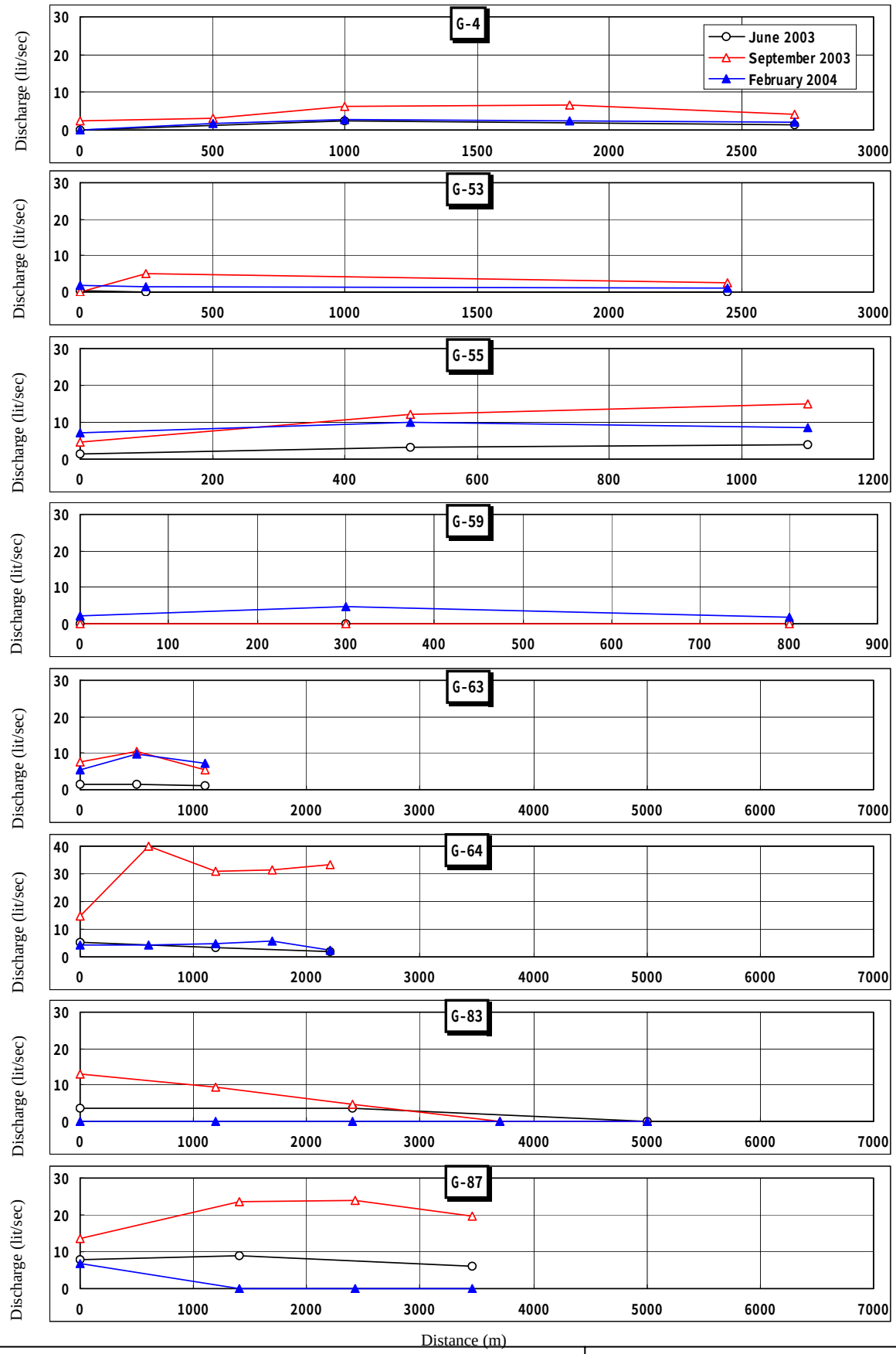


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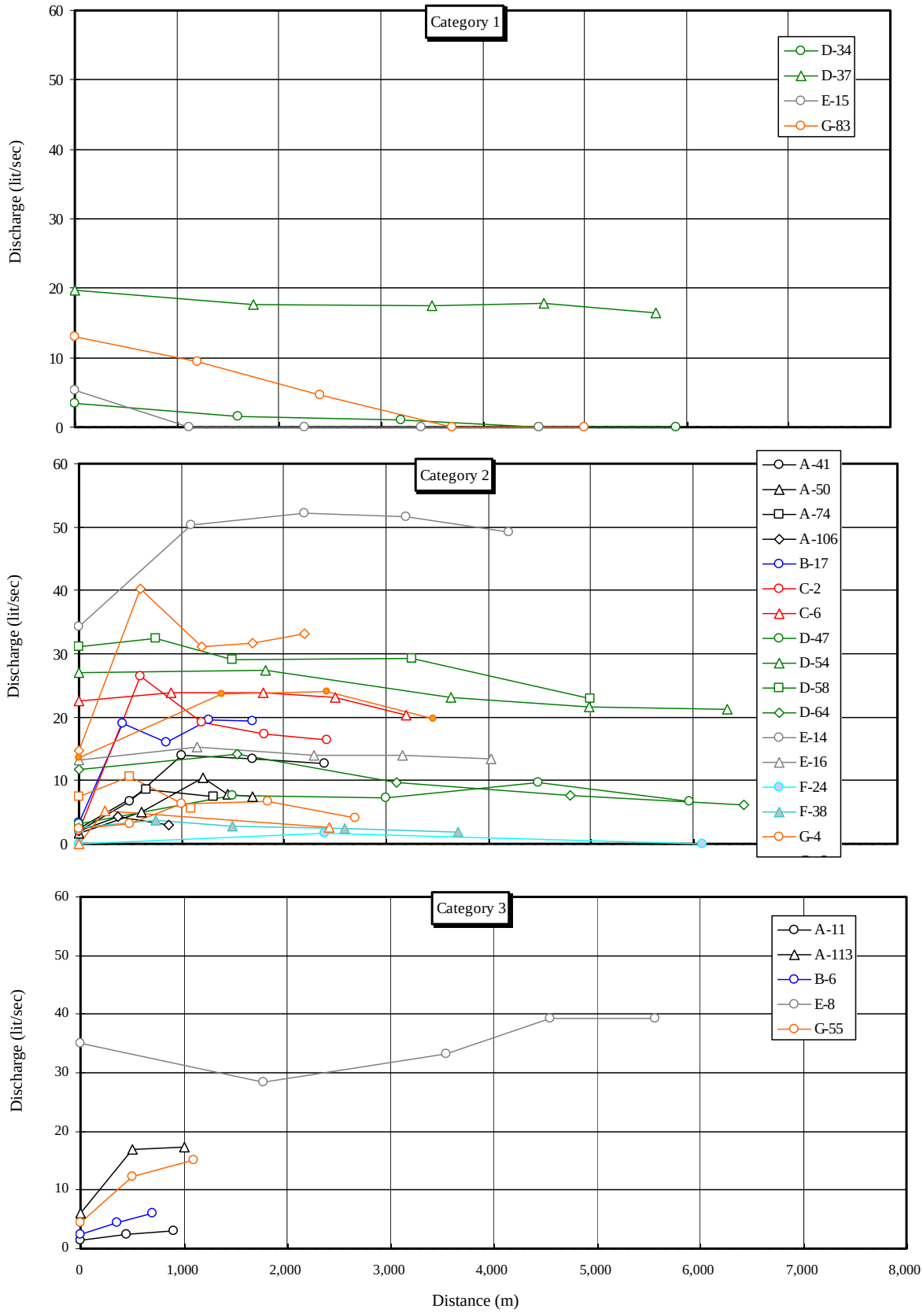
Figure B.3.2 (5)
Discharge Measurement of 30 Khettaras



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco

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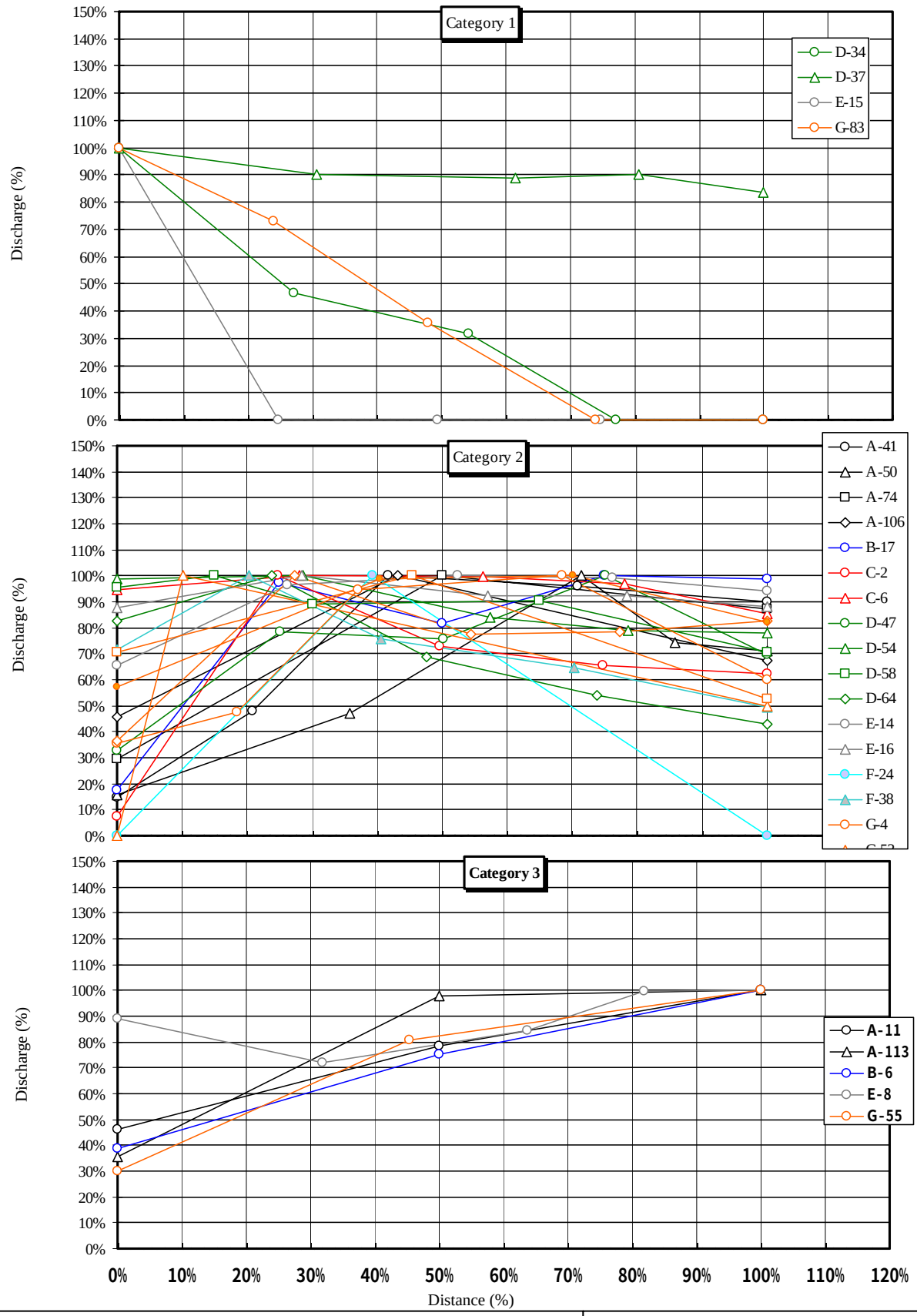
Figure B.3.3 (1)
Discharge Distribution along the Gallery



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco

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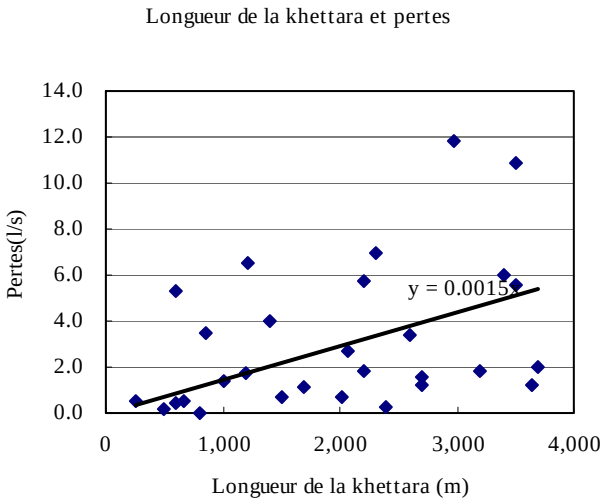
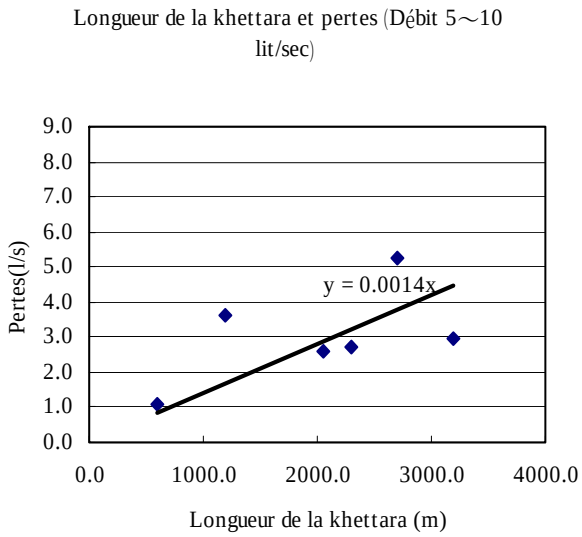
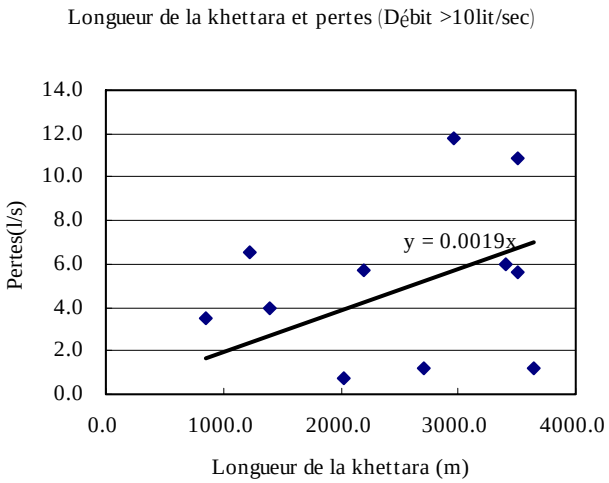
Figure B.3.3 (2)
Discharge Distribution along the Gallery

