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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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Chapter 8 Qarah Renovation

Introduction

This chapter is partly descriptive and partly analytical. It concerns the community-based intervention (renovation) that took place at the site of Qarah during 2003/04. It describes the process of renovation of the qanat 'Ayn al Taybeh. The intention of this chapter is to provide an analysis of the renovation, its main actors and various endogenous and exogenous dimensions of collective action. The chapter will form a basis for comparison with the renovation of Shallalah Saghirah.

Organisation of this chapter

The first part of the chapter deals with the presentation of data and description of the renovation. It discusses previous government supported renovation activities in the region. Preparations of the collective action and initiatives that determined the course of the renovation are described. The main actors of the collective action are analysed as well as an overview of the process and execution of the renovation. The second part of this chapter analyses the endogenous and exogenous dimensions of collective action. It considers leadership and power relations between the main actors and initiators, social relations at user community level and the role of third parties. It will also describe the hydrogeological impact of the renovation and its effect on the further social and technical sustainability of the qanat. Finally, questions are raised about the cost-effectiveness and sustainability of the qanat renovation.

8.1 The renovation in Qarah from September 2003-April 2004

We first entered the site of qanat 'Ayn al Taybeh in March 2001 during our national survey. Afterwards we decided to include the site of Qarah in our in-depth investigations of qanats in Syria. Qarah was chosen alongside the sites of Arak and Dmayr[78]. We spent the months April and May carrying out fieldwork. At the time, the research team resided in the monastery of *Dayr Mar Yaqub*, which was used as a base to map, survey and investigate the surrounding qanats. It also meant we had daily contact with the users of the nearby qanat of 'Ayn al Taybeh. The *natur* was

[78] *An extensive description of both sites Arak and Dmayr can be found in the internal research report by Wessels, J.I., Hoogeveen, R., Aw-Hassan, A., Arab, G. (2003)" The Potential for Renovating Qanat Systems in Syria through community action –final project report for NRMP, ICARDA", Syria, 110 pp.*

present during the day, regulating the irrigation timeshares between the users. To open and close the reservoir (*birkeh*), he stayed every day from 8:00 until 16:00 in a purposely-built stone house next to the *birkeh*. The *natur* checks the amount of water in the *birkeh* using a specific measuring pole with lines representing the actual water shares of the farmer families. The line is held against the level of the water in the *birkeh* and tells the *natur* when to change the direction of the water flow towards a certain field. Both volume and time determine the irrigation share of a user. The user has paid for a certain amount of timeshare and both the *natur* and the chairman of the qanat committee divide the total volume of the *birkeh* just before opening. This maximum volume is divided into the existing timeshares, which then determines the place of the line on the measuring pole. It is the job of the *natur* to regulate the flow along the duration of the timeshare. If the pressure in the *birkeh* is too high and the water flows too fast, the *natur* is able to adjust the flow using the tap on the *birkeh*.

The *birkeh* was filled every day and the users used the water extensively. Although the qanat of ‘Ayn al Taybeh was flowing quite well, the *natur* of ‘Ayn al Taybeh had noticed a severe drop in flow since 1999. He explained the drop by showing the lines of the water level, which could be observed on the side-walls of the *birkeh*. The *birkeh* was built in 1999 and the first recorded water level, that was represented by a white line at 143 cm on the sidewall. But when we interviewed the *natur* of ‘Ayn al Taybeh on 24 April 2001, the fluctuating lines of the water level in the *birkeh* were between 80 and 89 cm. Both the *natur* and our key informants from ‘Ayn al Taybeh explained the drop in discharge by the lack of rainfall during the years 1998 and 2001.

Comparing the trend in the data we received from the regional directorate of irrigation, we correlated a similar drop in the discharge of the qanat of ‘Ayn al Taybeh. During the fieldwork, we noticed that nearby ‘Ayn al Qutneh had also dried up completely. Both qanats used to have the same owner in the past. Later the ownership was split among his descendants. The two qanats are physically connected but a wall prevents any water flow from the tunnel of ‘Ayn al Taybeh to ‘Ayn al Qutneh. The closure of the opening was constructed 40 years ago and consequently ‘Ayn al Qutneh dried up causing major disputes between the users. These disputes dissolved after a period of heavy rains when the flow in ‘Ayn al Qutneh returned through seepage from the raised groundwater levels. In 2000, the qanat of ‘Ayn al Qutneh dried up again; the users registered their land and water rights with the Qarah town hall and abandoned the qanat until the water would return. Their strategy was to wait for better rainfall years. Interestingly, some respondents said renovating the monastery was the cause of the drying up of the qanats. Since 2000 a small group of nuns had started to live in the renovated monaster with the

help of The Greek Melkite community of Homs, Hama and Yabroud. Farmers of both ‘Ayn al Qutneh and ‘Ayn al Taybeh to became suspicious towards the monastic community because the arrival of the nuns and the diminishing discharge coincided.

Poor maintenance was another reason the qanat galleries stopped flowing. Although the monastery had been completely renovated above ground, the underground water works had not been given the same attention. In 1999, a new tarmac road was built towards the monastery as well as a car park, covering some major airshafts. Some airshafts had been renovated only superficially. The remaining airshafts were partly collapsed and the underground tunnels had been left untouched; consequently the qanat tunnels had started to decline further and debris has accumulated. In spring 2001, we expected the qanat ‘Ayn al Taybeh to dry up in maximum 5-10 years time if no maintenance was carried out. At the time, the monastic community had experienced some water shortages but had not considered renovating the qanat. Instead the nuns were contemplating drilling deeper wells inside the monastery to find other sources of water supply. They had just installed some guest facilities such as showers and toilets and needed more water for their future needs.

The shock came in the summer of 2002, when the qanat of ‘Ayn al Taybeh dramatically dried up and became no more than a trickle. The *natur* had stopped working as of January 2002 and only farmers close to the outlet of the *birkeh* remained irrigating their plots with the meagre water supply. The monastery had attempted to drill deep wells but could only find brackish water. The nuns had started to order water tankers in for their water supply. This proved to be an expensive operation; the price was 300 SYP per 2,5 m3 of water including the rent of the tractor that brings the supply. They should pay 25.000 SYP ($ 500) to fill up their domestic tank completely once in three weeks. When the domestic tank is filled the water is pumped on top of the monastery. Previously, the monastery filled their domestic tank with qanat water and had a water right from the qanat of 2 days every 21 days. They paid far less for the water right on an annual basis to the farmers’ committee. Besides filling the tank, they also used qanat water to irrigate the garden. Now with the qanat water stopped, the situation was dire. Our 2001 projection of a remaining lifespan of about ten years for the ‘Ayn al Taybeh qanat had been far too optimistic.

The situation described above was the status quo when the first signs of collective action towards rehabilitation of the qanat of ‘Ayn al Taybeh were observed. The diminishing discharge was a major topic of discussion during feedback sessions in Qarah. Nearly a year later in 2003, a community based intervention (renovation) was executed. The following

sections concern the social processes and events leading to the development of this renovation.

8.1.1 Previous qanat renovations in the Qalamun basin

Before focusing completely on the renovation at the site of 'Ayn al Taybeh, it is necessary to describe some of the precedents of the renovation efforts in the region. The Qalamun region is situated between the Lebanese mountains and the south western tip of the Syrian Desert bordered by the Qalamun mountains. The area is well known for the presence of its qanats. The highest density of flowing qanats in Syria can be found in this region. The regional irrigation directorate has compiled an extensive database of hydrological data and monitors the flow of qanats as well as having upgraded the regular monitoring system. State subsidies also provide for repairs to be carried out under the supervision of the directorate.

With the government subsidies, some renovation works have been carried out throughout the Qalamun region. Some of the main renovation works took place in Dayr Atiyeh, Breikeh, Ayn al Tineh, Maalula, Dmayr and Qarah. In particular at the site of 'Ayn al Taybeh, the government had supported renovation in the year 1999 for the replacement of part of the old tunnel structure with a concrete tunnel. A contractor from Damascus carried out this work. The lining of the new tunnel was not properly done; in 2001 almost 10 cm standing water were observed in some parts and other parts 2 cm water. The qanat committee was not happy with the execution and accused the contractor of ignoring their advice; the work was carried out too fast without levelling equipment. The purpose of the concrete construction is unclear. According to the users, the new concrete tunnel was built because the farmers' community wanted to avoid the monastery pumping water from the qanat tunnel. A concrete tunnel would prevent this. However also it has been said that the concrete tunnel was built to strengthen the flow. In any case constructing a new concrete tunnel was faster and easier than renovating the old tunnel. The building contractors were said to be not experienced in rehabilitating old qanat tunnels. Therefore, the renovation was technically not a success. Furthermore some suspicion arose about potential corruption at mid-management level. In all government renovated sites, similar procedures and renovation techniques were carried out by external contractors under the supervision of the irrigation directorate.

