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To cooperate or not to cooperate...? : collective action for rehabilitation of traditional water tunnel systems (qanats) in Syria

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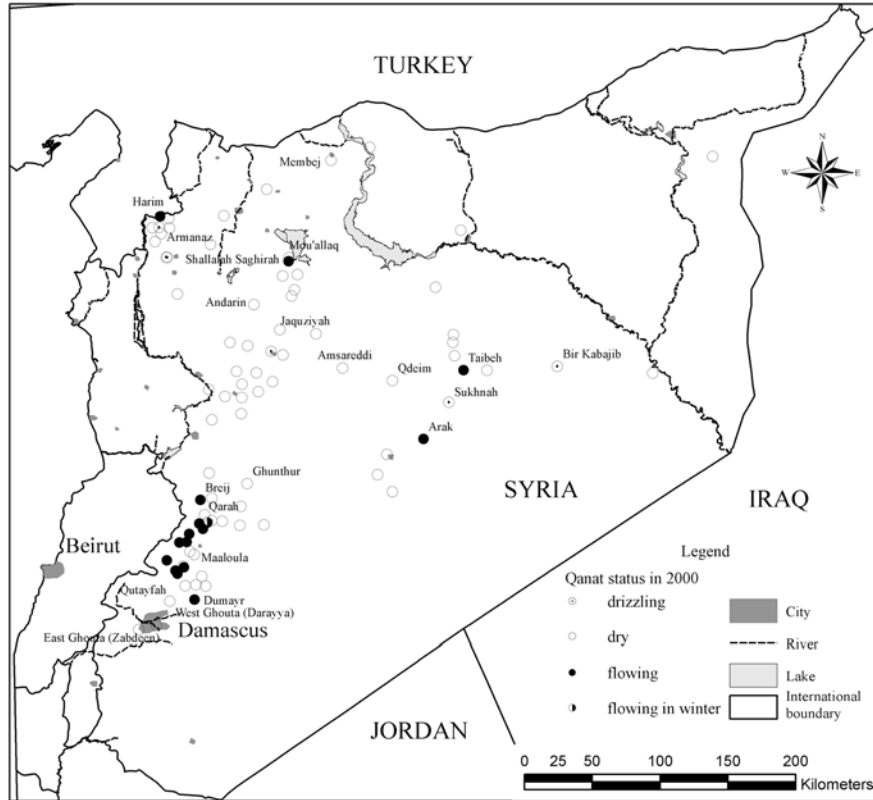
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APPENDIX 1