No.	Length (m)	Dischrage		Leakage (lit/sec)
		Upstream (lit/sec)	Downstream (lit/sec)	
A74	600	5.3	6.6	1.3
D34	3,200	1.8	7.0	5.2
D31	3,500	5.6	26.3	20.7
D54	3,640	1.2	23.1	21.9
F38	1,500	0.7	2.5	1.8
G53	250	0.5	0.5	0.0
G64	1,200	1.7	5.1	3.4
G83	2,400	0.3	3.7	3.4
A74	660	0.5	1.3	0.8
D34	2,700	1.6	5.2	3.6
D31	2,200	5.7	20.7	15.0
D54	2,700	1.2	21.9	20.7
F38	2,200	1.8	1.8	0.0
G53	800	0.0	0.0	0.0
G64	1000	1.4	3.4	2.0
G83	2,600	3.4	3.4	0.0
A106	500	0.2	2.6	2.4
B17	850	3.5	24.2	20.7
C2	1,220	6.5	26.9	20.4
C6	1,400	4.0	21.6	17.6
D47	2,970	11.8	19.6	7.8
D58	3,500	10.9	35.8	24.9
D64	3,400	6.0	11.0	5.0
E15	2,300	7.0	7.0	0.0
E8	2,024	0.7	40.0	39.3
F24	3,700	2.0	2.0	0.0
G4	1,700	1.1	2.6	1.5
G63	600	0.4	1.4	1.0
G87	2,060	2.7	8.9	6.2







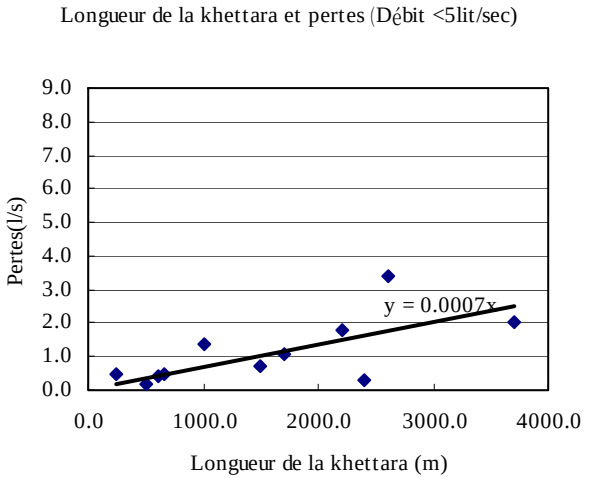


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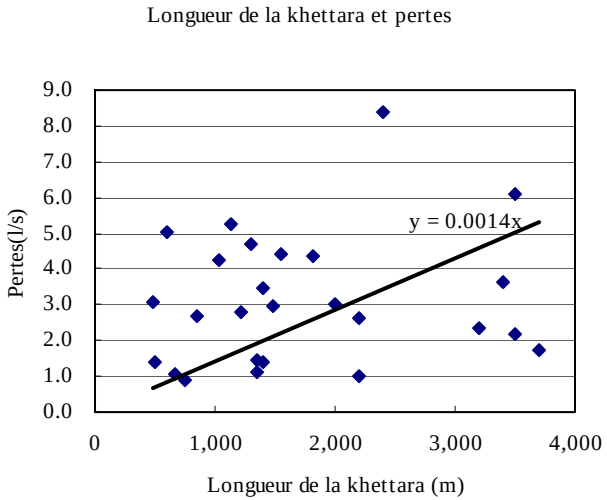
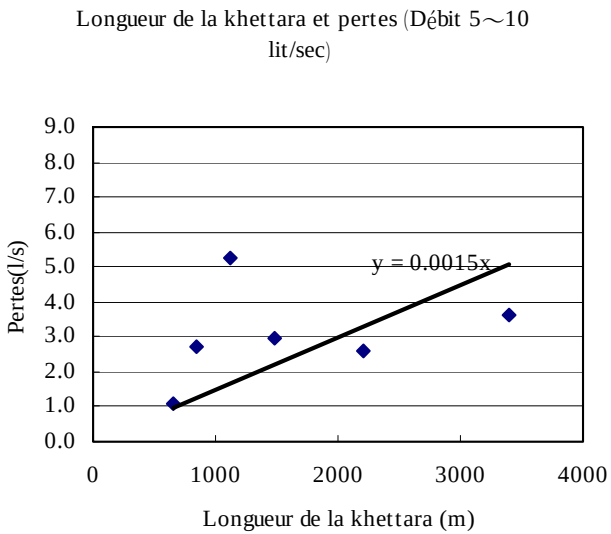
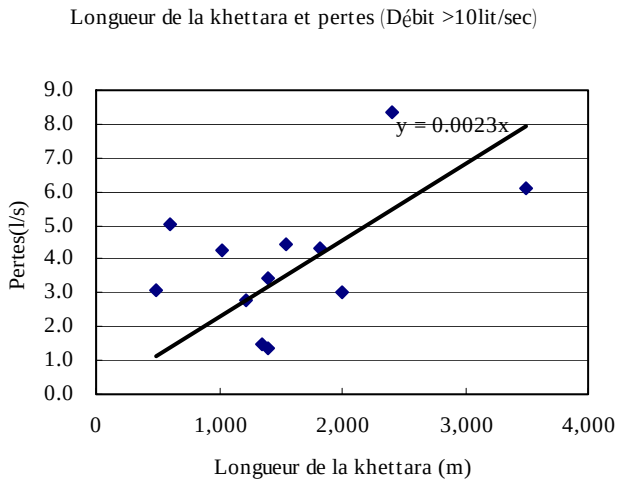
Figure B.3.4 (1)
Leakage Loss (Dischrage: June 2003)

No.	Length (m)	Dischrage		Leakage (lit/sec)
		Upstream (lit/sec)	Downstream (lit/sec)	
A41	1,400	1.4	14.0	12.6
A50	484	3.1	10.5	7.5
A74	660	1.1	8.5	7.4
A106	500	1.4	4.4	2.9
C2	1,220	2.8	19.2	16.4
C6	1,400	3.5	23.8	20.3
D34	3,200	2.4	3.5	1.1
D34	1,350	1.1	1.1	0.0
D31	3,500	2.2	19.7	17.5
D31	2,200	1.0	17.5	16.5
D47	1,485	2.9	9.7	6.8
D54	1,820	4.4	27.4	23.1
D54	1,350	1.5	23.1	21.6
D58	3500	6.1	29.0	22.9
D64	1,550	4.4	14.2	9.7
D64	3,400	3.7	9.7	6.1
E14	2,000	3.0	52.2	49.1
E15	1,125	5.3	5.3	0.0
F24	3,700	1.7	1.7	0.0
F38	750	0.9	3.6	2.8
G4	850	2.7	6.7	4.0
G53	2200	2.62	5.22	2.6
G63	600	5.01	10.56	5.55
G83	2400	8.37	13.04	4.67
G83	1300	4.67	4.67	0
G87	1030	4.27	23.95	19.68







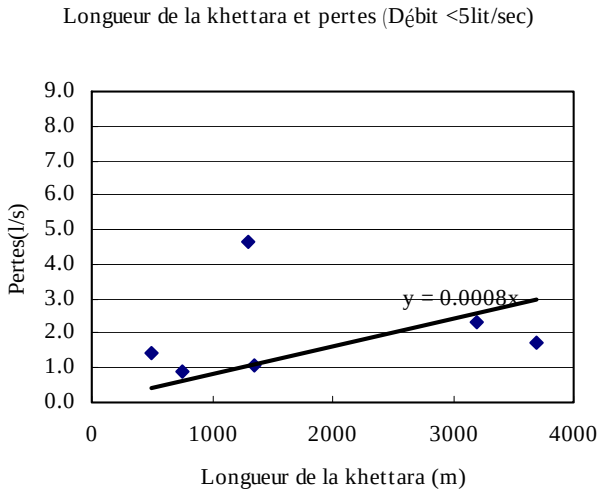


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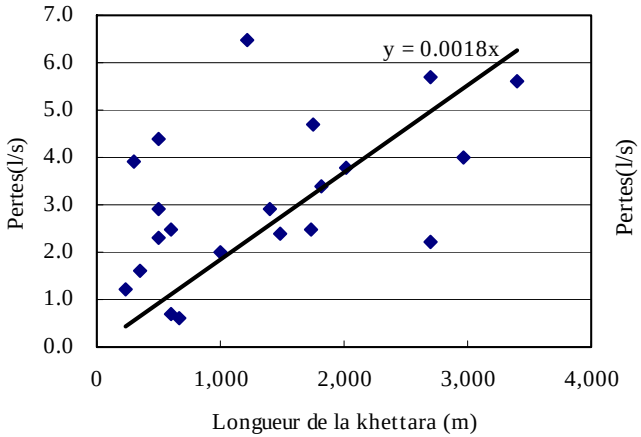
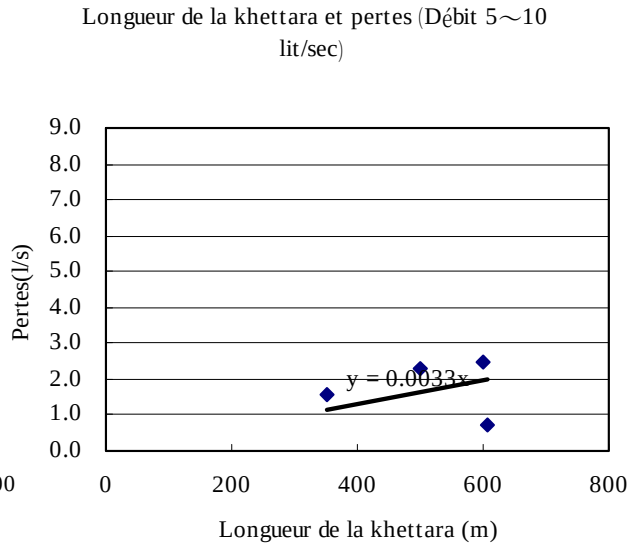
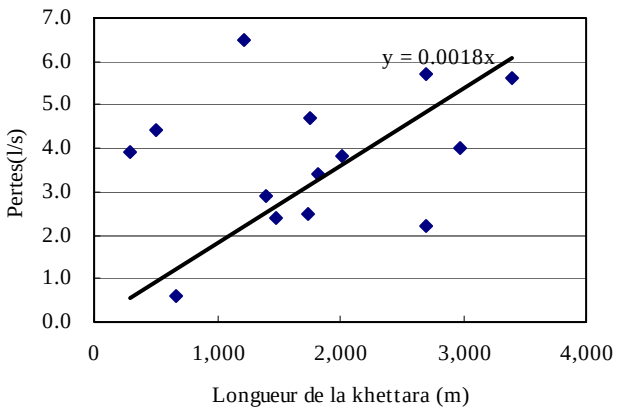
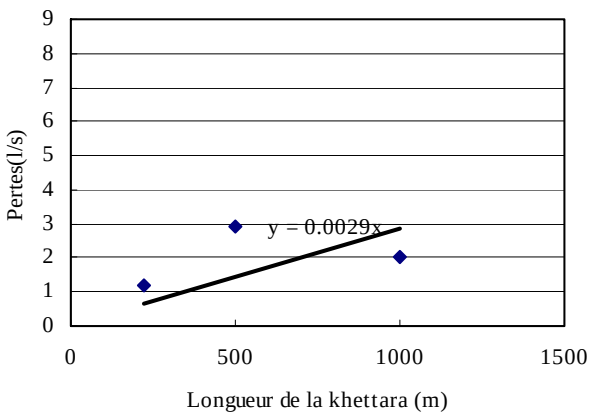
Figure B.3.4 (2)
Leakage Loss (Dischrage: September 2003)

No.	Length (m)	Dischrage		Leakage (lit/sec)
		Upstream (lit/sec)	Downstream (lit/sec)	
A11	225	1.2	3.7	2.5
A50	608	0.7	6.3	5.6
A74	660	0.6	18.3	17.7
A106	500	2.3	9.5	7.2
A113	500	4.4	22.3	17.9
B6	350	1.6	8.2	6.6
C2	1,220	6.5	33.0	26.5
C6	1,400	2.9	24.4	21.5
D34	2,700	5.7	12.9	7.2
D47	2,970	4.0	15.6	11.6
D47	1,485	2.4	11.6	9.2
D54	1,820	3.4	24.6	21.2
D54	2,700	2.2	21.2	19.0
D58	1750	4.7	30.0	25.3
D64	3,400	5.6	10.7	5.1
E17	2,024	3.8	34.7	30.9
E16	1,734	2.5	17.3	14.8
G55	300	3.9	12.3	8.4
G59	500	2.9	4.7	1.8
G53	600	2.5	9.9	7.4
G64	1,000	2.0	4.6	2.6









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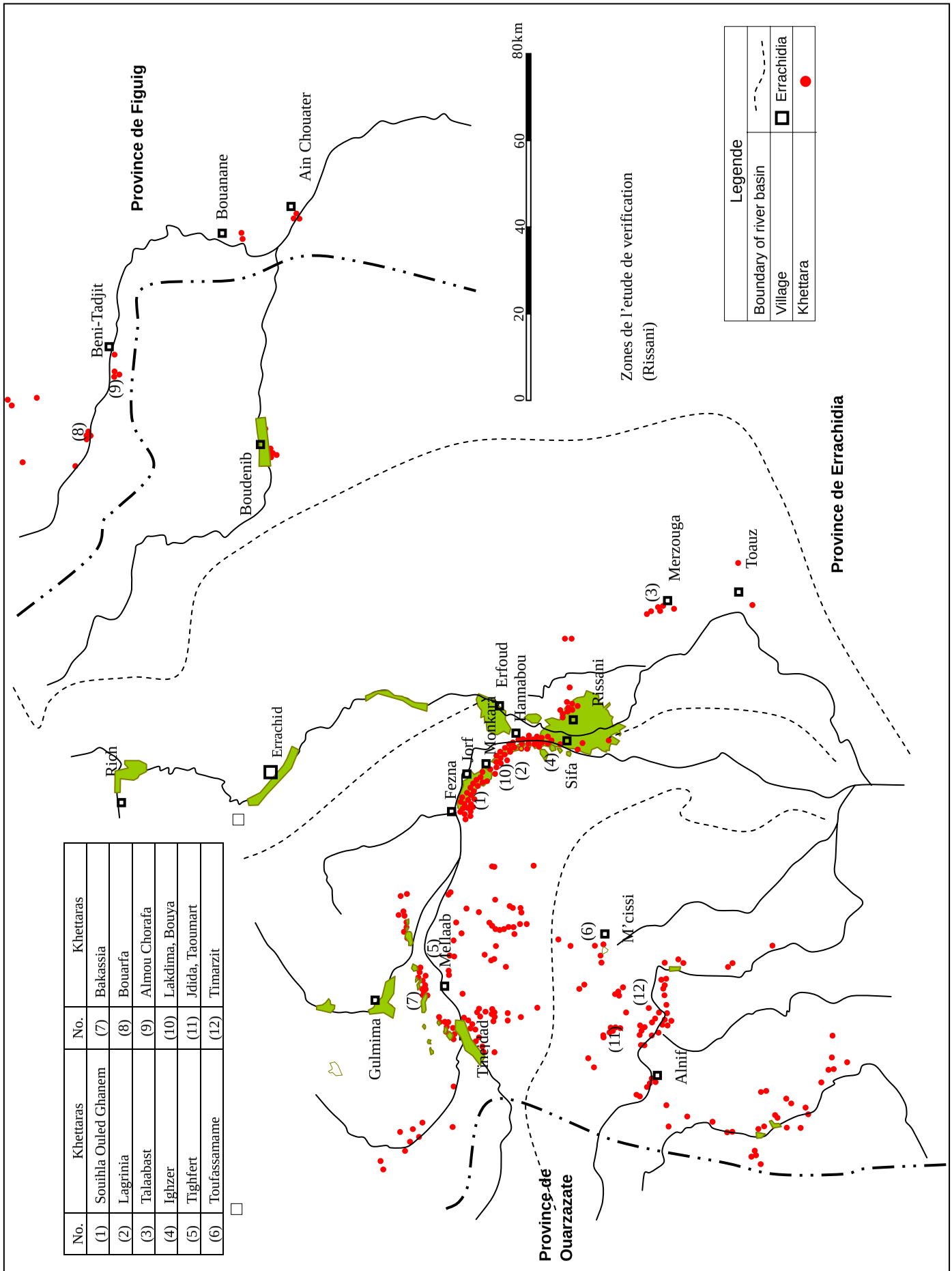
Japan International Cooperation Agency