The procedures for these renovation works are as follows; the community representatives, send a request for renovation to the Office of the Directorate of Irrigation of Awaj and Barada in Damascus. The request concerns a certain part of the qanat to be renovated. After the official request, the data of the monthly monitoring of rainfall, discharge

and chemical data are compared with the respective qanat. If it appears that the hydrological data indicate a declining trend in the discharge, the qanat is considered for renovation. All annual requests are ranked at priority of severity of diminishing discharge. Depending on the allocated state budget and the technical requirements for the renovation, two to four qanat sites per year are selected for renovation. The government takes full responsibility for the repair and cleaning work. The directorate approaches a local contractor to organise the renovation. It is the responsibility of the contractor to choose workers for the cleaning. The workers are paid according to the amount of debris they remove or according to the amount of meters they have cleared. There is little to no involvement of the user community in renovation, except for the *natur* and the chairman of the users committee if it exists.

The most common renovation technique of the directorate of irrigation is the so-called *sunduqiye* technique. The materials used in this renovation method are mainly reinforced concrete and modern calcareous blocks for masonry. The equipment used is an electricity powered modern winch and pulley together with hand shovels and pneumatic drills. The *sunduqiye* technique lends its name from the word *sunduq* meaning "box" in Arabic. The technique builds a concrete tunnel in the form of a square box that is placed in the old tunnel. The water is then led into the concrete tunnel. This reinforcement strengthens the structure of the tunnel and prevents collapsing.

There are several advantages and disadvantages of using reinforced concrete in *qanat* tunnel renovations. Firstly, the reinforced concrete provides a strong structure to the tunnel that secures the flow in the water transport section if placed in the correct gradient. Secondly, as a material, concrete is cheap and for the labourers relatively safe and easy to place. It takes less time to carry out the renovation works than if old masonry techniques are used. The Directorate of Irrigation prefers the use of outside contractors and concrete tunnels rather than implementing techniques that follow closely the traditional techniques used by the users' communities. One of the main reasons is the safety that has to be guaranteed for the outside contractors. As a general rule, the government is called in when any form of construction works is planned, legally they are responsible for supervision to prevent accidents and ensure construction according to certain guidelines set by the directorate of irrigation.

The use of concrete has some important disadvantages; if the *sunduqiye* technique is used in water production sections, it will hamper all potential sources and infiltration into the qanat. The problem is solved by drilling holes in the concrete at places where sources feed the qanats. But the use of a concrete tunnel to replace the old tunnel, also prevents an

accurate lining of the gradient of the tunnel; hand-dug tunnels can be adjusted more precise than a prefabricated re-enforced tunnel. In many cases of previous renovations, an incorrect gradient was observed whereby the water in the tunnel is deep and stands still in parts of the concrete tunnel. The use of concrete also diminishes the architectural and cultural value of the qanat.

The level of priority for qanat renovation for the government is lower in relationship to the other budget items of the regional directorate such as the drilling of deep wells for industrial, domestic and agricultural water supply. At the level of contractors hired by the government there is a general lack of communication with the users community and traditional techniques are not regarded as sufficient for renovation. Hence some renovation works carried out by the Directorate of Irrigation have been counter-productive. In two cases, the tunnel had to be re-opened by the user community to break down the concrete renovation works to open the flow of the water.

Lastly, there is a lack of communication between the directorate of irrigation and the Directorate of Antiquities of Damascus country-side (*Reef Dimashq*). Both directorates have documented and registered qanats in the same region. The Directorate of Antiquities has registered qanats that have value as an archaeological site whilst the Directorate of Irrigation has registered sites that are important sources of water supply. Both criteria are essential when considering qanat renovation but in practice, there is a discrepancy between the two. The positive side is that there is a notion of the existence of qanats in the region at governmental level and that initiatives are being developed to register and protect both the hydrological and cultural value of qanat site. These circumstances were helpful for the enabling environment of the renovation in Qarah.

8.1.2 Main actors of the renovation

The main actors of collective action can be distinguished in the case of the renovation at the site of ‘Ayn al Taybeh. Figure 52 shows them divided in seven main categories; The monastic community of *Dayr Mar Yaqub*, the Qanat committee ‘Ayn al Taybeh, Qanat experts Ma’aloula/Nebk Qarah municipality, Directorate of Irrigation of Awaj/Barada, international consultants and the funders of the renovation.

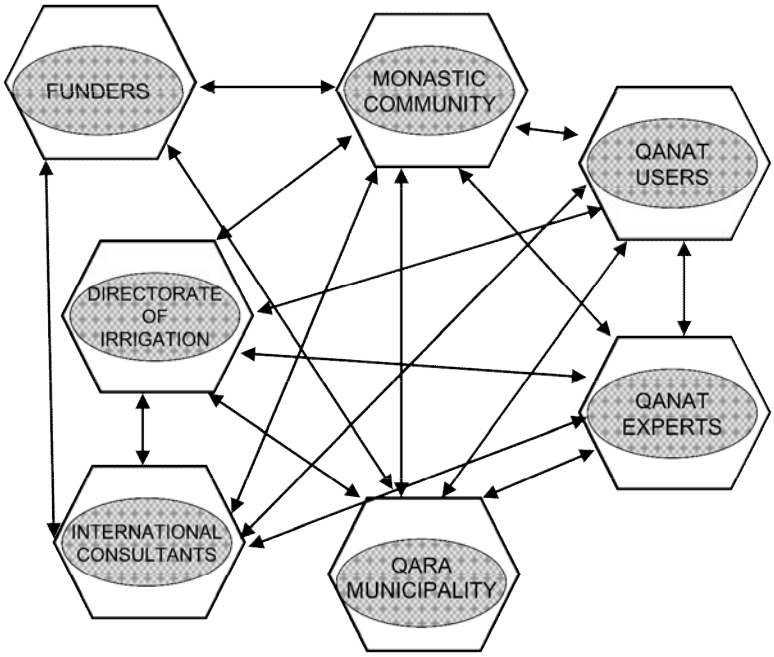

Figure 52 - Main actors Qarah renovation

Although the renovation in Qarah was a result of previous action research activities of an ICARDA research team, during the execution of this renovation there was no institutional involvement of ICARDA as a main actor. One of the main reasons for this was that the initiative of this renovation came from the monastic community. They decided not to approach ICARDA with their proposal for a community based intervention. As an autonomous and legal institution, the Monastery had directly approached funders in Damascus. This was a logical step considering the access and close proximity of the international institutions in Damascus compared to ICARDA located in Aleppo and secondly, the mandate of ICARDA is focused mainly on agricultural research and as such does not function as a development organisation. Moreover, the ICARDA qanat research team had been dissolved in September 2001 after the end of my contract as an Associate Professional Officer (APO) for the Dutch government seconded to ICARDA. This also marked the official end of the research activities for the DGIS/SDC supported qanat action research project hosted by ICARDA. Therefore there was no presence of an ICARDA representative during the renovation of 'Ayn al Taybeh that started in 2003.

Parallel to the renovation analysis of Shallalah Saghirah, each of the categories above can be divided in their own microcosmic division of

individual main actors that have dealt with the execution of the renovation on a daily basis. The configuration of main actors will be used in the following sections to describe and analyse the renovation in Qarah. A point of caution needs to be mentioned here; whereas in the analysis of the case of Shallalah Saghirah I had an intimate knowledge of the multiple types of individuals, specifically in the group of villagers, this level of knowledge does not exist for the groups identified in the renovation of Qarah.

Let us start with the monastic community as a main actor of the renovation. The monastic community represents the Melkite church of Qarah and consists of seven nuns led by the Mother of the community. The community is part of the "Maison d'Antioche" located in Zouk Mikael, Lebanon. The Maison d'Antioch coordinates an atelier for the restoration of the written and painted heritage of the Christian Middle-East. It has set itself the objective to protect and conserve the cultural heritage of Christianity in the Middle East by serving as an operational platform for initiatives to increase the knowledge and conservation of this heritage. To this purpose, the Maison has a wide network of local and international experts on iconography and Christian Art in the Middle East. It organises international seminars and projects on public awareness, inventory of materials both in private collection and public property, conservation and restoration of iconography and preventive measures. The Monastery of *Dayr Mar Yaqub* plays an important role in the conservation of this cultural heritage.

Since 2000, seven French and Lebanese nuns headed by a Mother, started living in the Monastery. The monastery has approximately 35 guestrooms with basic facilities for visitors for spiritual retreats and experts who work on restoration of icons. The daily activities of the nuns mainly concern the restoration of icons, household activities and spiritual nourishment such as praying together at set times. The site of the monastery provides a peaceful and quiet environment for them to carry out this work.

The qanat users is a group of users of the qanat of 'Ayn al Taybeh. A committee, a selection of the biggest shareholders of irrigation rights, represents the users. They collect yearly contributions of all the irrigation right holders on an annual basis to pay the salary of the *natur* and costs towards repair works both above ground (open channels) and underground (tunnels). The committee is recognised by both the municipality of Qarah and the regional irrigation directorate of Awaj/Barada as a legal institution. It consists of the main irrigation right holders of the garden. Mother Agnes as the representative of the Monastery, the biggest shareholder, is a member of this committee. One of the main influential individuals in this group is the head of the Zayn

family. The Zayn family has lived in Qarah since 400 years. The present family group is centred around seven elder brothers of which the oldest one living is regarded as the principle qanat expert of the family. But his age prevents him to take active seat in the committee and his son-in-law has taken over the position as chairman. He regulates and monitors the irrigation rights and their trade among members together with the natour. The natour is paid through the qanat committee contributions. The Zayn family members are depending mainly on irrigated farming and off-farm trade. Although many family members also travelled abroad for migration work, for example in 1955 one of their elders went to Saudia Arabia to help build a tarmac road. As a family they have a personal and good relationship with the Irrigation Directorate of Barada/Awaj.

