THE OASIS CITY

WATER
And from water We made all living things.
THE OASIS CITY

ETH Studio Basel Contemporary City Institute
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THE MIDDLE EAST STUDIO
Wintersemester 2009
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THE OASIS CITY

INTRODUCTION

THE BEGINNING OF DAMASCUS
THE FERTILE CRESCENT
FROM SWAMP TO FERTILE LAND IN DAMASCUS

THE CHANGE TO MODERN TIMES
URBAN MORPHOLOGY
ELEMENTS OF URBAN FABRIC

WATER

THE PORTRAIT OF THE RIVER BARADA

WATER BACKFLOW

FUTURE PROJECTS FOR WATER SUPPLY
Introduction

The past of Damascus is defined by the resource and usage of water. Damascus as an oasis was from the beginning on, since 3500BC a central meeting point in the Middle East as the longest permanently inhabited city. It was both a trading point and a crossing town for the Hajj from north towards Mekka.

Set between the Anti Lebanon Mountains and the Syrian desert along the Barrada River developed a very fertile Ghouta and people were able to grow plants and vegetables as well as doing animal husbandry. So the history of Damascus has to go on although its citizens face a huge water shortage and pollutions of soil and groundwater.

Themes

To understand how Damascus has recently developed and the main problems of the country people and the citizens, we start with an embedding of Syria and Damascus in the Middle East. The whole geopolitical area of the western part of the Middle East is important. Damascus is part of a very fertile belt but the lack of rain makes it essential to have an artificial and very branched irrigation system.

Since the beginning there were strict habits about which field size can use which amount of water.

The introduction of the pipelinesystems by the French in 1924 changed the Damascus as a Middle Eastern city completely. Sabils, courtyards the tale’s, specifically all ancient techniques, became obsolete and couldn’t get combined with the new system. The collapse of the islamic urban culture began. A decoupling of water from the architecture happened and a modern development arose.

This kind of architecture; highrisers, apartments, watertaps, allowed more people to live in the city and from then on they city grew inexorably. As Ecochard planned a city for 2.5Mio inhabitants, currently around 4Mio are living in.

In present times the shortage of water got more and more serious and the city is still growing. Although already in the roman times citizens started to use the Figeh spring in the Barrada Valley, which is said to be the best spring water in the Middle East, it is not enough water for agriculture and domestic use. 85% of the water is needed for irrigation. A lot of it is covered by treated water but this water contains heavy metals and high nitrates values which goes back into the groundwater.

The historical lifeline Barrada became a shadow of one’s former self and is left as a trickle running through the city in huge channels. If there is water it is mostly polluted sewage water or most of the time no water at all.

Just once a year during rainperiod in spring the river is filling up again to remember people that there is still water running and as long that happens the city will continue.
THE BEGINNING OF DAMASCUS
The Fertile Crescent

**TERMINOLOGY**

The Fertile Crescent is a region in Western Asia incorporating the Levant and Mesopotamia, and often incorrectly extended to Egypt. Mesopotamia is considered the cradle of civilization and saw the development of the earliest human civilizations and is the birthplace of writing and the wheel.

The region of the Fertile Crescent broadly corresponds to present-day Iraq, Syria, Lebanon, Israel, Kuwait, Jordan, south-eastern Turkey and west and south-western Iran.

The term “Fertile Crescent” was coined by University of Chicago archaeologist James Henry Breasted in his “Ancient Records of Egypt”, around 1900. The region was named so due to its rich soil and crescent shape.

[1]

**THE ROLE OF THE RIVERS**

As crucial as rivers were to the rise of civilization in the Fertile Crescent, they were not the only factor in the area’s precocity. The area is important as the „bridge“ between Africa and Eurasia. This „bridging role“ has allowed the Fertile Crescent to retain a greater amount of biodiversity than either Europe or North Africa, where climate changes during the Ice Age led to repeated extinction events due to ecosystems becoming squeezed against the waters of the Mediterranean Sea. This Middle Eastern land-bridge is of extreme importance to the modern distribution of Old World flora and fauna, including the spread of humanity.

The fact that this area has borne the brunt of the tectonic divergence between the African and Arabian plates, and the converging Arabian and Eurasian plates, has also made this region a very diverse zone of high snow-covered mountains, fertile broad alluvial basins and desert plateaux, which has also increased its biodiversity further and enabled the survival into historic times of species not found elsewhere.