Figure B.3.4 (3)
Leakage Loss (Dischrage: February 2004)



No.	Khettaras	No.	Khettaras
(1)	Souihla Ouled Ghanem	(7)	Bakassia
(2)	Lagrinia	(8)	Bouarfa
(3)	Talaabast	(9)	Almou Chorafa
(4)	Ighzer	(10)	Lakdima, Bouya
(5)	Tighfert	(11)	Jdida, Taoumart
(6)	Toufassamame	(12)	Timarzit

The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco du Maroc

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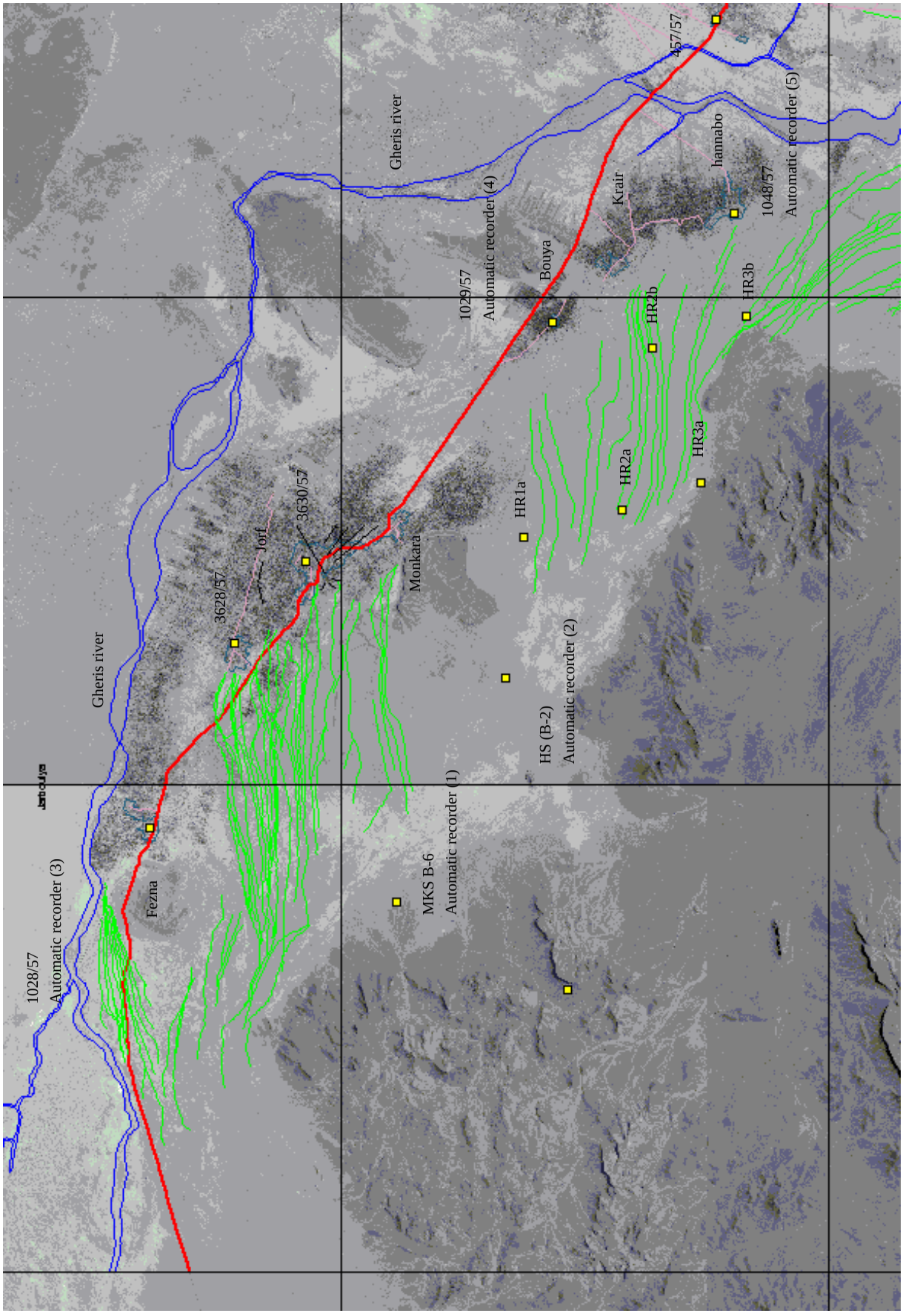
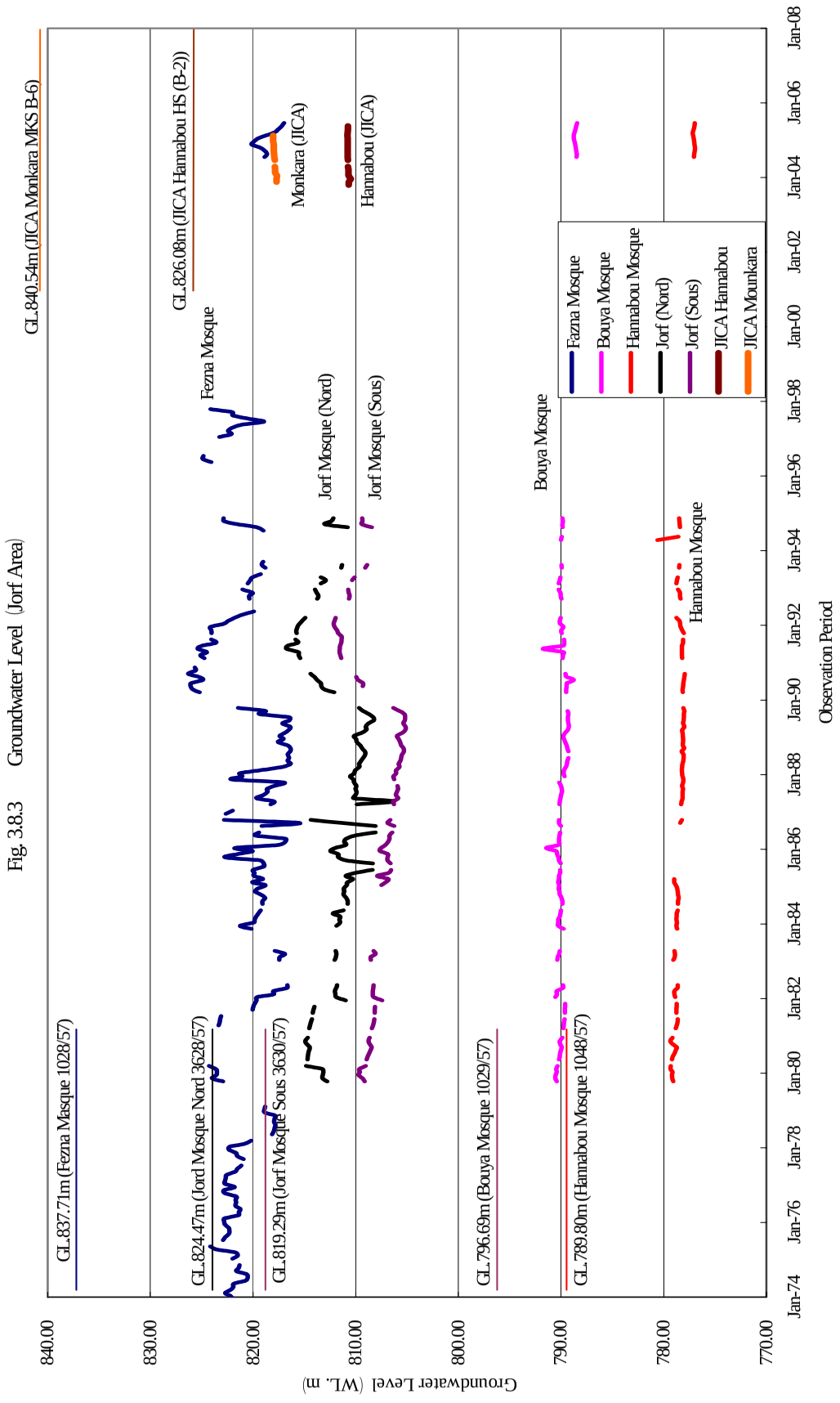
Figure B.4.1

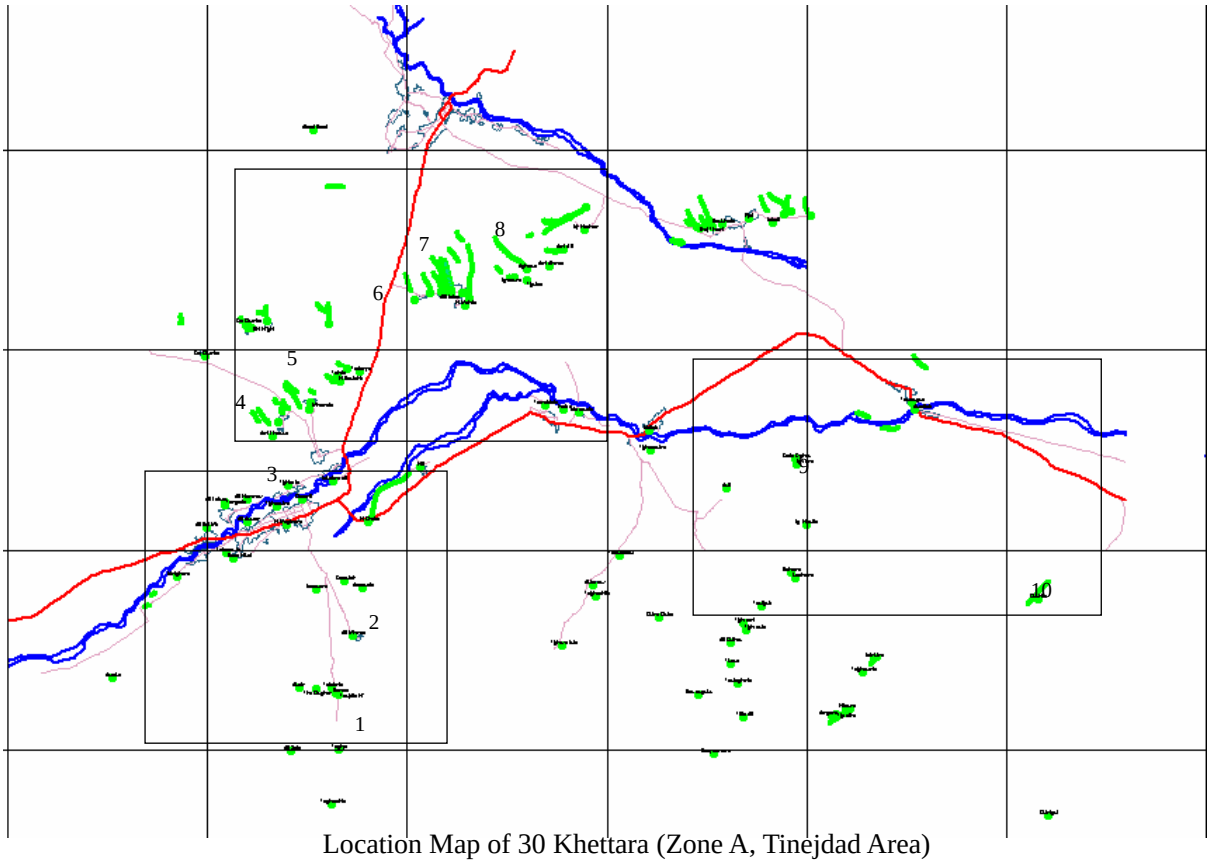
Khettaras rehabilitated under Small Scale Grant Aid Program



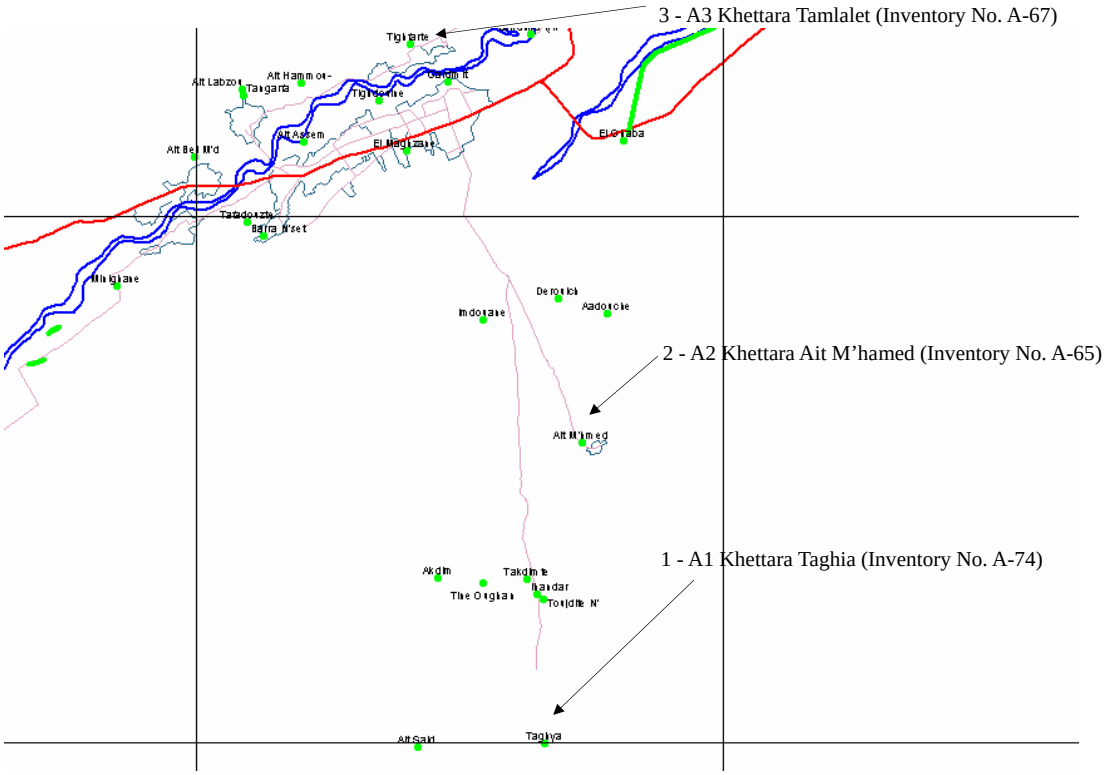
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.1 Location of Groundwater Observation Sites
Japan International Cooperation Agency	