The third group consists of local qanat experts. These are labourers from mainly Ma'aloula and the nearby town of Nebk. The monastic community had identified the qanat experts with the assistance of the qanat committee. The village of Ma'aloula lies some 30 km south of Qarah and is famous for the language of Aramaic that is still spoken widely in the village. This language is thought to be the colloquial language spoken in the time of Jesus. Ma'aloula is a majority Christian village and its Monastery of Saint Taqlah makes it a main tourist venue in Syria. There is a qanat system in Ma'aloula and the local experts had been repairing this system and other systems throughout the Qalamun for several years. A senior traditional qanat expert from Nebk guided the group who had wide experience in applying traditional masonry techniques in the restoration of qanats of the Qalamun.

A fourth group of main actors is the municipality of Qarah led by the Mayor of the town. Qanats in Qarah are of historical importance and as such are featured in the information material for tourists visiting Qarah. Until the arrival of piped water supply from the government, the town had been completely dependant on the supply of water by the qanats. The historical value as well as the agricultural value for the town is significant and as such, the mayor takes an interest in qanat renovations. The municipality is the first representative of governmental leadership as well as seat of the local Baath party. Officially the qanat committee should be registered as official instititution with the municipality as wel as the individual names of all right holders and their right.

The fifth group is the Directorate of Irrigation of the Barada and Awaj Basin. Until 2006, the Directorate of Irrigation of the Awaj and Barada Basin belonged to the Ministry of Irrigation (MOI)[79]. The

[79] *The respective regional directorates of Irrigation were divided based on seven main basins in Syria respectively Barada-Awaj, Yarmouk, Orontes, Coastal, Tigris and Khabour, Euphrates and Steppe (or Badia). The*

Directorate of Irrigation for the Barada and Awaj Basin was created in 1986 as quasi-autonomous body by law no.17 (Trolldalen, 1997). This was an important step towards decentralisation of the Ministry of Irrigation. As described in the previous chapter, the Barada and Awaj Basin faces a most urgent ground water deficit. As such the Directorate had an enormous task at hand. The Directorate had the responsibility for many functions of the MOI such as planning and design, collection of data, water resources studies, development and protection of water resources and operation of irrigation projects and hydraulic works. Qanats in Qarah thus fell under the official responsibility of the Barada and Awaj basin.

The sixth group of actors are the international consultants. On the request of the monastic community and the funders international experts visited the site of the qanat of 'Ayn al Taybeh twice during the execution of the renovation. These were myself, as independent researcher and qanat specialist and a German consultant on hydropower who was especially asked to look at the feasibility of re-using the old water mill in the Monastery. These actors played an advisory role in the execution of the renovation.

The seventh and last group consisted of the funders. Representatives of three European embassies; the German, Dutch and Swiss Embassy were part of this group. The project was the first project organised between these partners outside of the European Union representation. In this sense, the project was unique. The funders took some part in the renovation proposal development but left the management to the community. Important for this group was the successful renovation and by visiting the site at crucial moment during the renovation the funders gave high profile to the undertaking. Obviously most of the financial support came from the funders, which gave them automatically an important power dimension in relation to the community.

8.1.3 The power of video feedback

In 2002, I went back to Qarah to collect more field data and organise a community video feedback session. The aim was to use the video in a facilitated focus group meeting to discuss the problem of abandonment of qanats and possible policy solutions on the ground.

Barada and Awaj Basin is the main basin for the Damascus country side. However, the organisation of the MOI is drastically re-organised in 2006. Instead of basin-based directorates and the MOI, a General Organisation for Water Resources (GOWR) will be established. Detailed information and structure was not available at the time of writing (source: WRIC, 2005).

Furthermore the feedback session would give me insight into the attitude of the farmers and users towards qanat rehabilitation. The main subject of this rough-cut version film was the national survey we had carried out combined with interviews and material filmed at Shallalah Saghirah, Dmayr, Arak and Qarah. It was thought that showing a renovation and various other qanat sites in Syria, specifically the transect walks which we filmed with key informants, would evoke reactions from the farmers of Qarah. This in turn would provide valuable information for the research.

I decided together with the Mother of the monastic community to organise a meeting with the user community of Qarah on the 22 August 2002. Since the problem with the qanat 'Ayn al Taybeh was very recent and quite urgent, the Mother of the monastic community suggested to hold the feedback meeting at the Qarah Cultural Centre of the local Baath Party branch and also invite the Mayor of the town, the head of the Baath party and representatives of the Directorate of Irrigation of Barada and Awaj. The feedback session attracted some 60 farmers from Qarah and the video film was received well. Most farmers identified with the problems stated in the interviews such as the rapidly changing lifestyles, urbanisation, migrating young people, the drought of the recent years, the collapsing of tunnels and the general nostalgia that was expressed about the usefulness of the systems and how wonderful the qanats had been in the past.

The power of video became apparent when the farmers watched footage of a transect conducted by a farmer and the research team in the bustan of 'Ayn al Qraizah. His choice of words, he had a strong Qarah dialect[80], first caused hilarity in the farmers group. The atmosphere became relaxed and the identification with the farmer in the video caused a sense of belonging and recognition. The farmer explained that the problem of the land was the overpopulation and the drought. The group became quiet when in the video, the farmer discussed the problem of the pumps. He explained that many owners of pumps had used bribes to get a permit to pump water. Then he continued with an explanation of the situation of the drinking water supply. The main piped drinking water comes from the deep governmental bore-holes in Qarah. These wells are drilled into what he calls "a sea of water" and this affects the qanats. He complains that this "*sea is being emptied and taken to Damascus*". With the exception of some drinking water, Qarah gets no supply. In fact, the

[80] *The area of the Qalamun in Syria is well known for its unique collection of Arabic dialects. Most famous is the well-researched dialect of nearby Nabk. (source: Le système vocalique du dialecte arabe de Nabk (Syrien): changements diachroniques et synchroniques. In: Ferrando, I. & Sánchez Sandoval, J. (eds.): AIDA 5th Conference Proceedings. Cádiz 2003, 501–9)*

deep wells are solely for the Qarah municipal piped water supply. The remark of the farmer indicates that there is a inequality between the capital and the Damascus region.

The video feedback session ended with footage showing the damage in the qanat ‘Ayn al Taybeh. The group discussion that followed the screening of the first film generated a flurry of remarks between the various stakeholders that were present concerning the problems of the qanats of Qarah. Especially some of the major water right holders and representatives of the committees had taken this opportunity to express their requests concerning improvement of their qanat systems. The Mother of the monastery then requested the latest material to be shown, footage that I had filmed days before to document the diminished flow of the qanat ‘Ayn al Taybeh and the damage to the air shaft and tunnel sections. The screening of this material generated strong reactions from the stakeholders. They were shocked when they saw the state of the qanat and demanded that ‘Ayn al Taybeh be immediately cleaned and renovated. The leader of the Baath party and a representative of the Directorate of Antiquities who were present expressed their commitment to initiate procedures from their institutional bases. The Mother of the Monastery committed herself to initiate a search for funds for the qanat renovation. She discussed with the farmers committee on how best to approach the various funders. The Monastery, with 2 days in a 21 day rotation, was the largest irrigation shareholder and therefore had the right to decide upon this initiative.

The reactions during the feedback session prove the power of the use of video in development. The feedback session was set up to facilitate the communication process between various main actors and stakeholders of the qanats in Qarah. The use of video was a technique to start up a two-way communication process between the farmers, the researcher and the government representatives. The video interviews with stakeholders from Qarah forced the government representatives present in the room to listen to the opinions of local people. Importantly, the video provided a technique to convey opinions and views of other qanat users in Syria, from sites like Arak, Dmayr and Shallalah Saghirah to the qanat users of Qarah. It obliged both the government representatives and other stakeholders to listen to the various views, opinions and explanations about the on-going abandonment of qanats in Syria. The video induced reflective listening and dialogue afterwards. This reflection coincides with the reflective moment in participatory action research; the use of video at this moment has not been explored in the academic world fully but in the case of Qarah it proved to be a critical moment to use video feedback techniques. In this study, video is used as methodological tool to facilitate

observation, communication and reflection on the collective action rather than being the sole object of study.

The versatile nature of digital video made it possible to screen footage recorded days before on the request of one of the key respondents. This key respondent recognised the power of the tool and used it to her benefit in maing her statement about the drying up of the qanat of ‘Ayn al Taybeh. This action was not planned but induced an interesting dialogue and self-reflective process amongst the participants of the feedback session. The meeting ended with promises and commitments of various stakeholders to start up a community based initiative to renovate the qanats, in particular the qanat of ‘Ayn al Taybeh.