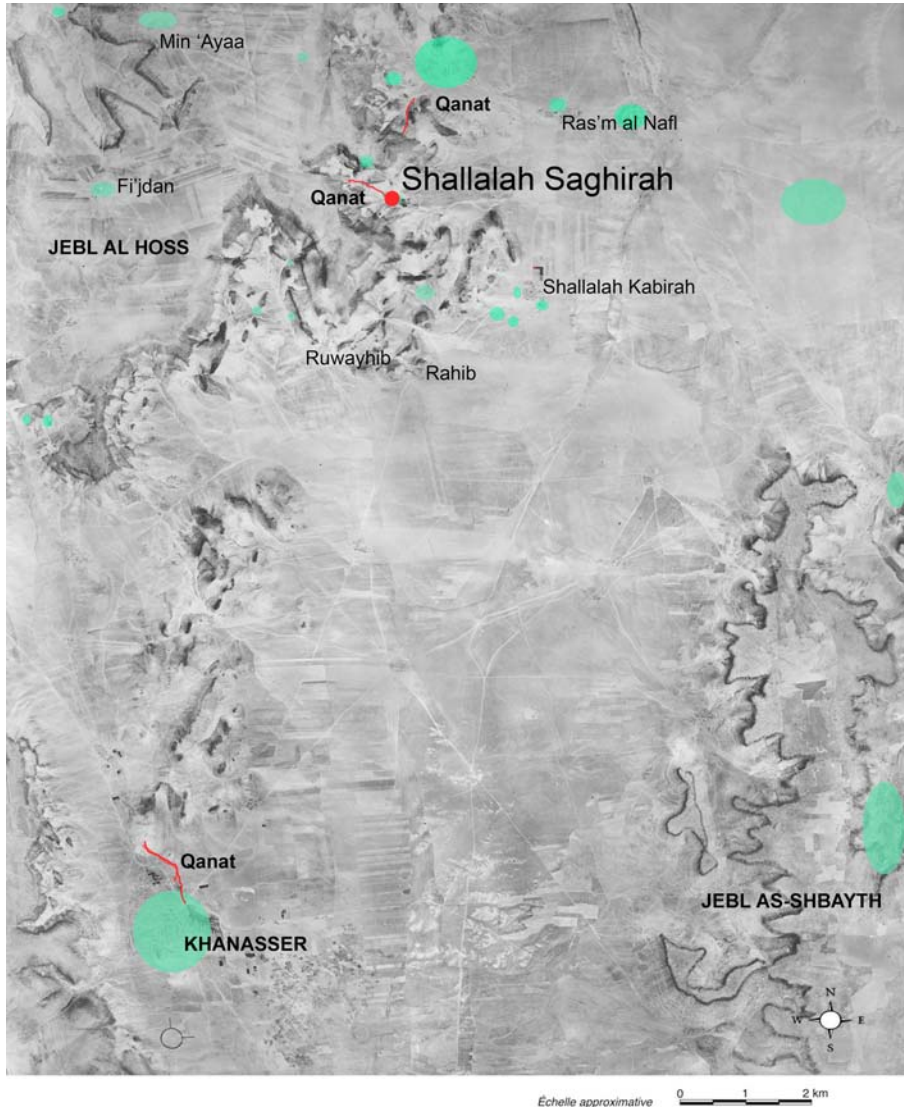
MAPS



Map 3 - Distribution of qanats in Syria

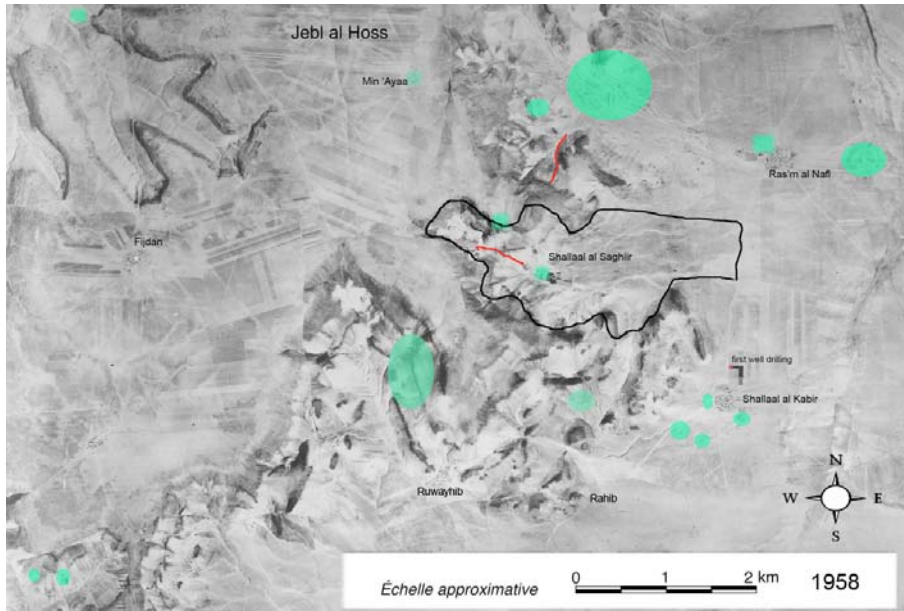


Map 4 - The qanat site of Shallalah Saghirah