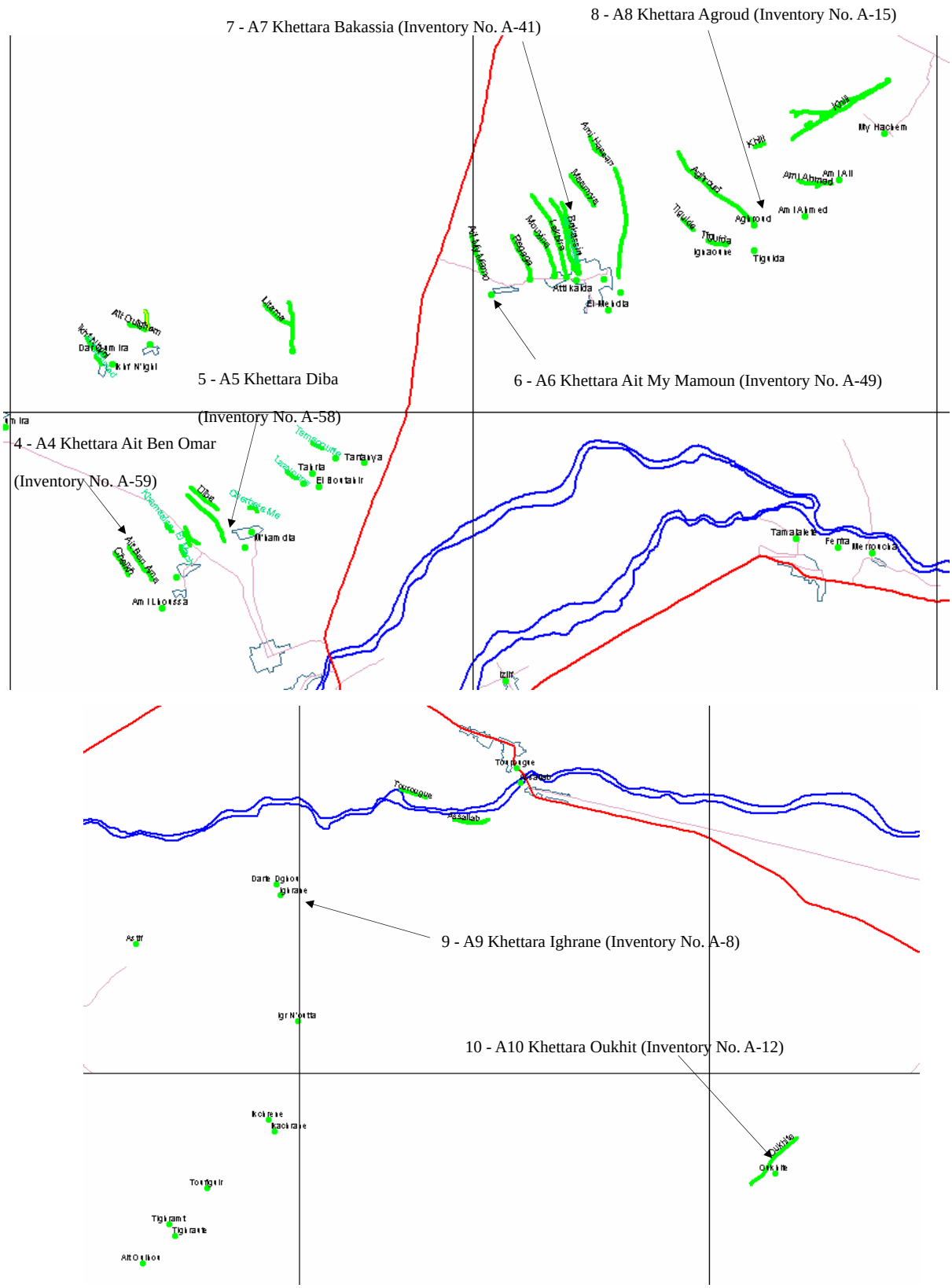
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.2
Japan International Cooperation Agency	Groundwater Level at Observation Sites



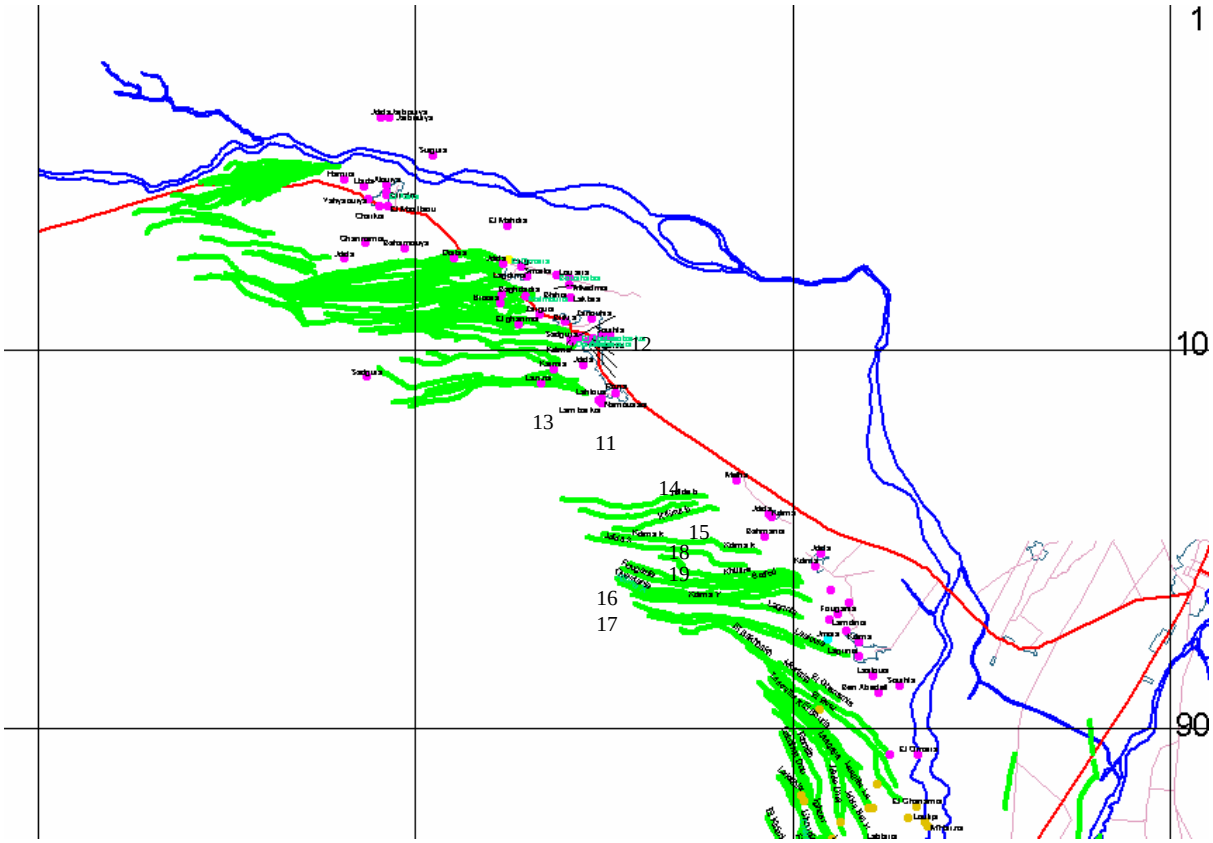
Location Map of 30 Khettara (Zone A, Tinejdad Area)



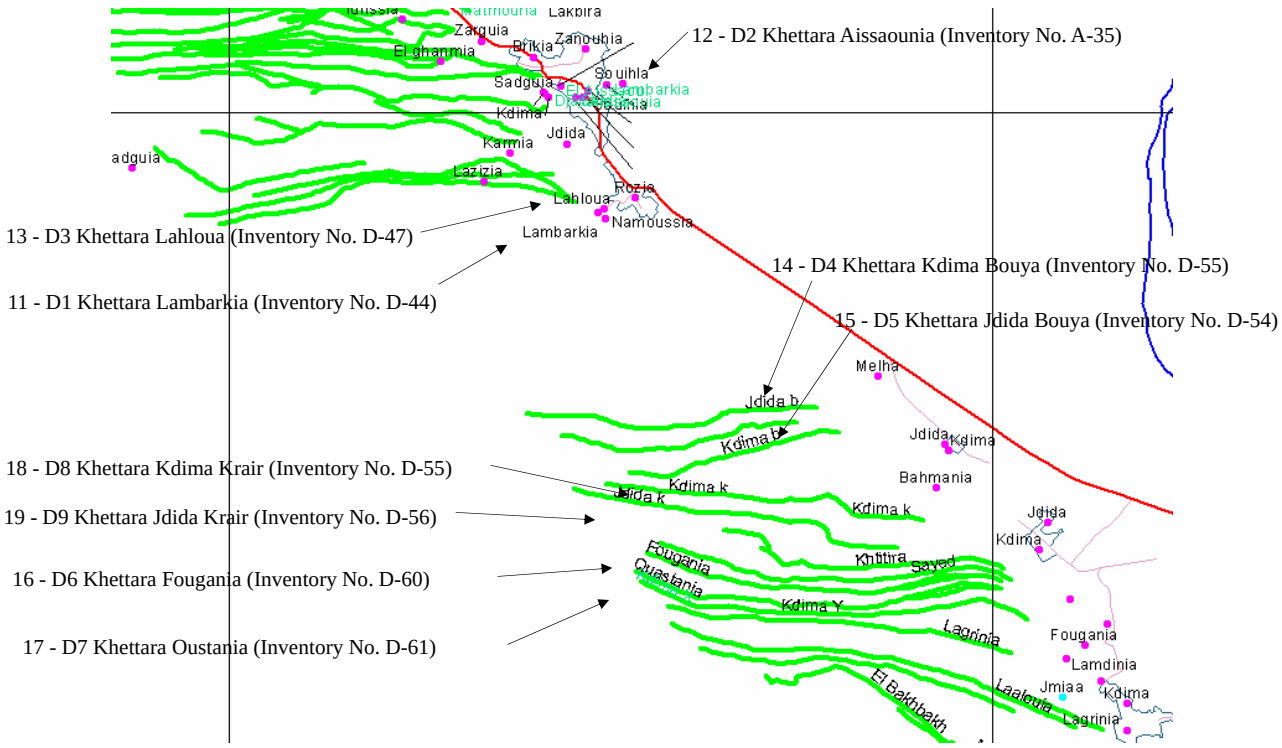
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (1) Location of 30 Khettaras for Dischrage Measurement (Zone A, Tinejdad Area)
Japan International Cooperation Agency	



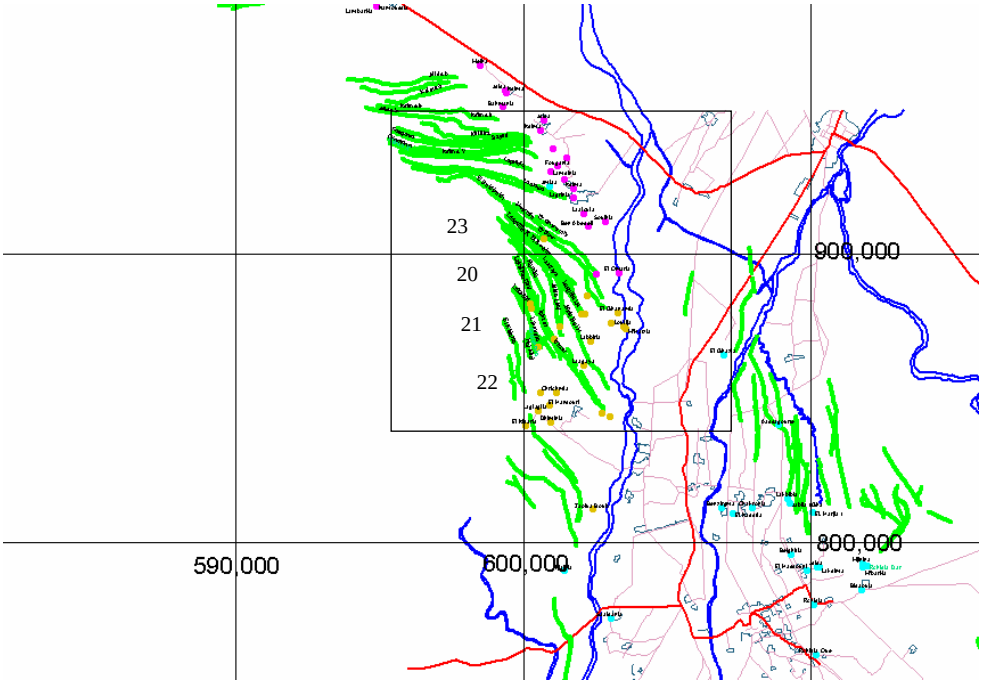
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (2) Location of 30 Khettaras for Dischrage Measurement (Zone A, Tinejdad Area)
Japan International Cooperation Agency	