The monastery and the farmer’s community had achieved significant engagement momentum with the mayor of Qarah after the organised feedback session. A dialogue between the three stakeholders started to take shape. They agreed that a difficult social situation had emerged due to the drying up of the qanats. According to the municipality 40-45 % of the local income is derived from irrigated agriculture and the lack of water has meant that poverty has loomed for the farming community. Less than a year later, the three parties approached the German, Dutch and Swiss embassies in Damascus with a request for funds to support the renovation of the qanat ‘Ayn al Taybeh.

8.1.4 Preparations of collective action

The enabling environment for the renovation in Qarah had overall been favourable for the development of the community initiative described above. These favourable factors are especially found in the social and political environments. There was a strong commitment and willingness from at least three major community stakeholders to invest in future renovation efforts. Their traditional system was well established with a long history. The lead provided by the monastery in developing the initiative was beneficial at several levels; as the biggest shareholder of the irrigation right of ‘Ayn al Taybeh, it had a legitimate leadership position and there was a good rapport with the farmers and the monastery after the feedback session. The monastic community under the leadership of Mother Agnes already had strong social capital both with local and regional government but also as also at the international level. The facilities at the monastery such as a computer and communication equipment helped in establishing contact with international agencies. The mere fact that the monastic community could communicate in English with potential funders was beneficial. The power of vocabulary is easy to underestimate but it shapes and interacts with the ways we think and behave (Chambers, 2005). In a development context, language and choice of words continues to shape both the policy of funders and the behaviour

of those that seek funds. Those who master the latest vocabulary have most chance to win funding.

Although the socio-political circumstances were favourable towards an enabling environment, the environmental factors were less favourable; the area had known a series of drought years and the groundwater levels around the qanat 'Ayn al Taybeh had been influenced by pumping activities both in the South and the governmental piped water supply point further towards the Lebanese mountains. The effects of these environmental factors were not measured in detail such as isotopic analysis but it is assumed these two factors had a strong negative effect on the declining discharges. However, the observation that the qanat 'Ayn al Baydah had gained in water flow after some minor cleaning works in 2001/2 and the fact that this qanat was the nearest southern qanat was hopeful. The observation of still standing water in all tunnel branches of qanat 'Ayn al Taybeh and the severely neglected state of repair had encouraged us to expect that a renovation effort for the construction of 'Ayn al Taybeh would result in an increase in discharge and therefore beneficial for the user's community.

The monastic community had requested the research team to compile scientific advice for them based on the survey work done in 2001 and 2002. This advice was duly developed in September 2002[81]. The advice concluded with social, institutional and technical recommendations for the qanats. The advice stated that the qanats of Qarah have an active and well established traditional user community but there is a tendency that the younger generation is moving away from farming towards urban employment, specifically to Damascus. The government support is fairly well developed but farmers should be involved at an equal level in renovation efforts. The presence of the renovated monastery, its fresco's and the importance of the site for international heritage, justifies the assistance to maintain and conserve this valuable system as a human ecosystem.

The discharge of 'Ayn al Taybeh had been significant in the past and the advice included several remarks on the prospect of the discharge of the qanat after renovation works. In our survey we could not identify major groundwater abstraction around the proximity of the qanats in Qarah and the official irrigation laws prevent drilling of wells within 1 km of the sources of qanats. However near 'Ayn al Taybeh, there were two groundwater users; the monastery itself and the neighbouring poultry

[81] *Wessels & Hoogeveen, 2002, Internal advice and report on Qanats of Dayr Mar Yaqub - an extract of the scientific reports for ICARDA and the United Nations University prepared for the monastic Community of Dayr Mar Yaqub, Qarah*

farm. It was recommended that both users should agree upon the amount of water to be used. The flow in the qanat showed a downward trend and the nature of the sources of the water flowing in the qanat needed to be thoroughly researched and identified. It was advised that a groundwater balance should be drawn up by the Directorate of Irrigation to determine the exact influence of pumping activities. Other advice concerned the building of infiltration dams, as it was observed that near the qanat of 'Ayn al Baydah, the infiltration dam had been beneficial for the discharge. Infiltration dams are thought to increase infiltration into the alluvial fan that feeds the qanats. Alternative water resources and ways to use them were also discussed in the recommendations, such as the reuse of domestic waster water for the monastery and the introduction of drip irrigation techniques. A precedent was already set by farmers in several of the gardens of the qanats in Qarah.

Institutionally, it was advised that the Monastery renovates the qanat of 'Ayn al Taybeh in co-operation with the other stakeholders such as the farmer's committee, the local government representatives. The position of the Monastery was favourable because it already had received large sums of financial resources to renovate the ancient church and monastery and had access to both Ministerial representatives and foreign donors. Furthermore the advice included a recommendation that the Directorate of Antiquities and the Irrigation Directorate of Awaj/Barada be closely involved in the renovation. The Directorate of Awaj/Barada had experience of several years of government subsidised qanat renovation and the Directorate of Antiquities of Damascus country side had gained considerably experience of qanat renovation during spring 2002, with the execution of the renovation in Dmayr[82].

After the the area maps and the advice became available, the Monastery of *Dayr Mar Yaqub* started negotiations with their fellow stakeholders and successfully approached international funders at Embassy level in Damascus. In August 2003 a draft agreement was drawn up between three European embassies and the monastery representing the farmer's community of the qanat of 'Ayn al Taybeh. In the agreement, the farmer's community had stated that they were prepared to invest in the material costs of the renovation;

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[82] *The Community Based Intervention at Dmayr had been carried out in Spring 2002 within the framework of the overall study on qanats. A detailed description can be found in the project report; Wessels, J.I., R. Hoogeveen, Aw-Hassan, A., Arab, G. (2003) the Potential for Renovating Qanat Systems in Syria through community action –final project report for NRMP, ICARDA, Syria, 110 pp.*

(.....)

The farmer's community along with the Mar Yaqub Monastery have decided to restore the Qanat of 'Ayn al Taybeh, following the orientations of Joshka Wessels who had, last summer, delivered a very successful speech, outlining the possibility of rehabilitation of the qanats[83]. The Mayor of Qarah has also been approached for this purpose. All three partners conerned are willing to pool their resources to ensure a successful restoration and hope to have back the important water supply that represents the future of the bustan[84]. Mar Yaqub monastery sunk a well to try to overcome the water crisis but this solution was not as successful as it was first thought. The water was salty and could not be used for drinking or agriculture. The only hope for the 'Ayn al Taybeh is a concerted effort to restore the antic Qanat. All our studies, beginning with those of Joshka Wessels, indicate that a good restoration of the Qanat would supply at least 300 to 400 cubic meters per day, which is almost the 2/3 of the last debit.

Although the farmer's community has submitted requests to three Embassies – in alphabetical order: Germany, Netherlands and Switzerland – they are also willing to meet some of the material costs:
1 – the farmers are willing to provide free labour up to 3 workers per day for three months
2 – The Mayor of Qarah will provide unlimited use of a bobcat and trucks
3- The monastery of Mar Yaqub will provide board and lodgings free of charge for the 2 supervisors of the project.
4 – Furthermore the farmers community is willing to support the necessary maintenance and cleaning in the future.

After a survey of the situation all three partners submit their requesst to the above mentioned embassies requesting financial help for this important matter of survival.

General project objective
To renovate and sustain the vital water resource represented by the 'Ayn al Taybeh qanat. Restoration work will concentrate on preserving the authenticity of the Qanat by using traditional local material and techniques
(…)

Source: Project agreement " rehabilitation of the qanat water system Qanat 'Ayn al Taybeh Qarah – Syria – compiled by the Monastery of Saint Jacques de Mutile (Mar Yaqub)

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[83] *This section refers to the video feedback session organised in Qara in 2002*
[84] *Irrigated garden (Arabic)*

With this agreement, international funds were allocated to the Monastery and logistics for the renovation work could be arranged. A meeting with the farmer's community was organised to discuss the organisation of the renovation. A specialist group of qanat cleaners both in Ma'aloula and Nebk was approached to carry out the daily work, a daily supervisor would be appointed from the Ma'aloula group. The Directorate of Antiquities was informed and it was decided that a representative of the Irrigation Directorate of Awaj/Barada would visit the site regularly for governmental supervision. The Mother of the Monastery would take care of the overall project coordination.

8.1.5 Execution of the renovation

Having secured the outside funding from the three embassies, the monastic community began preparing the renovation effort at the beginning of September 2003. After discussions with the other members of the Qanat committee, the qanat experts were selected and a topographical survey conducted. The Irrigation Directorate provided a topographical map of the area. The three galleries of Qanat 'Ayn al Taybeh were surveyed. The various airshafts of the qanat were surveyed and damage reports developed. Water levels were taken from each airshaft, showing a problem with the gradient. The survey team also measured the discharge at several points in the water course. They also measured a figure of 11,304 litres/day in the water production section, 19,872 litres/day at the outlet and at the end of the open channel the qanat gave an average of 9,216 litres/day.