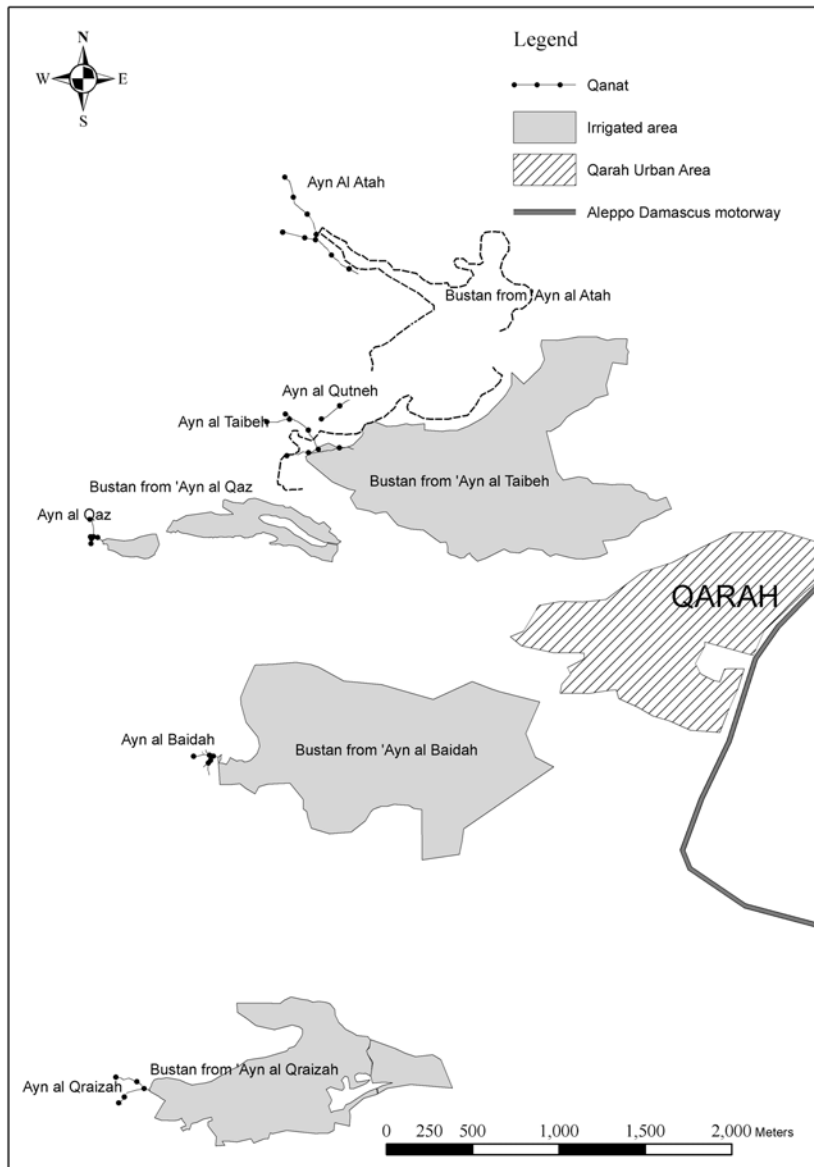


Qanat = —
Green = Area of Byzantine settlement

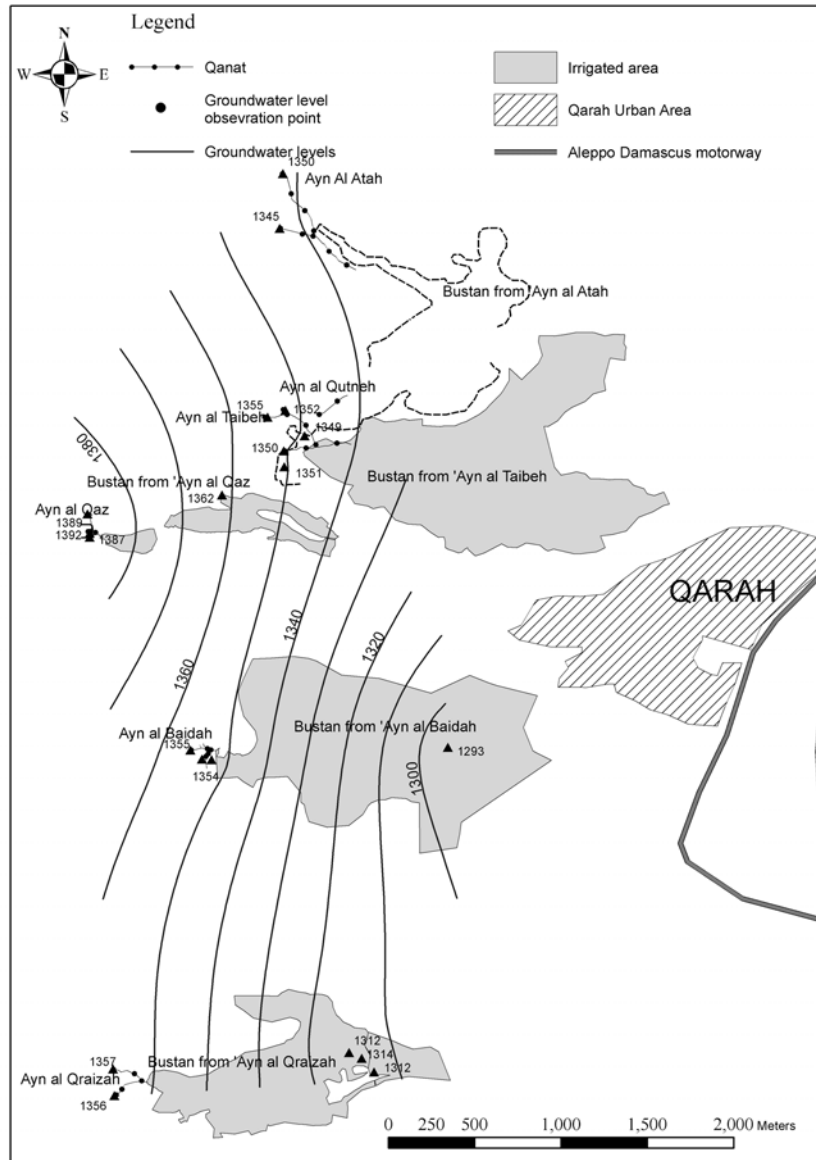
Map 5 - Aerial Photo the Khanasser Valley, 1958 no: P327Sa (source: ICARDA-GIS Unit)