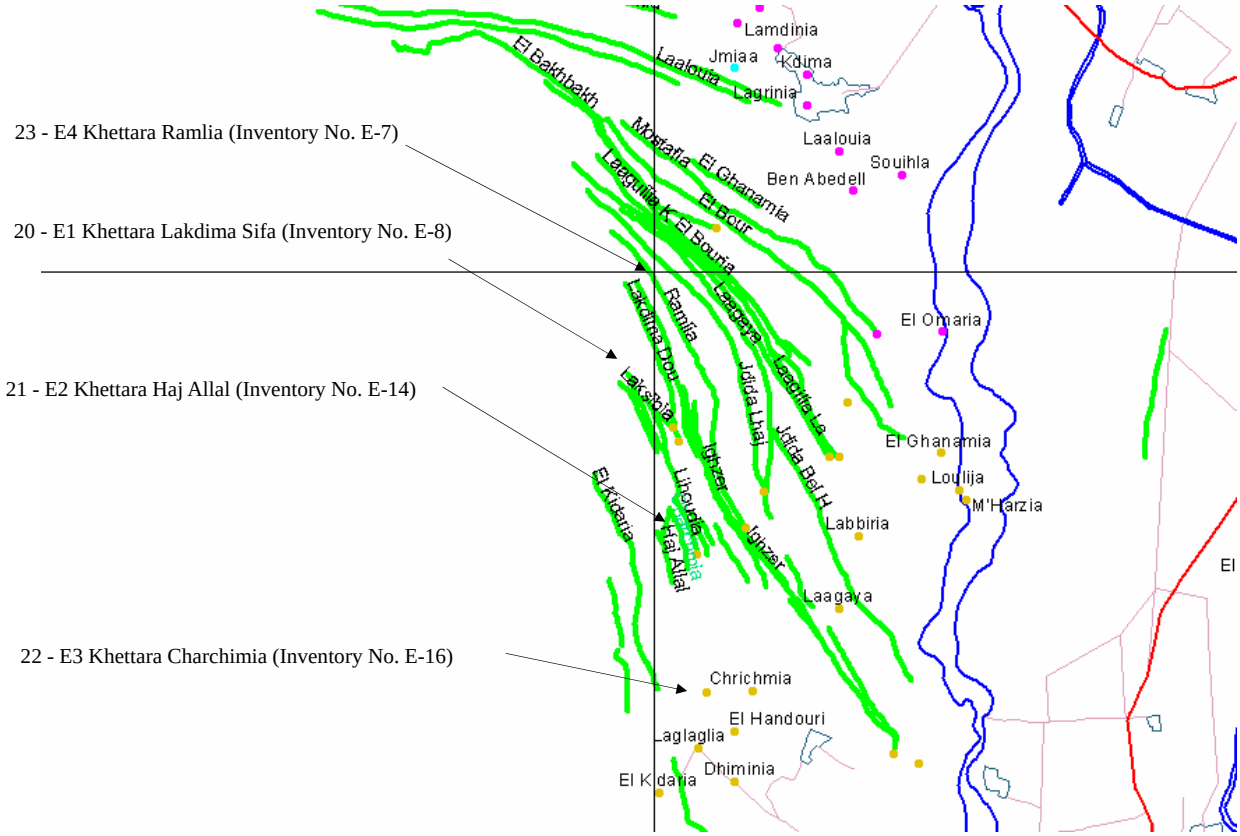
Location Map of 30 Khettara (Zone D, Jorf Area)



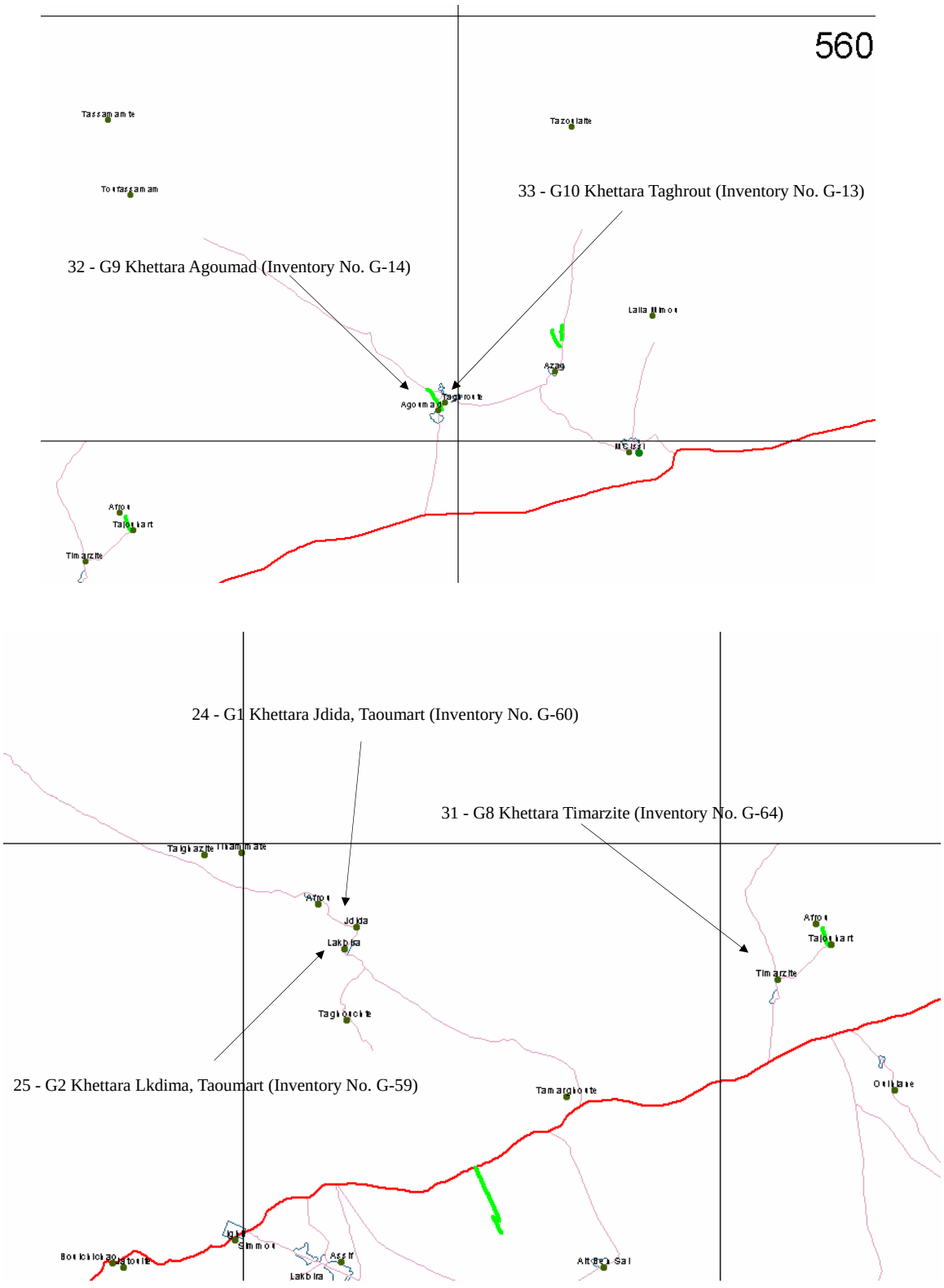
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (3) Location of 30 Khettaras for Dischrage Measurement (Zone D, Jorf Area)
Japan International Cooperation Agency	



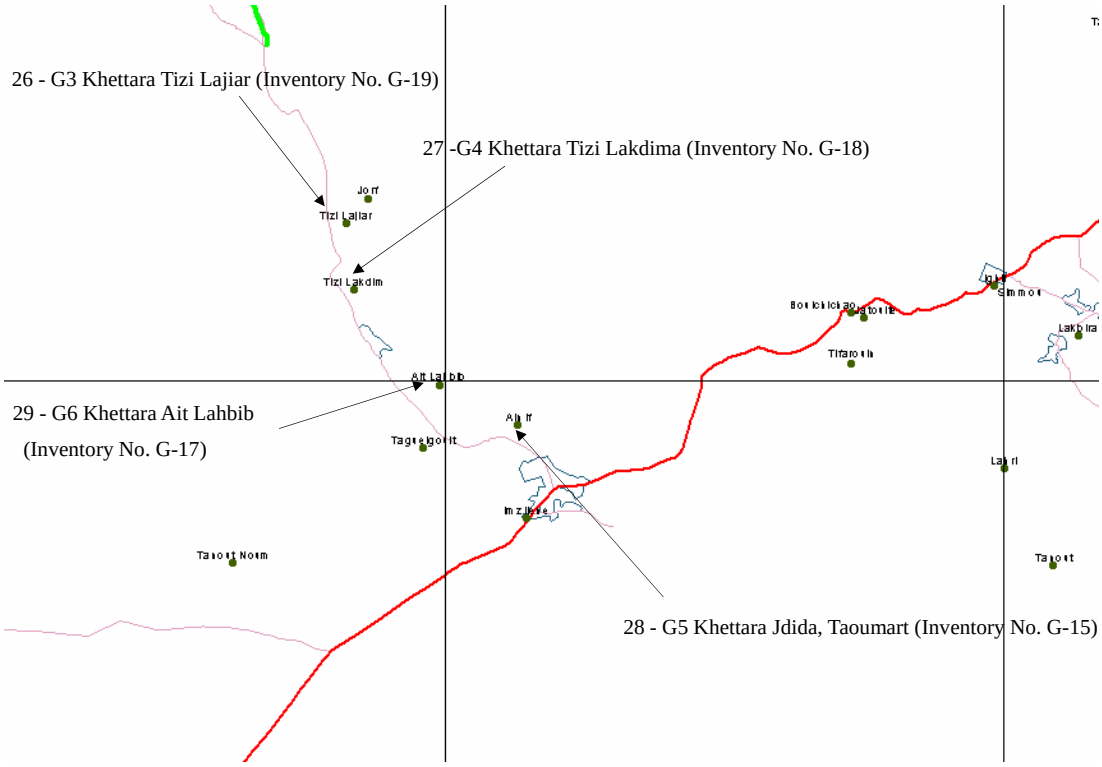
Location Map of 30 Khettara (Zone E, Sifa Area)

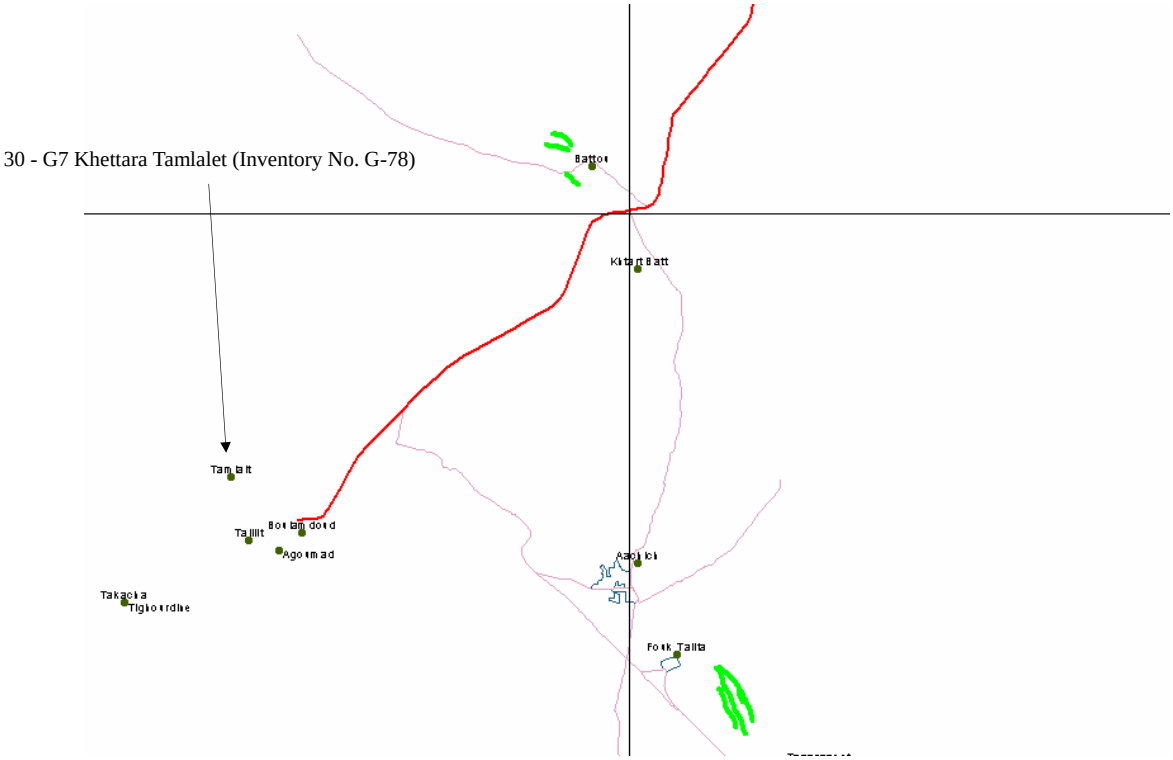


The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (4) Location of 30 Khettaras for Dischrage Measurement (Zone E, Sifa Area)
Japan International Cooperation Agency	

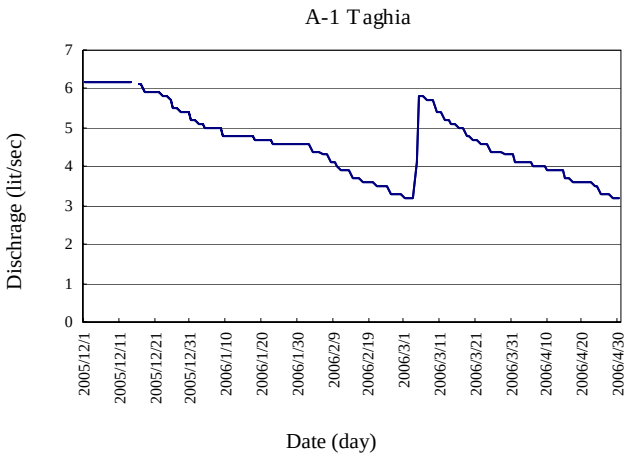


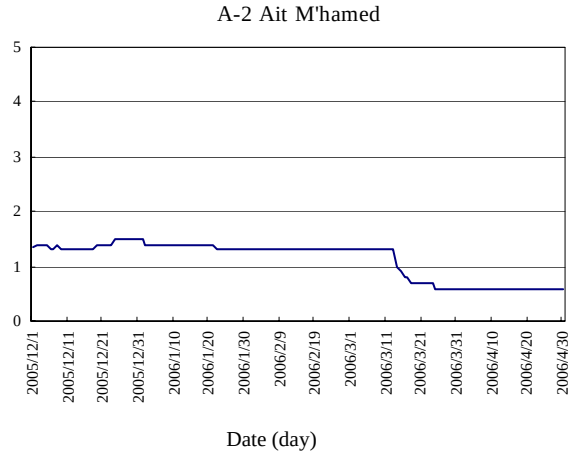
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (5) Location of 30 Khettaras for Dischrage Measurement (Zone G, Alnif Area)
Japan International Cooperation Agency	