The measured water loss shocked the survey team and they realised that most of the loss of water during the course was due to the evaporation from the open channel leading to the irrigation reservoir. Together with the Irrigation Directorate and the qanat experts, the coordinator of the monastic community decided to discuss this find with the qanat committee. The qanat committee decided that the channel and *birkeh* should be cleaned with payments from the *sunduq*. They would decide whether there was budget left to cover the open channel to avoid evaporation.

The final preparatory task of the monastic community was the involvement of a *zahori* or water diviner/dowser to assist in locating possible springs. The term *zahori*[85] means the one who sees what is

[85] *The same term is used in Spanish where "zahori art", or geomancy, is focused on study of harmonizing energy streams in the earth, spiritual development and regeneration of the human being. It is based on the principle that each site, for living, working or sacred purposes has a particular energetic constitution.*

hidden and takes care of the earth. Given the spiritual background of the monastic community, it is not surprising that they would employ a dowser. The services of local *zahoris* are often employed by farmers to give an indication about where wells should be drilled. The local belief in the capability of a *zahori* to find water is strong and often they determine where wells are drilled and how deep they should be. The conclusion of the *zahori* that investigated the qanat of 'Ayn al Taybeh was that there was water 10 meters deeper than the actual level. This could be another aquifer below the water sources feeding the qanat.

After the preparatory activities, the cleaning work started on 16th September. The work was carried out by the qanat experts and continued for ten days. The group of qanat experts consisted of 5 specialist workers from Ma'aloula and 3 builders from Nebk. All workers had experience with qanat renovation. The group from Nebk was specialised in the traditional building of tunnels using slabs of stones whilst the group from Ma'aloula cleaned the tunnel and reinforced the airshafts. A daily supervisor was appointed from the Ma'aloula group. A representative from the Irrigation Directorate of Awaj/Barada Basin visited regularly the site to inspect the works. The Mother of the Monastery of *Dayr Mar Yaqub* took care of the overall project coordination.

The qanat experts worked in the water production section to clean out mud and reinforce the structures of the airshafts. In their work they re-discovered two karstic springs. The renovation focused on the cleaning of the water channel and rebuilding of the casing. The casing was rebuilt using traditional techniques. The stones used were built in a fishbone pattern similar to the walls renovated in the Monastery of *Dayr Mar Yaqub*. The renovation effort in Taybeh 2 reinforced the tunnel and its airshafts, providing extra strength to the structure. Already a double increase of flow was recorded after the cleaning of branch Taybeh 2. After ten days a German water expert, visited the site. He investigated the feasibility of rehabilitating the water mill that was located in the monastery.

A second visit by an international consultant (myself) took place in November. The consultant entered and explored the open channel, reservoir and tunnel of Taybeh 3 with the Ma'aloula supervisor and a representative of the farmers' community to give technical instructions. It was found that Taybeh 3 contained water that stands still. The tunnel was in need of renovation and cleaning. Taybeh 3 was a beautifully preserved example of a Byzantine qanat construction. Its sources section was high and strong construction dug in limestone hardrock. However there was a problem of blockage underneath the Monastery's parking lot and in the two first airshafts of the sources section. The open channel leading

towards the irrigation reservoir still lost much of the water through evaporation and leakage.

After the visit, a report was written with practical recommendations and sent to the monastic community and the funders. The conclusion focused on the potential outcomes of the renovation. The report concluded that to tackle the severe drop in flow of 'Ayn al Taybeh and other affected qanats, the overall groundwater policy in the region should be considered. There was a real danger of over-extraction of the aquifer providing the water supply to the Qarah qanats. On the long term without proper groundwater management in the whole Barada/Awaj basin, the future of Qarah's qanats looked difficult. Economically, the project could increase farmers' incomes if water flows increased. The additional water would enhance the local agriculture and enable a return to the traditional management system of water rights. However, the progress of the renovation work was very promising. The specialists were knowledgeable about the qanat technology and additional sources had already been opened up. The renovation of Taybeh 3 was also projected to give more water. Although the prospect of the renovation looked good, it was not envisaged that 'Ayn al Taybeh would return to its original discharge after the renovation project.

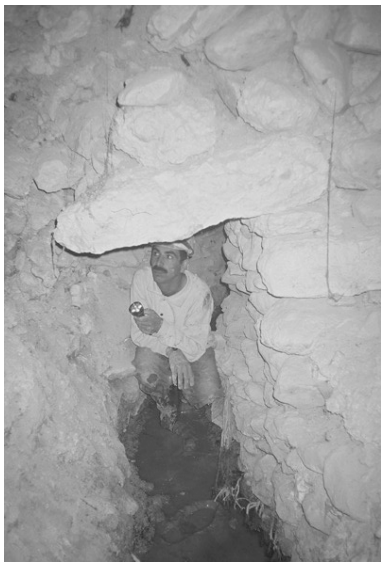

Figure 53 - Supervisor from Maaloula checks collapsed airshaft construction Taybeh 3 underneath the carpark

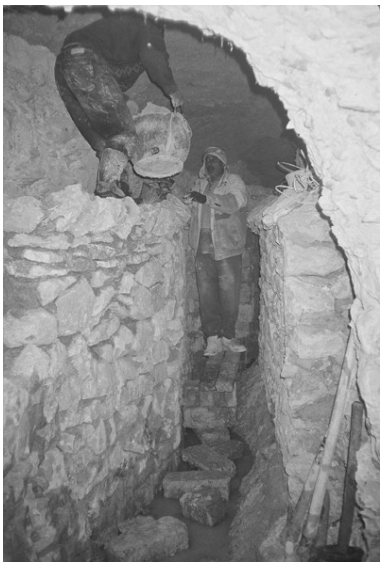

Figure 54 - Qanat experts at work in Taybeh renovation

Despite some delay due to cold weather, the work on the galleries of Taybeh 1 and 2 continued until January 2004. The team decided not to work on the concrete part of the tunnel that was introduced by the Irrigation Directorate some years ago. The coordinator of the monastic community considered this work as the responsibility of the Directorate. They felt a time pressure to finish within the project deadline and decided to continue with Taybeh 3, the worst affected branch of the qanat. This work took place between February and Mid-March 2004. The branch was most dangerous in terms of health and safety and careful precautions were taken before cleaning work started. Vaults and walls were rebuilt and where possible airshafts opened up and casings rebuilt. By the 11th March 2004, the renovation work finished.

In the final report of the monastic community it was stated that the work lasted 30 days longer than predicted. More than 850 meters of underground tunnels were explored and 25 tons of mud removed. The gradient of the tunnels have been restored to increase the water flow. More than 8 karstic springs were found and connected to the system. The casing, walls and vaults were rebuilt using original materials and building techniques to preserve the cultural heritage value.

The monastic community organised an inauguration day on the 29th April 2004 with representatives of all main actors present including European Embassy delegations with the German and Swiss ambassadors and a representative of the Dutch ambassador. This inauguration gave high profile to the renovation and was covered on national television. A

special plaque built by the municipality of Qarah was revealed to commemorate the renovation work in front of the qanat 'Ayn al Taybeh.

8.2 Endogenous and exogenous factors of collective action

This section provides an analysis of various endogenous and exogenous dimensions of collective action during the renovation of Qarah. The orientation-to-action grid of Uphoff is not used at this level due to the less intimate relationship between the researcher and respondents during this renovation. We collected the data of Qarah over periods of time with intervals during the renovation, whilst in Shallalah Saghirah the data were collected continuously. In our view, Uphoff's grid can best be used for analysis at micro-level, preferably the household, when there is a continuous on-site presence of the researcher. However, in Qarah, we can use the configuration of main actors both at community level and in the enabling environment as guidelines for the analysis of endogenous and exogenous dimensions. Various dimensions will be discussed in the following section to give an insight into the processes that took place during the renovation of Qarah.

As explained in previous chapters, the politics of water can be divided in four categories; every day politics, politics of policy, hydro-politics and global politics[86] (Mollinga, 2004, 2001). These four types have overlaps and connections, but constitute different domains that require different approaches for analysis (*ibid.)*. Everyday politics, where the core theme is social relations of power in a community or a region, is the focus of the following analysis of endogenous dimensions (*cf* Mollinga, 2001). Politics of policy is another (higher level) focus of analysis where formulation and sectoral water policies play an important role. This level is concerned with exogenous dimensions of collective action.

8.2.1 Leadership and power

The following section will discuss the power dimensions of the renovation. As endogenous dimension, the leadership of the renovation was clearly in the hands of the monastic community. Being the largest shareholder of irrigation rights in the users community, this was a logical development. The orientation-to-action of the monastic community is primarily driven by self-interest in terms of securing their envisaged future use the monastery for their monastic activities. They had tried to

[86] *Initially Mollinga identified three categories, the category of global politics has been added later in his theoretical thinking.*

solve the water problem by drilling a well but failed. Therefore the monastic community resorted to the rehabilitation of the ancient water supply. But self-interest is not the sole driving factor for the initiative that the monastic community developed. Together with a particular worldview of the monastic community on living in harmony with nature, these endogenous dimensions led to the development of another inspiration of the renovation. The power of a communication tool provided by a third party, i.e. the researcher's use of video for feedback, eventually facilitated the partnership between the monastic community and the municipality. The symbolic status and historical value of both the Monastery and the qanat was of primary importance for the Municipality of Qarah to preserve the identity of the town in tact.