Map 6 - Location Byzantine sites near Shallalah Saghirah



Map 7 – The Qanat site of Qarah



Map 8 - Groundwater levels around Qarah qanats

APPENDIX 2 MARRIAGE ALLIANCES SHALLALAH SAGHIRAH

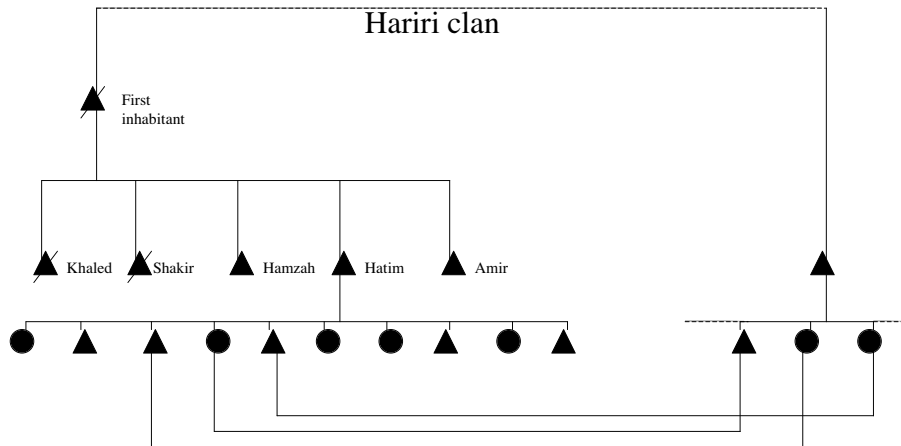


Figure 62 - Marriage alliance between Bayt Hatim and the higher echelons of the Hariri clan