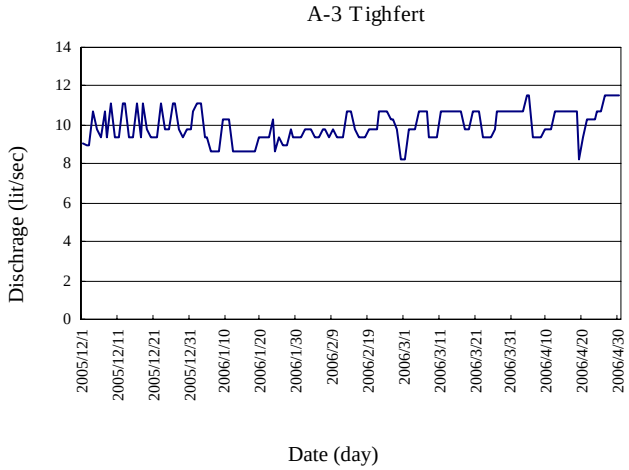


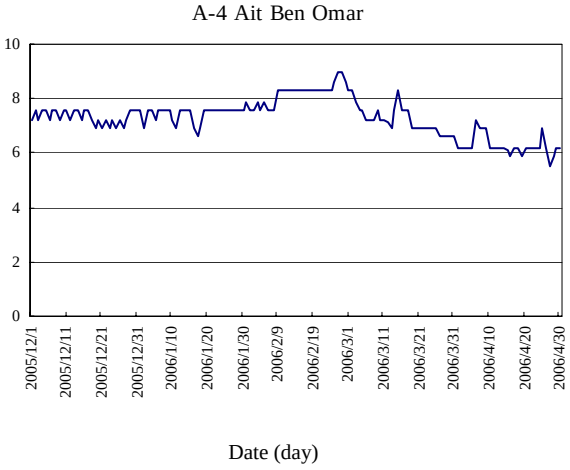


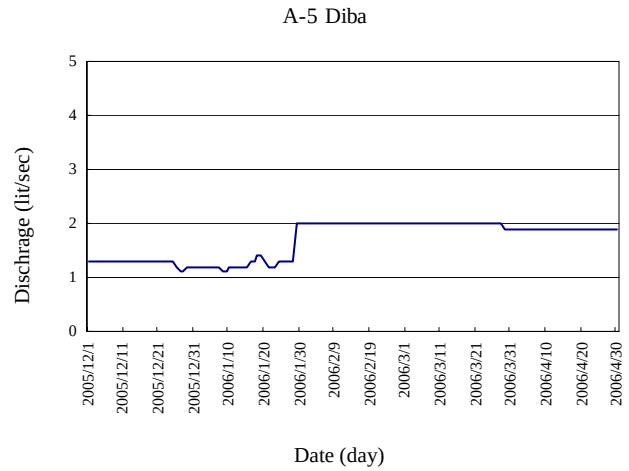
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.3 (6) Location of 30 Khettaras for Dischrage Measurement (Zone G, Alnif Area)
Japan International Cooperation Agency	











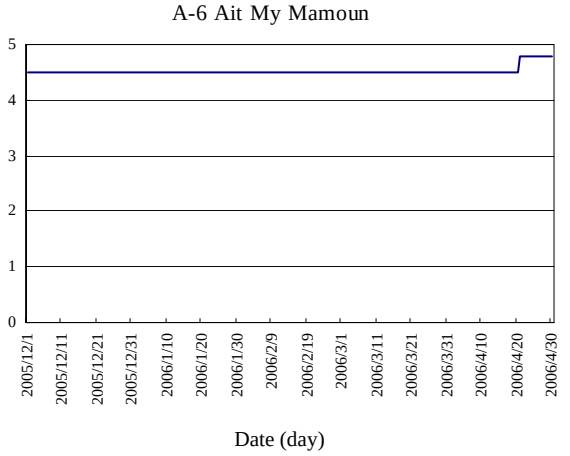


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Figure B.6.4 (1)
Khettara Discharge (Daily observation)

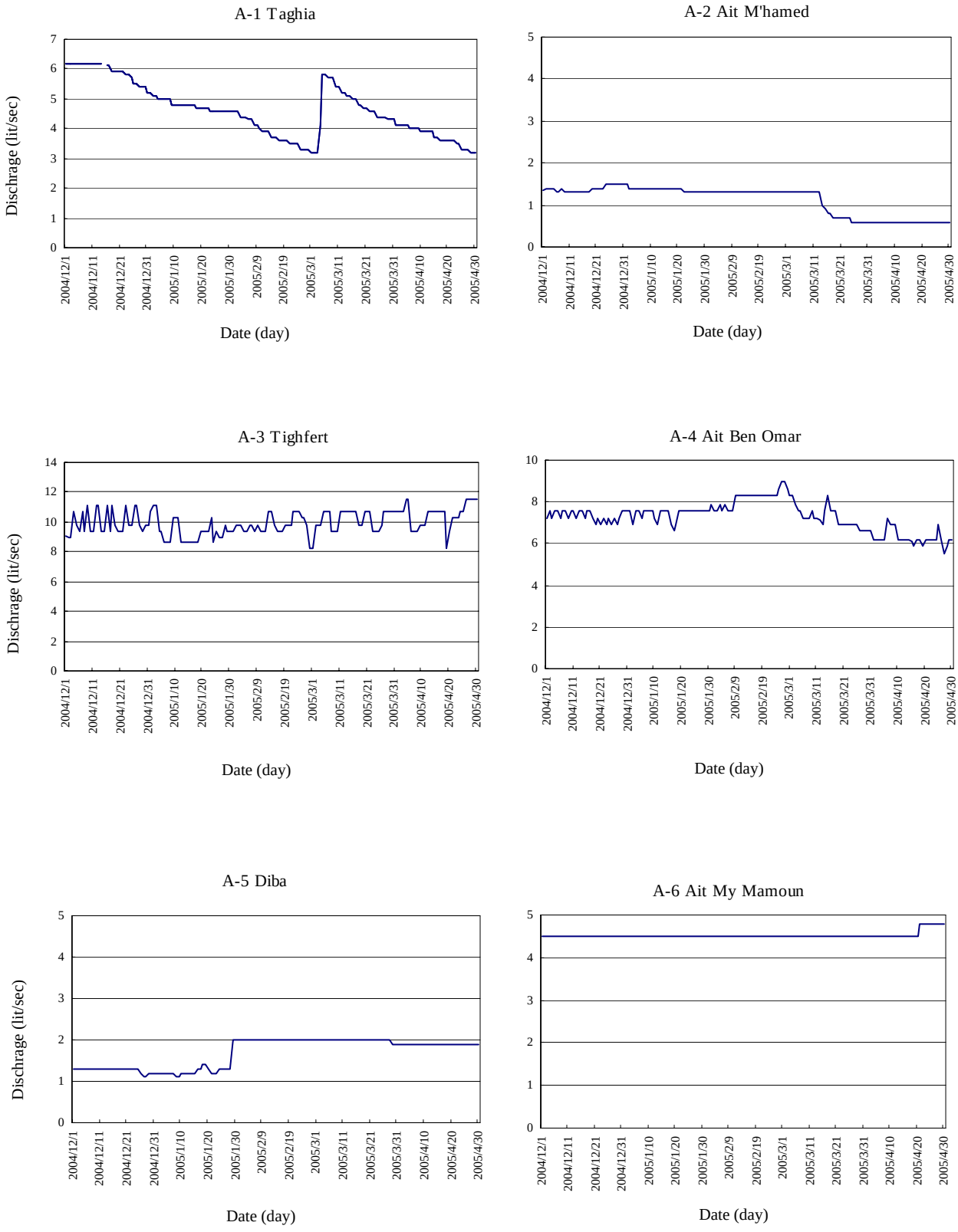

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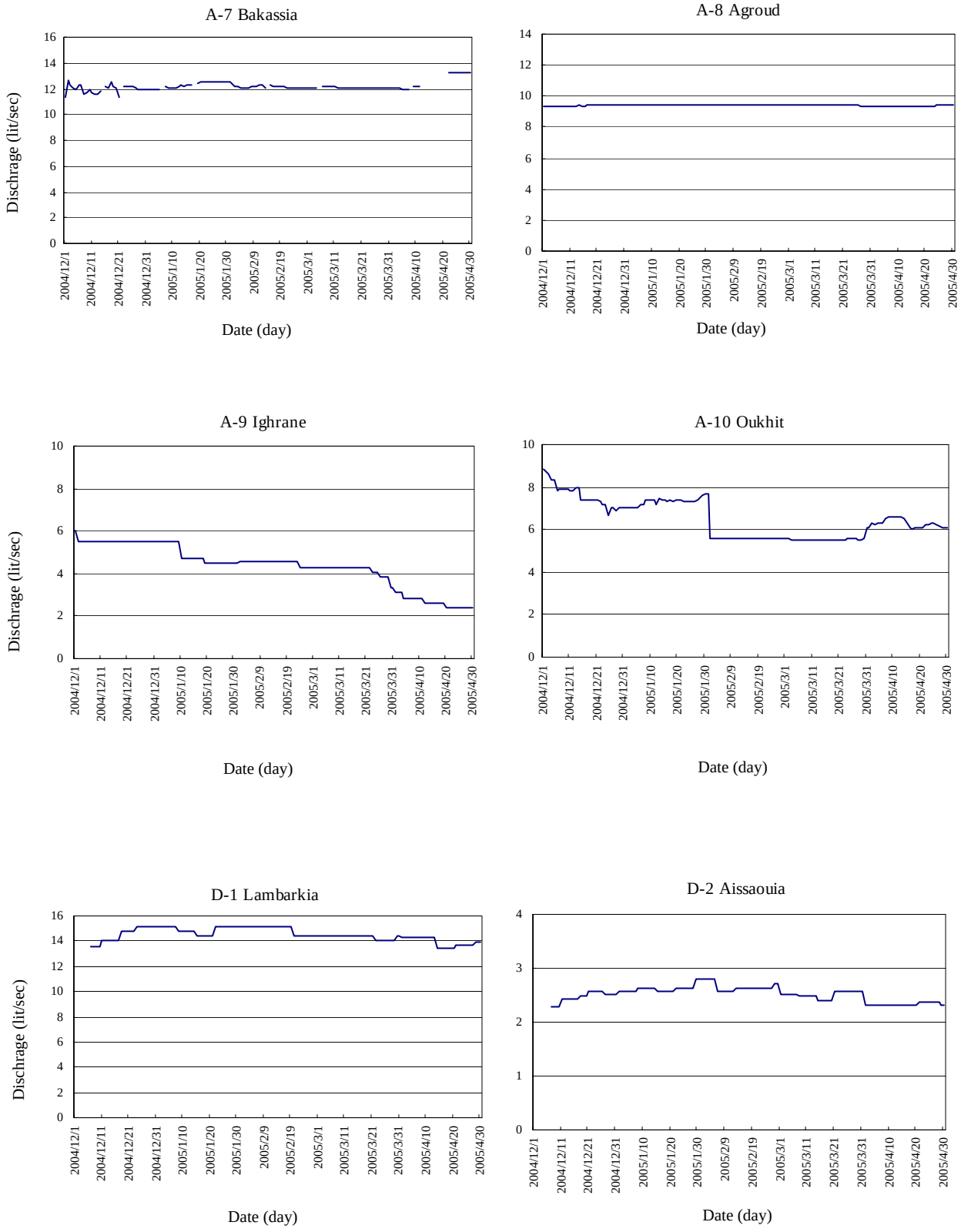
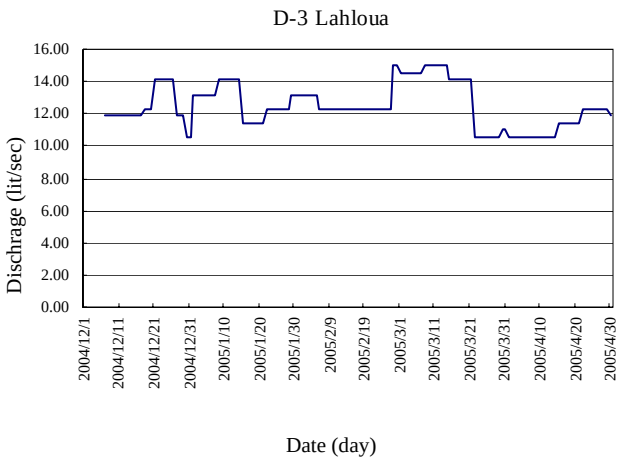
Figure B.6.4 (2)
Khettara Discharge (Daily observation)

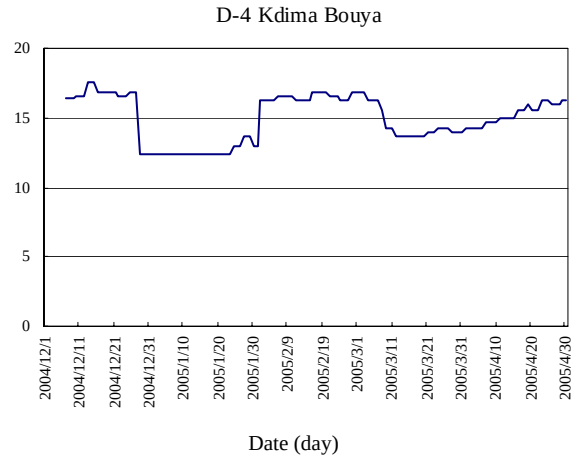


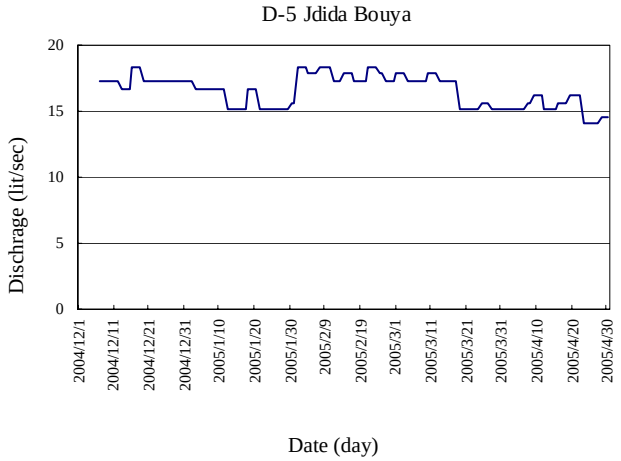
The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco

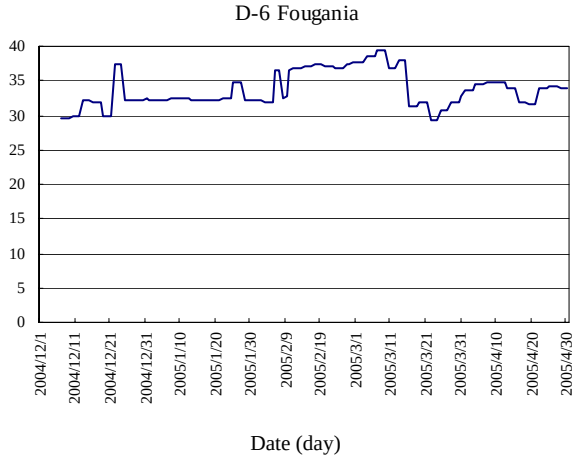
Japan International Cooperation Agency

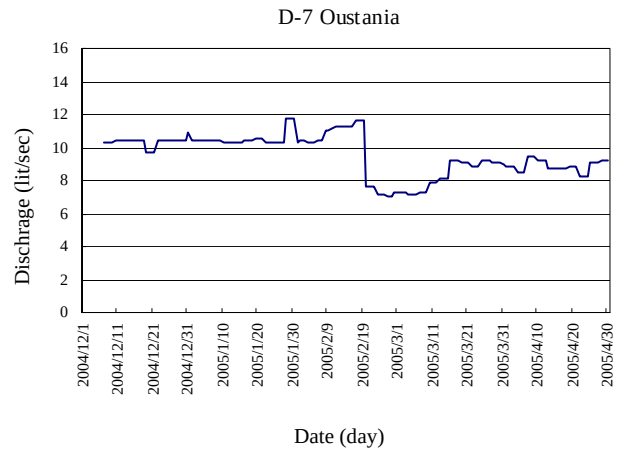
Figure B.6.4 (3)
Khettara Discharge (Daily observation)