The position and history of the monastic community gave them the power to mobilise other main community actors in the configuration of the renovation. As part of the Qanat committee they could assemble meetings with the rest of the committee members. Although the monastic community belonged to the so-called "lowers" (*cf* Chambers, 2005), they had power to initiate, convene, facilitate, coach and empower the rest of the qanat user community. This power is partly based on economics. The Monastery has the biggest irrigation share. And partly on the symbolic status that is respected throughout the qanat user community. The monastic community exerted this power unquestionably in the preparation, initiation and execution of the renovation. Furthermore by recognising the expert knowledge of the other committee members, they established good rapport with the second main shareholder, the Zayn family.

Figure 55 - Nun from monastry inspecting the work

Another power base for the monastic community was the access to international funds. The educational background, ability to communicate in the English language both written and spoken, the access to communication technologies such as internet and the previous experience with funding from abroad, all contribute to the capacity of the monastic community to communicate with the wider world in a manner that enhanced the development of a renovation. This technology and knowledge gap with the other qanat users

set the monastic community above many at community level. It gave them power over the farmers' community.

In addition a charismatic individual led the monastic community. We can identify the monastic community as the prime "initiator" of collective action. The orientation to action can be placed between self-regarding cooperation and other-regarding cooperation. The self-regarding cooperation is described above; the other-regarding cooperation is displayed in the argument that cleaning the 'Ayn al Taybeh qanat would help the whole user community from their state of poverty after a period of loss of the supply of water.

Obviously the dimensions of power are not only present at community level but also at the higher regional and national level . The power relationship between the monastic community and the qanat experts from Ma'aloula and Nebk was comparable to a client and a contractor. The qanat experts were hired from outside and given free board in the Monastery. The supervisor of the qanat experts regularly met with the Mother from the Monastery to discuss progress and results. The relationship was business like and the monastic community exerted power over the qanat experts.

The Qarah municipality and the monastic community had a more or less equal power relationship with each other. They needed each other to both reach their objectives with the renovation; first to survive and secondly to maintain the historical identity of the town of Qarah and gain possible revenue from increased tourism. Whilst the Municipality and the Directorate of Irrigation related to each other as government institutions, the relationship between the monastic community and the Directorate of Irrigation was one of ambiguity. The directorate was the official body to which the monastic community is responsible for carrying out the renovation. The renovation was not funded by the directorate, therefore undermining somewhat the decision-power of the directorate. The representative of the directorate however built up very good communication and rapport with both the monastic community and the Qanat committee. He was a well-respected and well-known individual whose orientation to action seems to be in the realm of individual generosity. He truly felt that renovating qanats was good for the future and worked on qanat renovations for over 20 years.

Let us now look at the power relationships between the monastic community and the remaining third party actors of the renovation. The relationship between the funders and the monastic community was unequal and based on dependency. The mere fact that reporting was required to unleash funds, gave the funders economic power over the monastic community and the rest of the actors. Although the community participation and ownership is one of the conditions for funding, it does

not take away the institutional power of funders as a paying party. As part of the 'uppers' with their funds they have the power over and power-to-empower the lowers.

Lastly, we look at the power relationship between the international consultants and the monastic community. Although the consultants are part of the 'uppers', the relationship was less unequal than between the monastic community and the funders. The relationship was more based on power-with than power-to-empower. However part of the relationship was also power-over. Both funders and the monastic community regarded me for example as a qanat specialist and advisor. A role, which I duly fulfilled based on my previous experience with renovations, study visits in the region and knowledge about the various research of qanats region wide. This gave me a power to guide the intervention. I was not in a position to mediate between funders and the monastic community and reported to both actors the practicalities of the renovation. The advice developed in the interim report guided the further practical steps during the renovation. The final power to decide was with the funders together with the Mother of the monastic community.

8.2.2 Social relations at user community level

This section looks at behaviour, strategic choices and social relationships of the user community. The social relationship between the monastic community and the wider user community of the qanat 'Ayn al Taybeh is somewhat ambiguous. There is a sense of distrust from some respondents about the intentions of the monastic community. The religious divide that exists in Qarah between Muslim and Christian farmers have not led to recent conflict between the two groups but in the past several events have led to religious violence. This violence is embedded in the collective history of both groups. One cannot say there is complete trust between the two groups. The recent entry of the monastic community since 2000, has raised some suspicion about the water use for the monastery's domestic water supply from the side of Muslim farmers. In addition to the religious dimension, the attitude of farmers, who are not a member of the qanat committee, towards qanat renovation, determined their willingness to cooperate actively in the renovation. The traditional management of the system does not require the farmers to contribute labour to renovation. An exception is made if a user is not able to pay contribution to the *sunduq* and prefers to work unpaid in maintenance instead.

In general, the user community was taking a waiting position towards the renovation. As long as there was no visible water increase, they did not feel inclined to work. Since the drying up of the 'Ayn al Qutneh*, Qaz* and 'Ayn al Taybeh, the farmers had lost the output of large

areas of irrigated land and turned to other sources of income as a solution. If they had other land, they would farm on lands belonging to the qanats that had increased. Another livelihood strategy was to find work in trading, construction work and urban employment. The *natur* of the reservoir of 'Ayn al Taybeh, whose prime responsibility it was to divide the water rights, stopped working on a daily basis after the decrease in water flow in beginning 2002. The house of the *natur* was standing empty and disused next to the reservoir. Only those users with land close to the reservoir were irrigating whenever it was their turn.

Gyawali (1998) distinguishes five styles of organising based on cultural theory; hierarchy, egalitarism, individualism, fatalism and hermits. We can see that the traditional organisation of qanat systems in Qarah reflected in that of the renovation is based on hierarchy. The system depends on a high degree of organisation for construction, maintenance and distribution of the water. There are power differences and unequal roles for members in this hierarchical structure. But we see that the organisation is moving from hierarchy towards individualism influenced by exogenous factors such as migration changing economy, markets and population dynamics in the enabling environment. Due to migration and the influx of off-farm income, the users are able to negotiate, sell and bargain on irrigation rights. There is also certain fatalism towards renovation, coping with everyday living as best as fate allows (Gyawali, 1998). The convincing argument for this is the perception of users that the main cause of the drying up of qanat is outside of their control. Therefore it is of no use to renovate a qanat when there is no prospect of increase in flow. "*It is all up to God, we can not help it*" is the general conclusion that is drawn. Some farmers have expressed that the real cause of the drying up is either due to the low rainfall or the existence of wells in the West. Some claim that the pump wells in Lebanon are responsible for over extraction of the water from the aquifer. In this approach the drying up of 'Ayn al Taybeh, can only be reversed if there is a comprehensive strategy for regional groundwater management.

The user community of 'Ayn al Taybeh was involved in the renovation of the qanat on several levels. The issue on the evaporation from the open channel had been discussed with the Zayn family in Qarah. Motivated by the increase of the water flow, the qanat committee decided to clean out both the channel and the reservoir. Furthermore the users communicated with the qanat experts from Ma'aloula and Nebk on the work in the qanat galleries. For example in the sources section, a possible connection with the qanat 'Ayn al Qutneh could have caused the water to flow from the qanat 'Ayn al Taybeh to 'Ayn al Qutneh. In the past, both farmers' communities have closed this connection to prevent further conflict between the two farmers' communities. The workers from

Ma'aloula were made aware of this past and took that into account during their work.

The users were not involved in the renovation work on a daily basis. One of the main reasons for this is the fact that the professional expert workers preferred to do the job underground. Apart from the professionalism there was also a sense of fear from the user community to work underground. Some years ago a farmer and his son were found dead in one of the qanats after a cleaning effort when an airshaft collapsed on them. Several other instances of qanat accidents were known in Qarah and thus had spread fear amongst the farmers. The users built up the airshafts walls above ground once the workers from Ma'aloula have finished their underground work. They also took care to renovate the open channel once more water was recorded after renovation. Despite the low involvement, the users were very content with the work that the specialists from Ma'aloula delivered. Obviously if they could see more water produced, they would return to their lands and the *natur* would work again, according to the respondents.

Another issue is the social relationship of the Monastery with the neighbouring chicken farm. The chicken farm owner has dug a well several years ago; it is unkown how deep the well reaches but it likely that it has influenced the flow of 'Ayn al Taybeh 3 negatively because of its location. The issue had been discussed with the representative of the Directorate of Barada and Awaj in terms of well licensing control. Officially the *law of harim* (no drilling of wells within 1.5 km from the qanat source) applies to the chicken farm owner and he should not be allowed to drill a well. The governmental laws should be sufficient to control the groundwater management of the chicken farm owner. Although they might have the institutional power to close down the well, the Irrigation Directorate did not show any intention to close the well of the chicken farm.