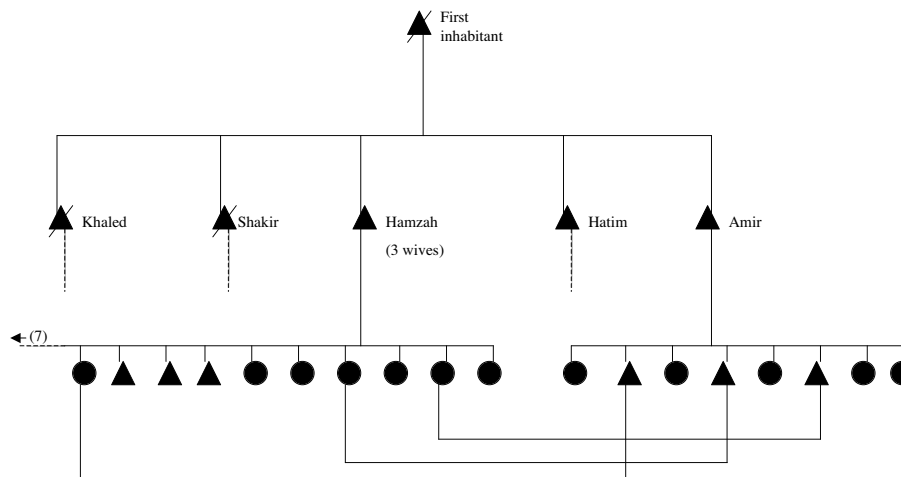


Figure 63 - Marriage alliance between Bayt Hamzah and Bayt Amir

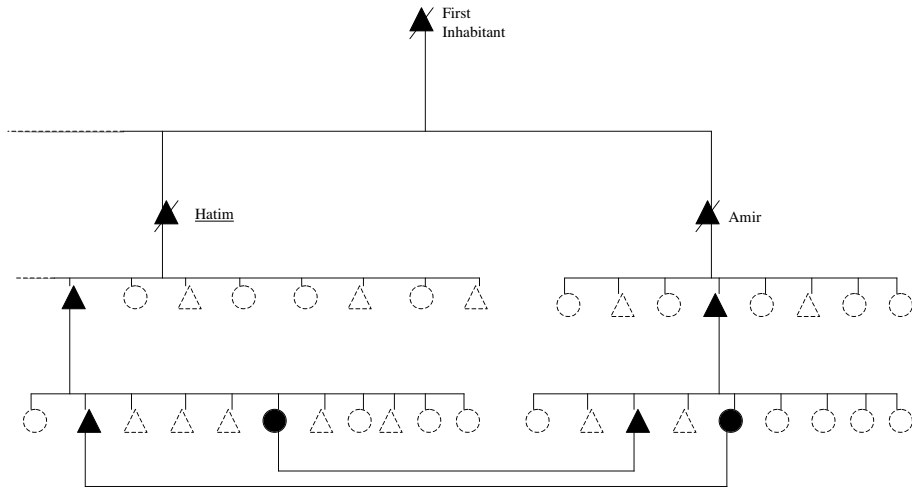


Figure 64 - Badileh marriage between Hatim and Amir lineages

APPENDIX GENERAL SITE INFORMATION OF SYRIAN QANATS

Site name	Qanat status 1994 (Lightfoot, 1996)	Qanat status 2000/01	Users households	Cleaning history	Last year of cleaning	Main qanats	Qanat type	Ownership of qanat	Leadership in community	Data collected
Shalalah Saghirah	No data	Flowing	25	Not regularly cleaned	2000	1	Spring	Private	None	1998-2004
Mot'allaq	No data	Standing	1	Not regularly cleaned	Not known	1	Spring	State	Mukhtar	15/02/2001
Membej	Dry after pumping	Dry	0	Not regularly cleaned	1985	7	Spring	State	Mukhtar	09/11/2000
Harim	Dry	Dry	2500	Irrigation channels are regularly cleaned, qanat is not	1995	7	Spring	State	Baladiya	11/02/2001
Salquin	Dry after pumping	Dry	300	Not regularly cleaned	N/A	2	Spring	State	Baladiya	12/02/2001
Armanaz	No data	Dry	1800	Not regularly cleaned	In 1990 only the source in 1967 the tunnels	2	Spring	State	Baladiya	13/02/2001
Khirbet Martin	No data	Poor flow	Not known	Not regularly cleaned	1970	1	Spring	State	Mukhtar	11/02/2001
Jdain	No data	Standing	Not known	Regularly cleaned	recently	1	Spring	Private	N/A	12/02/2001
El Qubayi'	No data	Standing	12	Not regularly cleaned	1995	1	Spring	Community	No	13/02/2001
Marata Es Shelf	No data	Dry/filled	Not known	Not regularly cleaned	1990	1	Filtration /spring	State	Baladiya	14/02/2001

Site name	Qanat status 1994 (Lightfoot, 1996)	Qanat status 2000/01	Users households	Cleaning history	Last year of cleaning	Main qanats	Qanat type	Ownership of qanat	Leadership in community	Data collected
As Sa'an	Flowing	Static water		Regularly cleaned	80's	7	Filtration	Community	Baladiya/Mukhtar (Sa'an)	20/03/2001
Nedwiye el Qdeir	No data	Dry	7	Not regularly cleaned	1975	1	Filtration /spring	Private	No determined leader	28/04/2000
Breij	No data	Flowing	350	Regularly cleaned	2001	1	Filtration /spring	Community	Baladiya	04/04/2001
Qdeim	Dry	Dry	1	Not regularly cleaned	1994	1	Filtration	Private	Shaykh	28/04/2000
Khamasser	Dry after pumping	Dry	0	Not regularly cleaned	1972	1	Filtration /spring	State	Mudir el nahia	01/04/2001
El aweina	No data	Dry	0	Not regularly cleaned	not known	1	Filtration /spring	N/A	No determined leader	31/03/2001
Kleia	No data	Dry	0	Not regularly cleaned	not known	1	Filtration /spring	State	Mukhtar	31/03/2001
Andarin	Dry after pumping	Dry	0	Not regularly cleaned	not known	1	Filtration	State	No determined leader	20/03/2001
Al Qowm	Dry after pumping	Dry	0	Not regularly cleaned	not known	1	Spring	State	Mukhtar	28/04/2000
Tal At'tout	Dry after pumping	Dry	0	Not regularly cleaned	1980	2	Filtration	State	Mukhtar	04/04/2001
Ghumhur	Dry after pumping	Dry	0	Not regularly cleaned	not known	5	Filtration	State	Mukhtar	04/04/2001
Sukmah	Flowing	Static water	x	Not regularly cleaned	not known	1	Filtration	Community	Mukhtar	28/04/2000
Arak	Flowing	Flowing	30 hh	Not regularly cleaned	1980	3	Filtration /spring	Farmers community	Only head of cooperation, no mukhtar or raiz baladiya	21/03/2001
Bir Kabajib	Flowing	Static water	150 hh	Not regularly cleaned	1984	1	Filtration	Community	No determined leader	21/03/2001