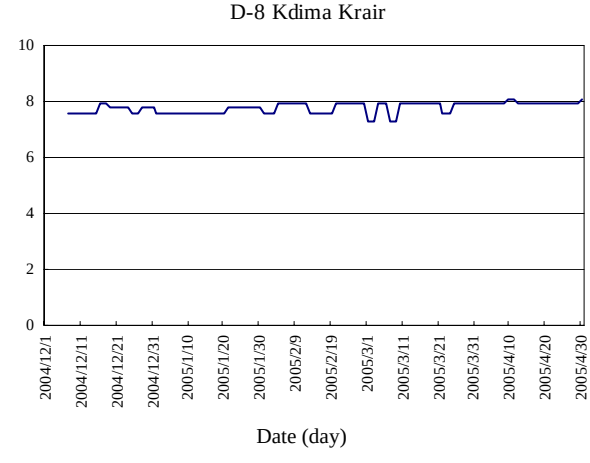












The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco

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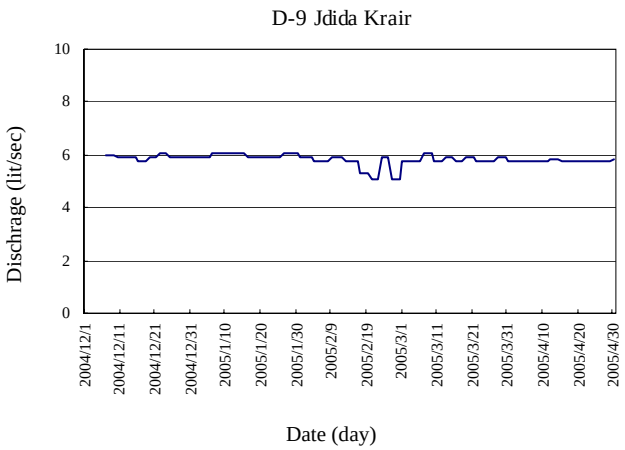
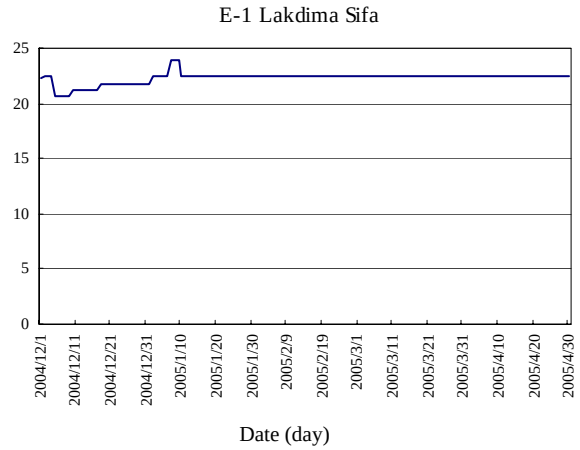
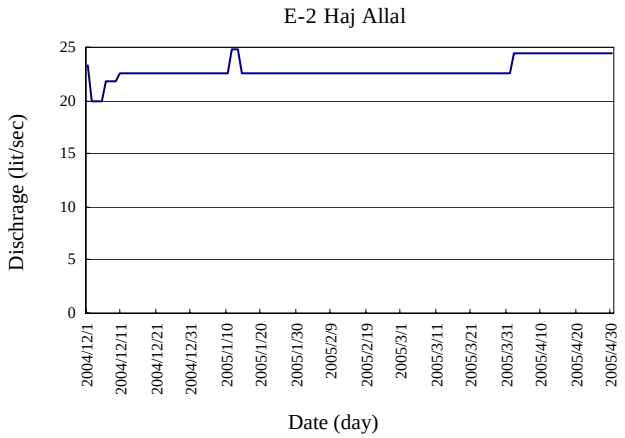
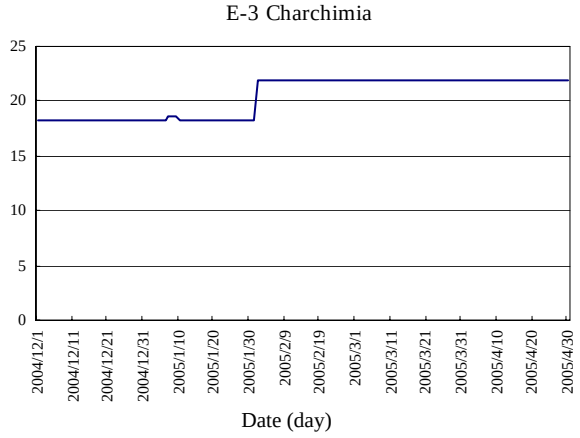
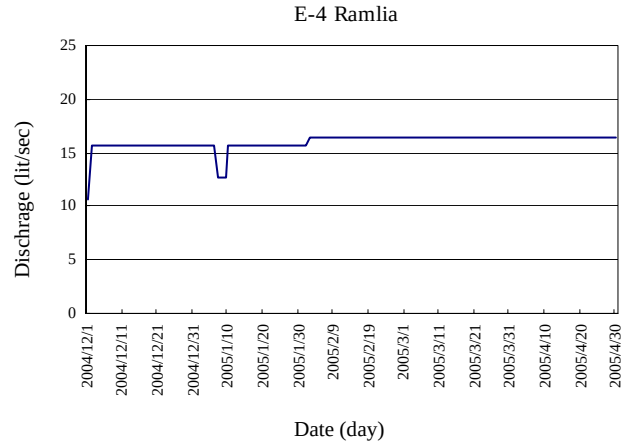
Figure B.6.4 (4)
Khettara Discharge (Daily observation)

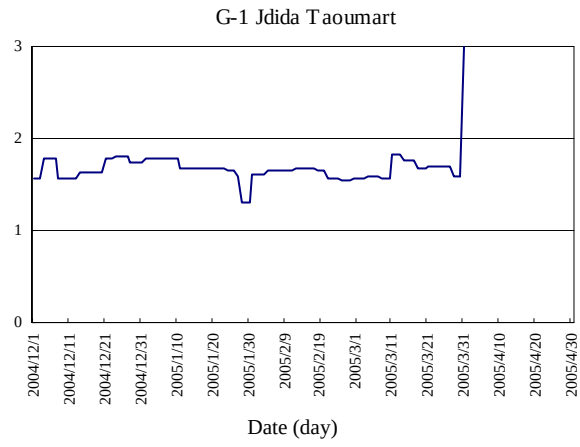












The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.4 (5) Khettara Discharge (Daily observation)
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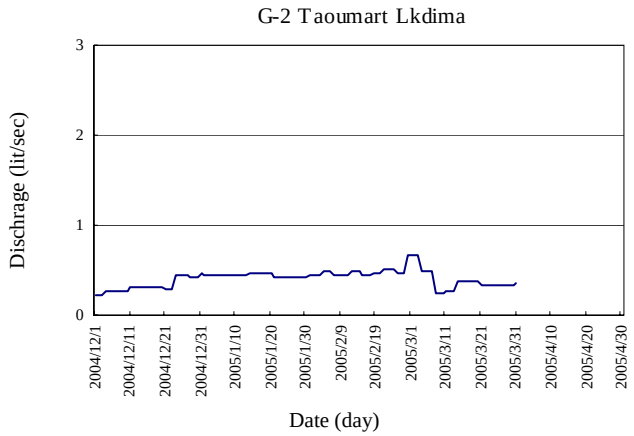

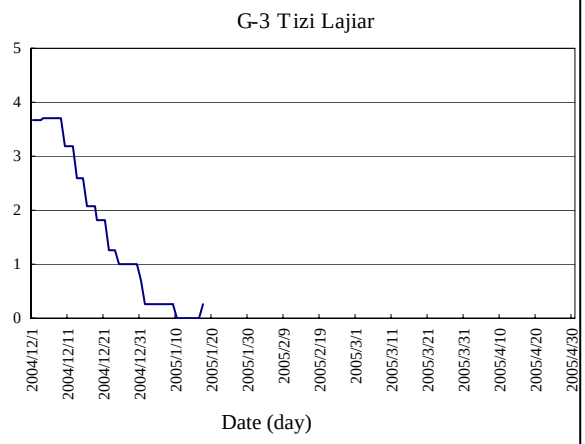

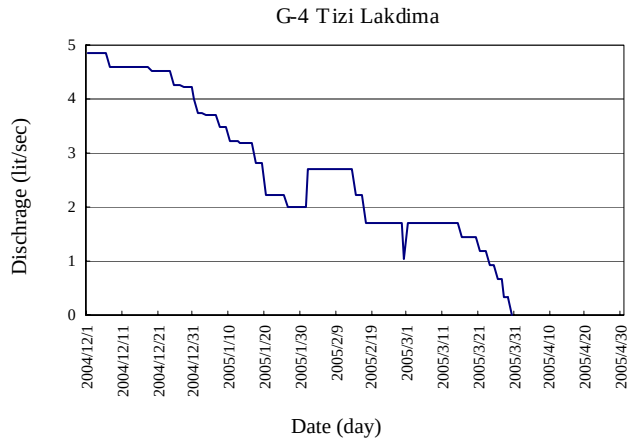

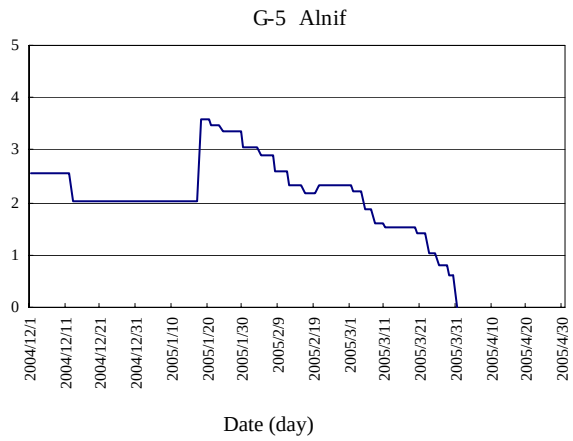

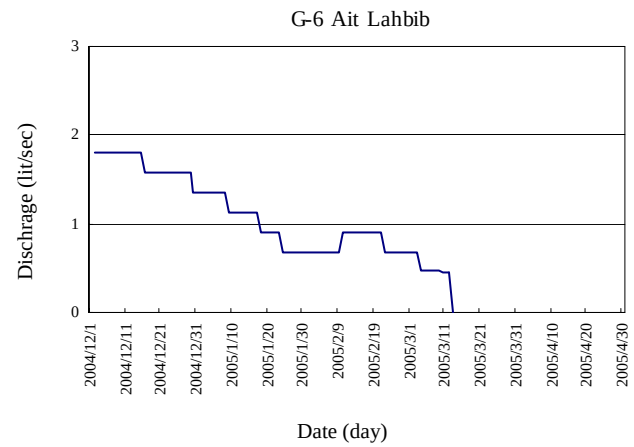

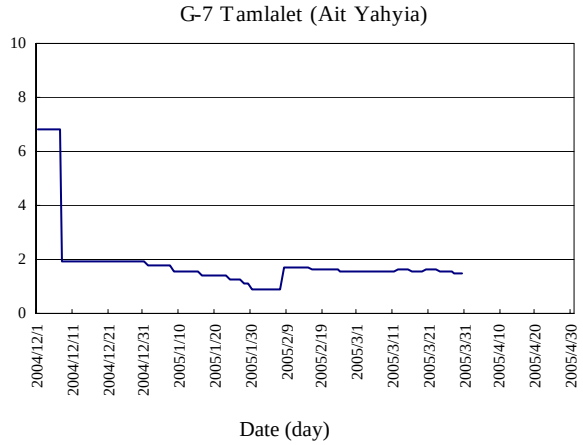

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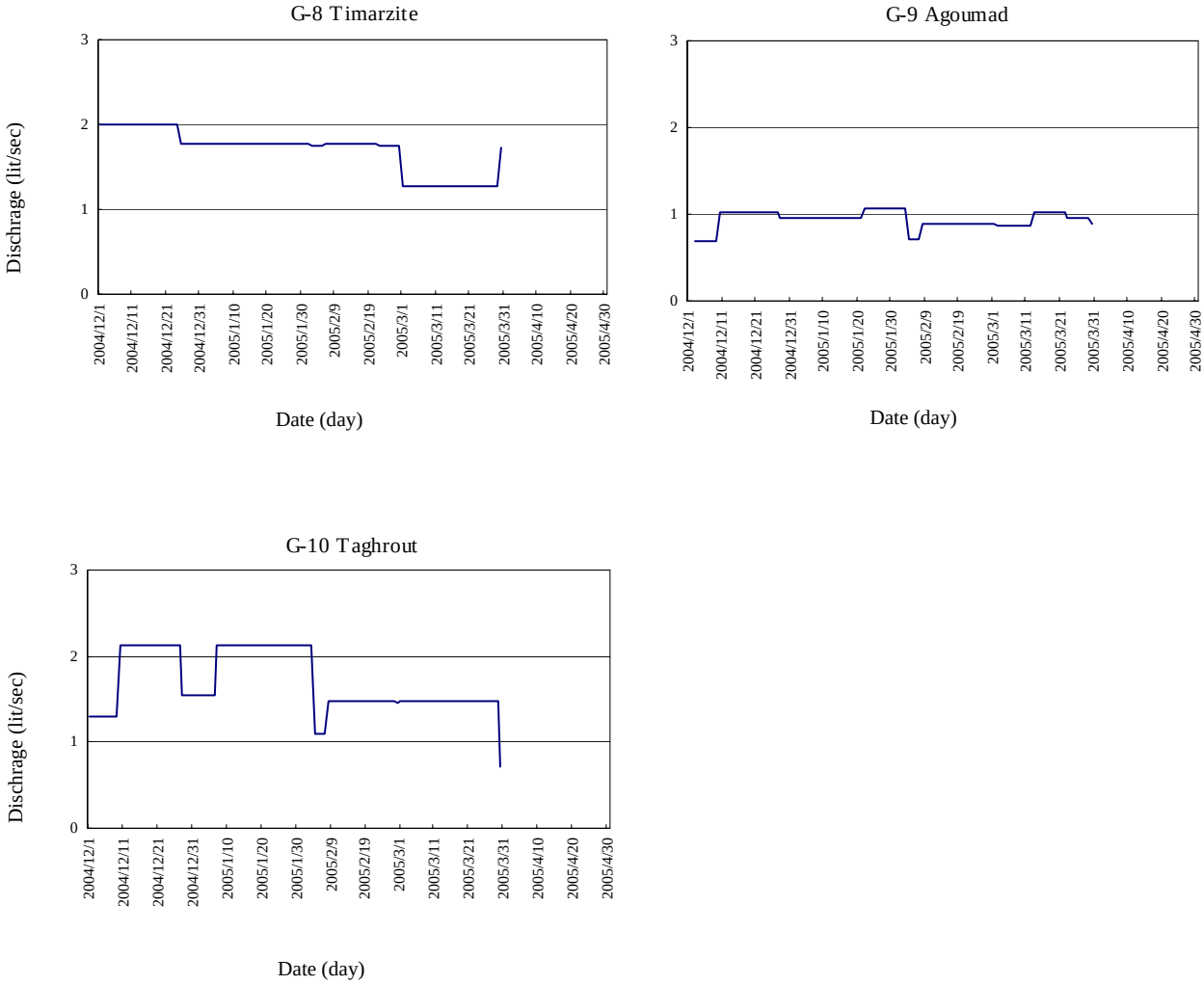
Figure B.6.4 (6)
Khettara Discharge (Daily observation)