8.2.3 The role of third parties and funding agencies

The involvement of a third party in the form of the funders as main actor of the collective action is an important issue in the successful execution of the renovation. Here is where the paradox of participation and development plays a role. The economic power that the funders possess over the community determines, either willingly or unwillingly, much of the course that the renovation is taking. The conditions imposed by the funders in carrying out the renovation is the active involvement and contribution to the project of the user community. On the other hand with project deadlines and administrative reporting requirements, the user community is dependant on the ability of the Monastic community to rerspond for these conditions. Just as with the renovation of Shallalah

Saghirah, the question is posed whether this collective action was truly community based ?

Again it is important to look at the role of the third party in the renovation of Qarah. We can distinguish three main actors as third parties in the collective action; the irrigation directorate, the international consultants and the funders. The municipality is not regarded as third party but as agent for the user community. The primary role of the irrigation directorate was one of law enforcement, giving the activity justification. With the involvement of the government, the collective action was given an official profile. Furthermore the renovation was subject to government regulations concerning groundwater use and health and safety. The irrigation directorate was responsible for the enforcement of these regulations.

The international consultants functioned as advisory agents. They were mainly present to give technical advice and as such have a consultative role towards the user community. They did not have any financial decision making power over the renovation nor could they determine the exact course of the execution of it. However, the perception and status of the international consultant gave them a certain respect with the user community. First of all the consultants were European which is synonymous with "high tech knowledge" for many of the user community members. Therefore the advice given was not taken lightly. This was in contrast with the perception of the contractors who had in the past carried out government-supported rehabilitation. They tended not to be respected by the farmers. An endogenous equivalent to the respect that farmers have for international consultants, is the advice that is given by a *zohari*, or water dowser. In fact I would argue that a *zohari* were given most respect.

The funders functioned as a financing agency. They played a crucial role. Without the involvement of the funders, the renovation would not have taken place in the manner, or over the relatively short period, that it did. Although the initiative did not come from the funders, their approval of the proposal gave them the financial power over the monastic community. The monastic community was the initiator of collective action with investment from the qanat committee but main part of the investment came from outside and not from the community.

This brings us again to the crucial question of development; can community based intervention with participation at the highest level be expected in the case of a well-intentioned financial donation if there are demands and controls from funders? The contradiction is clear; a conditional gift automatically creates an unequal relationship between funder and receiver and implies dependency, which contradicts the

paradigm of participation[87]. Lenders or funders maintain unequal relations and power over recipients through the ever-changing demands they make on administrative capacity (Chambers, 2005).

Paradoxically if all conditions for spontaneous collective action and participation were present on the ground, the user community would not automatically seek outside assistance. The receivers would have sufficient self-esteem, trustworthiness, responsibility and autonomy to take care of themselves. As part of the various endogenous dimensions, it was mainly the lack of economic resources at ground level that drove the monastic community to request financial assistance. The fact that the funders subsidised rather than gave a loan made it easier for the community to decide which type of funder to approach. If people can choose between a loan and a donation, the choice is clear. The funders on their part wanted to know if their money was going to be well spent and placed conditions that guarantee the responsibility and trustworthiness of the receivers.

None of the mentioned third parties assumed the role of conflict mediation. This was not necessary because no major conflict arose during the renovation. Conflict mediation and management is an endogenous factor below community level and embedded in the traditional organisation of the qanats in Qarah. The social cohesion of the user community was strong enough before the renovation not to become a platform for conflict. The qanat committee would have solved internally any conflict that had broken out. Respondents explained that in difficult cases, the municipality would have been the next mediator after the qanat committee.

8.2.5 Hydrogeological impact of the renovation

This section gives an insight in the hydrogeological impact of the renovation. As mentioned before, the aquifers of Qarah are difficult to exploit with modern pump technology due to the nature of the soils. Qanat technology seems to be the best approach to the provision of water services. We observed that the majority of the *qanat* water of the qanat ‘Ayn al Taybeh comes from small (2cm) to large (25 cm) karstic holes in the Palaeogene rock. According to the local inhabitants only certain layers of the Palaeocene contain water, which they call “Qadan”. Karstic holes from which water is flowing have also been observed in ‘Ayn al Qraizah , ‘Ayn al Baydah and ‘Ayn *al Qaz*. During the renovation these karstic holes in the limestone rock were found and cleared to lead their water

[87] *Chambers (1983, 1998, 2005) pleas for a levelling of power relations through a synergy of reducing demands from the “uppers’ and increasing responsibility of the “lower”*

back into the qanat tunnel. This has mainly contributed to the increase of flow after the renovation.

We do not have exact discharge data of the flow after March 2004 but a general impression of the qanat flow can be derived from secondary data. It was reported by the monastic community that the qanat flow increased three fold after the renovation. The increased flow was the reason for a cautious happiness expressed by the monastic community in the final briefing to the funders sent in May 2004:

(...) It is not the first time in history that Ayn Taybeh Qanat has run dry. Even though the flow of water has increased three times following the renovation work, it is not sufficient to give life back to our Bustan. Nevertheless, hope remains that the period of dryness will come to an end. In the meantime the very instrument to provide water is the Qânat and, thanks to three Embassies who believed in it, THE QANAT IS NOW RENOVATED! Many thanks to our sponsors !(...)

source: Briefing II - 20th of October 2003 - 11th of March 2004

Almost a year later following the rainy season of 2004/2005, the qanat flow had definitely increased as expressed in an email message that was sent by the Mother of the monastic community:

(....) Good news! The 'Ayn al Taybeh Qanat is RUNNING AGAIN !! It has now reached half of its former volume: more than 300 m3 per day! Now Qarah is asking if we could not use the same technique to renovate the Ayn al Qass Qanat. We will invite the three ambassadors to make a new proposal. God bless you, dear Joshka. Without you, this dream would not have been possible(....)

source: Email message 01/04/05

Apart from the indication of a certain level of dependency on the funders and to a certain extent the international consultants that we read in both messages, it also expresses that the technical result of the renovation was promising and reached its goal of increased water supply. Reportedly the *natur* went back to his daily work and farmers have begun irrigating their land again. The enthusiasm of the monastic community led to a willingness to start a proposal for similar renovation work with the qanat 'Ayn *al Qass*.

8.2.6 Cost-benefit analysis of the Qarah renovation

This last section will discuss the various questions of sustainability that are raised after the successful renovation of the qanat of 'Ayn al Taybeh. Looking at its history, the qanat's age has proven a capacity for a long-term physical sustainability, having been used for

more than 1500 years. But this does not account for the social and economic sustainability in a changing modern enabling environment. In this section, we will look at respectively the economical cost-effectiveness of the renovation and the prospect of sustainability in relationship to environmental and societal change in the locality and in the region which includes Damascus.

We will start with the main contributors to the renovation. The funders had each combined their contribution to the renovation. If we look at the investment of the German Embassy[88], they have spent a total of €8246,70 on the renovation in Qarah. The combined investment of the funders was $23,810,- this was used for equipment, construction materials and workers' fees.

The monastic community invested mainly in opportunity costs such as voluntary labour time for the nuns, accommodation for the supervisors and international consultants. There is no data on what daily fee rate a nun would earn; the original proposal suggested a fee for the project coordinator of $100,- per day. Taking this as a guideline and 30 days of budgeted working days, it means a labour investment of $3000,-. Normally, the monastic community does not request any price for staying at the monastery but expects a donation of the visitors. In total they accommodated the qanat experts for 139 days, and the international consultants for respectively 2 and 4 days. Assuming a "donation rate" of $25,- per day for accommodation, this cost the monastic community $3625,-. After the project, they had a deficit of $266,54. So they invested an estimated minimum total of $6891.54.

The Qanat committee had pledged in the proposal to the funders that they would be ready to provide three workers per day for three months as opportunity costs. Based on a daily fee of $10,- this would amount to $1890,- investment.

The Qanat experts and their supervisor did not invest in opportunity costs. They were subcontracted for their work and earned a fee. Insurance for health care and accidents was provided by the project.

The Qarah municipality had pledged the lending of bobcats and trucks if needed. It is not clear whether this equipment was extensively used. However the first report mentions that the municipality had not provided the machines yet. The Directorate of Irrigation had invested the time of one of their staff in the execution of the project. The exact salary

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http://www.damaskus.diplo.de/de/05/Wirtschaftliche__Zusammenarbeit/List__of__small__sized__projects.html

	Calculated value	
INPUT		
Funders	$23,810.00	
Monastic community	$6,891.54	
Qanat Committee	$1,890.00	
Qanat experts	$0.00	
Qara Municipality	n.a.	
Directorate of Irrigation	n.a.	
International consultants	$1,250.00	
Total minimum investment	**$33,841.54**	
OUTPUT	*Best-case*	*Realistic*
Pure benefit		
Free water	$2.53 million	$253,130.00
Agriculture	n.a.	
Multiplier benefit		
Tourism	n.a.	
Cultural heritage	n.a.	
Promotion and image EU/Syria	n.a.	
Public Environmental Awareness	n.a.	
Environmental services	n.a.	
Total minimum benefit	**$253,130.00**	

Table 24 - Cost-benefit analysis renovation Qarah

of this representative is not known and since this staff member only came on short visits, this investment was negligible.