Site name	Qanat status 1994 (Lightfoot, 1996)	Qanat status 2000/01	Users households	Cleaning history	Last year of cleaning	Main qanats	Qanat type	Ownership of qanat	Leadership in community	Data collected
Jaquziyah	No data	Dry	0	Not regularly cleaned	not known	1	Filtration	State	No determined leader	20/03/2001
Amsareddi	Dry	Dry	0	Not known	not known	1	Filtration	Private	No determined leader	28/04/2000
Ruhaybah	Dry after pumping	Dry	0	Not regularly cleaned	1980	2	Filtration /spring	Private	Mukhtar	14/03/2001
West Ghouta (Darayya)	Dry after pumping	Dry	0		not known	10	Alluvial	Government	Baladiya	12/03/2001
Maatoula	No data	Flowing	900 (2 monasteries)	Not regularly cleaned, some deepening pf qanat	1970	2	Spring	Farmers cooperation	Baladiya	12/03/2001
Breikh	No data	Flowing in winter	100	Not regularly cleaned but protection of airshafts	2000	1	Filtration /spring	Farmers cooperative/ community/ Deir Attiyah	Deir Atiyah, no mukhtar	13/03/2001
Ras el Marra	No data	Flowing	560	Not regularly cleaned but irrigation channels are maintained	1997	1	Filtration /spring	Farmers community	Baladiya	17/03/2001
Mushrafih	No data	Flowing	3000	Regular maintenance	1996/7	1	Filtration /spring	Baladiya	Baladiya	17/03/2001
Sahl	No data	Flowing	600	Not regularly cleaned but some maintenance	not known	2	Spring	Farmers community	Baladiya	17/03/2001
Jarajeer	No data	Flowing	4500	Not regularly cleaned	1990	1	Spring	Farmers community	Mukhtar/Baladiy ^a	17/03/2001
Hmirra	No data	Drizzling	300	Not regularly cleaned	1995	2	Filtration /spring	Farmers community	Mukhtar	04/04/2001

Site name	Qanat status 1994 (Lightfoot, 1996)	Qanat status 2000/01	Users households	Cleaning history	Last year of cleaning	Main qanats	Qanat type	Ownership of qanat	Leadership in community	Data collected
Dumayr	Flowing	Flowing	7200	Regularly cleaned	2000	3	Filtration /spring	Farmers cooperative	Baladiya	14/03/2001
Qutayfah	Flowing	Dry	26000	Regularly cleaned/maintained	2000	1	Filtration /spring	Farmers cooperative	Baladiya	14/03/2001
Ain Altimah	Flowing	Flowing	400	Regularly cleaned/maintained	2000	2	Spring	Private	Baladiya	12/03/2001
Yabrud	Flowing	Dry	not known	Regularly cleaned	1990	2	Spring	Government owned and maintained since 1970 and used by local farmers	Baladiya	13/03/2001
Al Jubah	Flowing	Flowing	7000	Regularly repaired and maintained	1992	2	Spring	Common	Mukhtar in Mejar	16/03/2001
Deir Attiyah	Flowing	Flowing	500	Maintained periodically	1991	1	Filtration /spring	Farmers cooperative	Baladiya	13/03/2001
Qarah	Flowing	Flowing	19000	Occasionally cleaned	2001 (amah)	10	Filtration /spring	Common	Baladiya	15/03/2001
East Ghouta (Zabdeen)	Flowing	Dry	0	Maintained periodically	1992	2	Alluvial	Farmers community	Baladiya	13/03/2001