The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.4 (7) Khettara Discharge (Daily observation)
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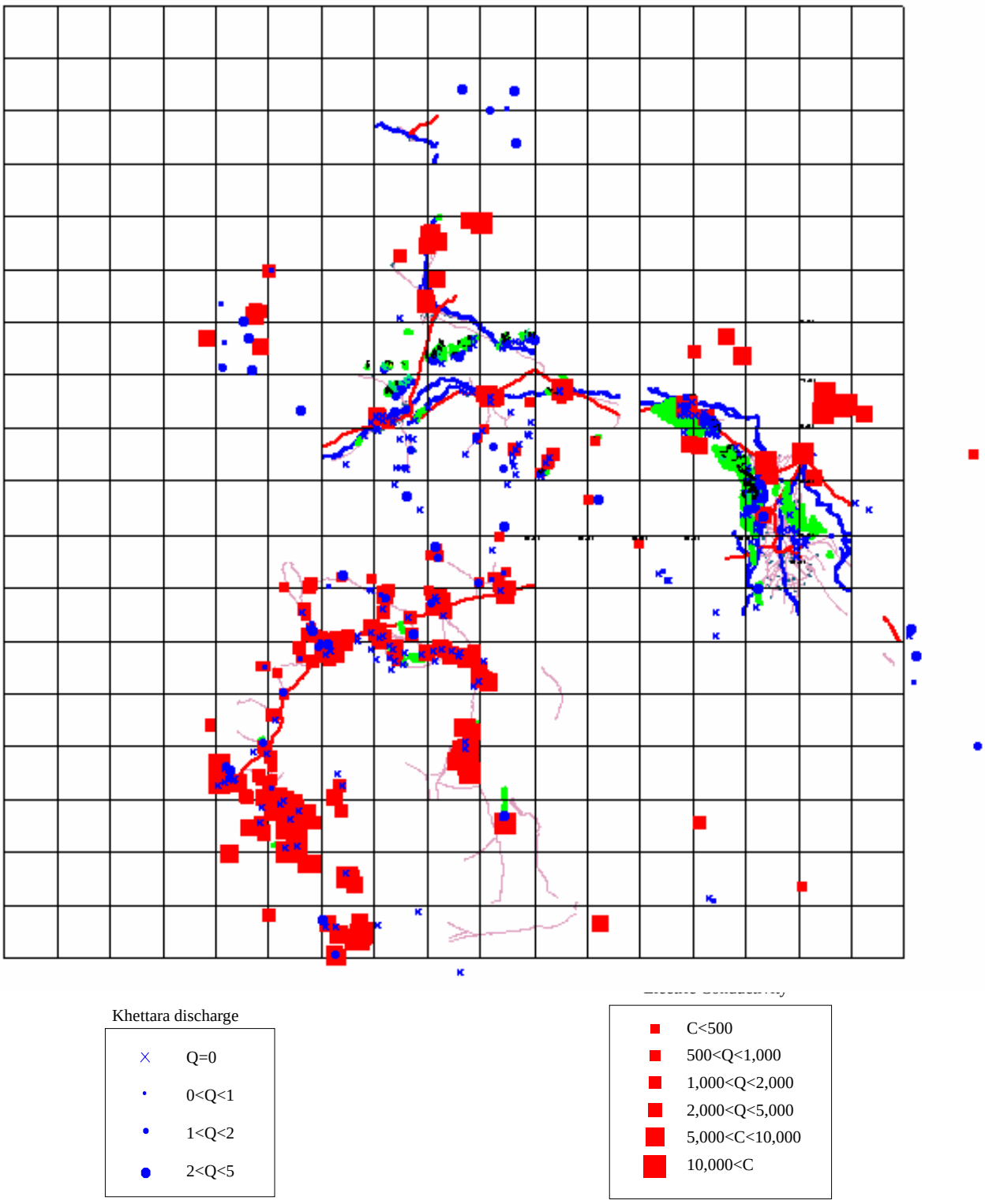

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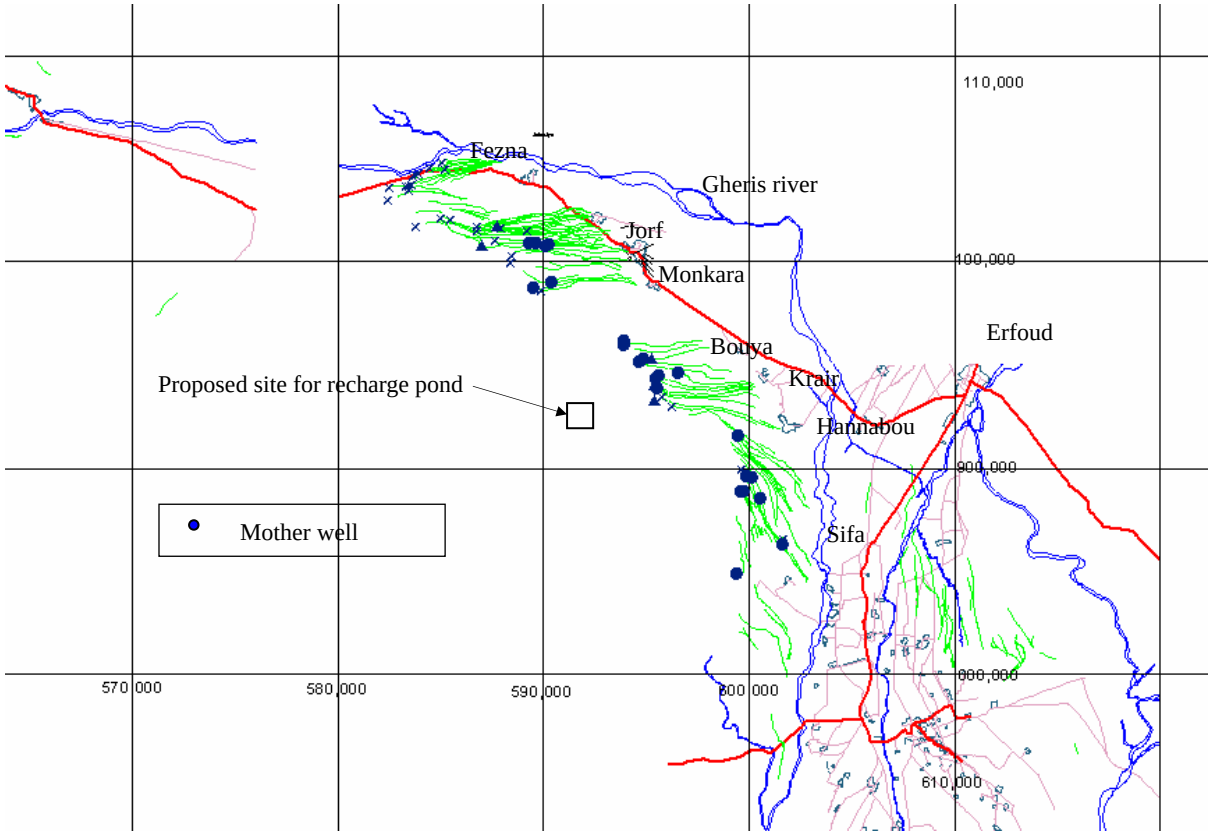
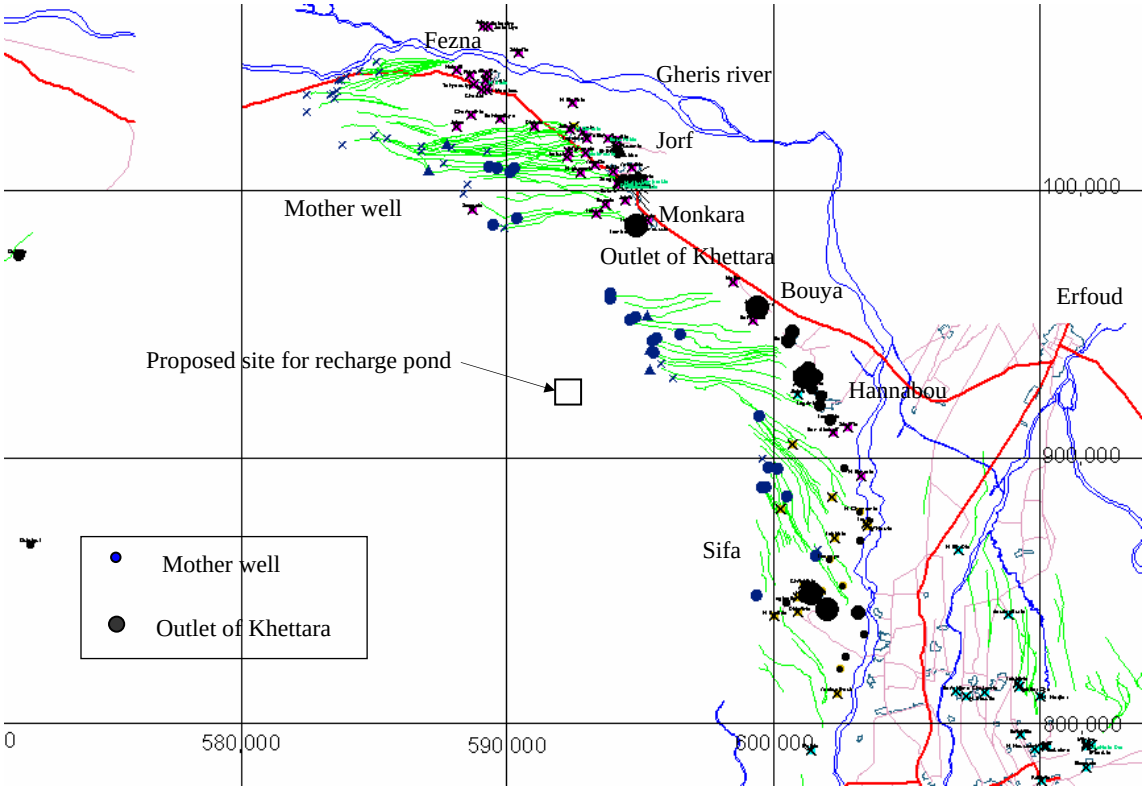
Figure B.6.5
Conductivity of Groundwater at Pump Stations for Potable Water Supply





The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.6 (1) Location and Water Presence of Khettara in Jorf - Hannabou
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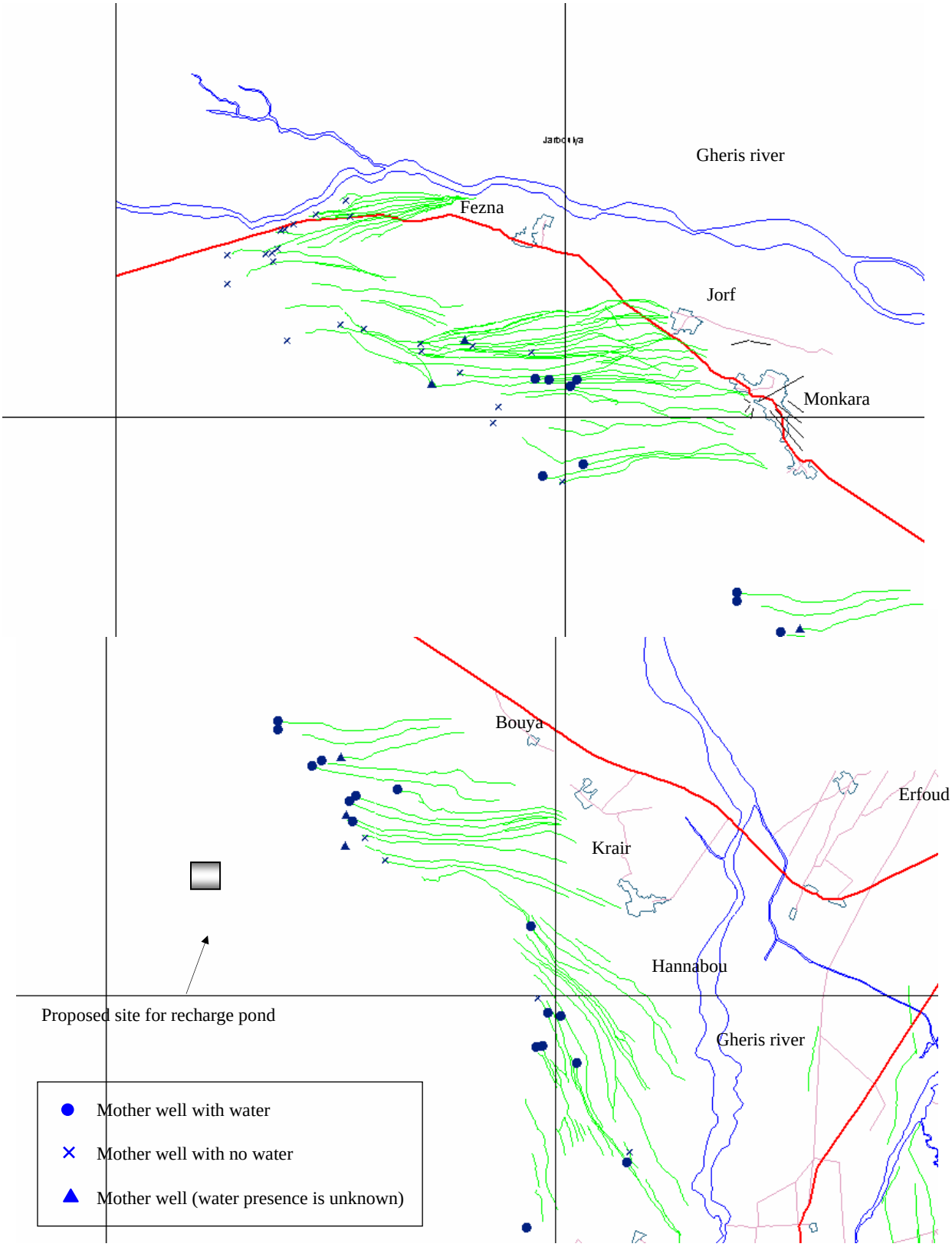

The Development Study on Rural Community Development Project in Semi-Arid East Atlas Regions with Khettara Rehabilitation in the Kingdom of Morocco	Figure B.6.6 (2) Location and Water Presence of Khettara in Jorf - Hannabou
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