The international consultants have invested in opportunity costs for labour and time for the renovation. The first consultant had visited the renovation site in between another professional mission. In the case of myself, I had relocated to Europe and had to take holidays from my self-employed work. The funders did not provide for consultancy fees, because this was a small sized project. My travel from the UK to Syria however was covered including accommodation and living expenses. Would international consultancy fees have applied to my mission, it would have cost a minimum of $250,- per day. I have spent at least 10 days voluntarily, which amounts to a total minimum personal investment in opportunity costs of $1250,-. Adding the individual investment of each of the main actors, it amounts to a total minimum investment input of $33.841,54.

The output is more difficult to determine in exact figures, since there are various multiplier effects and indirect benefits that I am not able to monetise for each actor individually. For example, environmental services are difficult to monetise. Firstly this has to do with the size of the resource in question; water. Environmental resources are in general too extensive for individual ownership. Human uses of natural resources create impacts in the larger environmental ecosystem both positively (increased biodiversity) and negatively (lowering groundwater table) (Rose, 2002). Secondly, without standard national monetisation of environmental services, there can be only a guess on the financial value of environmental multiplier benefits for the user community.

However considering the hydro-geological output of the renovation, we can develop an estimate of the pure benefit to the user community. The renovation has secured the free water supply for the user community in the near future. The local price of tank water is 300 SYP (50 SYP = 1 USD) per 2,5 m3 including the rent of the tractor that brings the supply. The qanat drinking water does not have a local value but is generally considered of better quality than the piped water supply. With this information we could develop an estimate of financial opportunity gain based on the local price of water.

The renovation resulted in an increase of continuous qanat flow of a minimum of 300m3 per day. This was half of its former volume and could potentially amplify. If we assume that the qanat will provide at least 10 years of non-interrupted water supply until the next maintenance action is needed. This means an estimated supply of 1095000 m3 in ten years. Not considering monetary inflation, fluctuation of qanat discharge this would mean a total value of 131.4 million SYP, which is an equivalent to $ 2,53 million USD. Obviously this figure is a “best-case scenario” with a lot of uncertain variables ignored, such as the impact of the groundwater use in the wider region, climatic changes, war and social upheaval and many others. A slightly less positive, but more realistic, scenario would be a calculation based on 3 years of continuous qanat flow of 300m3 for at least one-third of the year. In this case the total value of the drinking water supply would be 13.14 million SYP, or $253.130,- USD that the users do not have to pay for tank water supply for drinking and irrigation. Surprisingly in both scenarios, the total input of $33.841,54 is just a fraction of the projected benefit in the form of pure drinking water value. Moreover the next renovation exercise will not be as elaborate and costly as the recent renovation, assuming there is annual cleaning and maintenance, which will be paid by the qanat committee.

Agricultural development is another pure benefit; most of the qanat water is used for irrigation and this provides direct water supply to the abandoned farmers’ fields leading to increased agricultural production.

However agriculture does not come without costs. Agricultural investment is mainly put into seeds, crops, horticulture, agricultural equipment, irrigation technology and costs of land and water rights. The costs of land and water are combined because a farmer in Qarah would buy land together with the attached water rights. The price of land/water depends on various dynamic and static factors. Three main determining factors are (1) The current discharge of the qanat; the more flow the more expensive the water right. (2) the proximity of the qanat to the town centre; the more distant the location the cheaper the water and land right in qanat. (3) the quality of the soil. On average 4 dunum of land (4000 m2) in ʻAyn al Taybeh would cost 150.000 SYP (50 SYP = 1 USD) giving an irrigation right of 1 hour. This is a one-off payment to the qanat committee in case of change of ownership through sale.

Per year between only 1 or 2 sales of land/water take place in ʻAyn al Taybeh whereby ownership changes. The main reason for buying land with water is the investment to build a summer farm or to increase existing agricultural property. The main reasons for selling land are migration, change of investment priorities such as building a house in town and swapping land for land closer to existing agricultural property. The last reason does not happen often and is most traditional. It has roots in the inheritance of land; to keep the family land connected, a father would rather want to accumulate one large piece of land rather than many smaller pieces scattered over the garden or even over several qanats. Therefore he will try to sell and exchange land to create a manageable piece of land to be able to divide amongst his sons.

Next to investment to buy land with water, there are the annual qanat maintenance costs to be paid to the qanat committee. The payments that the users contribute to the *sunduq* for the maintenance vary on the qanat location and the fluctuations in discharge as well. In ʻAyn al Taybeh, a farmer would pay between 500 and 1000 SYP (50 SYP = 1 USD) per year to the *sunduq* for 4 dunum of land, for 1 hour of irrigation water. With such investment, the benefit will come from the agricultural production. Unfortunately the data collected do not justify exact monetisation of the increased income from agricultural revenue. However multiplier benefits for agriculture produce can be found in the added value that is gained from the fact that there are few products still irrigated with pure qanat water. Most farmers have changed crops to horticulture and drip irrigation which offers future potential. Obviously, this type of benefit requires attention to marketing and a guaranteed consumer demand either nationally or internationally.

There are other multiplier benefits in the wider enabling environment of the action. Just like opportunity costs these benefits are hidden and not explicitly mentioned in financial reporting. The main

multiplier benefits identified are; increased potential for tourism, conserved cultural heritage, the promotion of improved image of diplomatic relations between the EU and Syria, as well as the improved public environmental awareness and environmental services.

Looking at the cost-benefit analysis it is not difficult to see why the monastic community was more determined than the other farmers in the user community to renovate the qanat. Their survival depended on the sustainability of drink water supply from the qanat. Their alternative supply in the form of tanks could not have been financially viable. For the user community this was slightly different. The introduction of municipal piped water supply, removed their reliance on the qanat for drinking. So for them it did not matter if they did not pay for the free drinking water, most users' live in the town anyway. Their main goal was to gain water for irrigated agriculture. It could most likely be the reason why their incentive to contribute to the renovation increased after observing the increased discharge. However it is unlikely in a wider enabling environment that agricultural revenue could be a main driver for collective action. Most farmers were retired and considered the transformation of society - via of off-farm income, urbanisation and migration - to be more beneficial for the younger users'. They had the option to choose other livelihood strategies than farming. The perception of fast money and nice cars was probably more appealing in general than traditional qanat farming, despite the multiplier benefits of the qanat renovation.

8.3 Conclusions

The renovation of qanat 'Ayn al Taybeh can be summarised as a successful qanat renovation both technologically and socially. The enabling environment was favourable for collective action and a total of seven main actors have been identified. Compared to previous government subsidised qanat renovations in the Qalamun region, the renovation in Qarah was carried out following the traditional techniques where possible using the local expertise of the qanat users and experts. Leadership and power dimensions determined the process of initiation to the collective action and the main initiator of the renovation was the monastic community of *Dayr Mar Yaqub* led by the Mother.

An analysis is provided of the various power relationships between the monastic community and the other main actors during the renovation. Social relationships at user community level are analysed in relation to their behaviour and attitude towards qanat renovation. The role of third parties in development revealed various endogenous and exogenous dimensions of this collective action. In the analysis of the renovation, Uphoff's orientation-to-action grid is not used because of the

less intimate relationship between the researcher and respondents compared to the renovation in Shallalah Saghirah.

A cost-benefit analysis of the renovation identified the input of each main actor and the output in the form of pure and multiplier benefits. Even without monetisation of multiplier benefits and based on a rational choice theory of collective action, the strong traditional design principles and considerable economic benefits should have guaranteed the maintenance of the qanat in future. In the field, however we have observed that despite the projected benefits in an ideal world, spontaneous collective action did not take place previously. It only started with an energetic initiator, the use of video feedback and other participatory tools and involvement of a third party, namely the international funders. Following cultural theory, the lack of spontaneous collective action without involvement of a third party can thus be explained. We observed that fatalism and an attitude of laisser-faire of the user community hampered the initiative to develop collective action spontaneously. It took considerable energetic and committed initiators to start up the collective action.

Another factor that determined the lack of previous spontaneous collective action of the user community was a change in drinking water supply in Qarah. The using community all benefited from municipal piped water supply services, although the monastic community had to replace drinking water from the qanat with the much more expensive form of tanker water. Hence the main initiator was driven to collective action by a self-regarding urgent need for 'free' drinking water.

Other reasons for the non-emergence of spontaneous collective action could be found in the impacts of both environmental and societal change. In a broader perspective, various transformations are taking place such as population growth, migration, conflict, changing worldviews, environmental change, technological and infrastructural development as well as political developments, climate change and international development policy and trends. The exploration of these transformations is important to be able to say something about the future sustainability of qanat renovation. It is unrealistic to view qanat rehabilitation in isolation as if it means going back to an "ancient status-quo". Rehabilitation of qanats can only succeed if married successfully to modern developments taking place in the enabling environment, a process of retro-modernisation if you like. The next chapter will compare the two renovation case studies in the light of social and environmental transformation.