The fertile crescent also was origin of:

**AGRICULTURE/TRADE**

**CITIES/SETTLEMENTS**
GEOGRAPHICAL ENVIRONMENT

The geography of the Middle East is defined from a dry and hot climate. There are also huge aquifers in the area which create a very fertile area, the so called fertile belt reaching from the Nile Valley in Egypt to the Golf Sea over the Euphrates Region. One of the most significant signs of the Middle East is the desert and with it the Oasis. The created very comfortable microenvironments are origin of lots of city developments.

Climate types

- dry arid / semiarid
- midlatitude
Natural vegetation

Desert Areas
Daily Temperature January

Daily Temperature July
With the Neolithic Period the humans stopped being hunters and gatherers and start being settled. The first long-range settlements develop. The domestication, agriculture and animal husbandry are the start for the foundations of settlements and cities.

City: Greek polis was a community of citizens, sharing common political, religious and social traditions. With the Roman urbs its physical amenities were most important, e.g. forum/ark and its connections to the street system, water supply, fine buildings etc.

Settlement: permanently inhabited, regionally limited farming culture develops: intense use of certain vegetations and landscapes develops the fusion of proximate groups to associations which conducive to population growth.
Neolithic Period
5000-2000BC

Bronze Age
3000-1200BC

Iron Age
1200-332BC

Date of City Foundations
Soil constraints for agricultural production in Syria could be listed as follows:

1. Shallow soil depth over bedrock: These soils are usually found in mountainous areas and commonly associated with steep slopes. Removal of the natural forest cover, in historical as well as in recent times is believed to be the main reason for soil shallowness. Rock outcrops are found in summits, and upper parts of slopes followed by Lithosols (Lithic Torri/Xerorthents).

2. Presence of cemented crust very close to the soil surface: These are the petrocalcic and petrogypsic horizons. Petrocalcic horizons prevail in three mapping units in Syria. They are mostly related to mountainous fronts and colluvial fans. Their climate is typically transitional between the arid and Mediterranean climates, with rainfall ranging from 200÷350 mm.

3. High concentrations of gypsum and calcium carbonates: The Calcids and Gypsids are almost equally represented in the Aridisols of Syria. Together they cover about 40% of the country. The Gypsids (Gypsols) are mainly characterised by horizons with a very high amount of gypsum, ranging between 70 and 90% and in extreme cases the percentage may reach as high as 95%. Practically such horizons form a depth-limiting layer especially when the crust caps them. Hyper calcic horizon is usually found in association with soils having petrocalcic horizons.[2]

The first conclusion is that there has almost always been a water crisis in the Middle East. Population growth always expanded to the limits of the scarcest available resource, which was usually water. Existing settlements throughout history, were also threatened by climatic changes. The second conclusion is that whenever other conditions permitted, the water supply has always expanded to meet population requirements. Throughout the period of the British Mandate, experts were convinced that the land between the Jordan and the sea could not comfortably support any great population increase. As the population increased, the standard of living went up however.

The third conclusion is that feasible peaceful solutions to the water problem are at hand, but political considerations and lack of investment capital prevent their implementation. Desalination programs or import of water from neighbors such as Turkey would cost a small fraction of the Gross National Product of Israel, as argued by Arie Issar.

In Israel and Palestine and in Jordan, as well as in Egypt, water demand is as great as supply. Turkey, Syria, Lebanon and Iraq have a supply that considerably exceeds demand. Nonetheless, Syria for example, has a water shortage in the areas where water is needed. The water is there, but it is in the wrong place, and moving it is not feasible without investment. Turkey cannot sell water easily to Israel, because the pipes would have to go through Syria. [3]
Syria is set between the Mediterranean Sea, Lebanon, Turkey, Iraq, Israel, and Jordan. The climate is very diverser: From a mediterranean humid sea climate in the west to a “gemässigtes” humid climate in the Anti-Lebanon mountains to a dry arid desert climate towards east. The country is defined by the coastline, the Anti-Lebanon Mountains in the West and the Euphrates and Tigris Rivers as well as the Syrian desert in the East. Most of the Population lives in the western part of the country. Damascus itself is always on a borderline of two different zones, e.g. Precipitation, Temperature, Humidity.
From Swamp to fertile Land

ORIGIN OF DAMASCUS AND ITS ELEMENTS

Carbon-14 dating at Tell Ramad on the outskirts of Damascus suggests that the site may have been occupied since the second half of the seventh millennium BCE, possibly around 6300 BCE. However, evidence of settlement in the wider Barada basin dating back to 9000 BCE exists, although no large-scale settlement was present within Damascus walls until the second millennium BCE. The city is considered to be the oldest continuously inhabited city in the world.[4]

Swamp in the Zion National Park, desert of Utah, USA

4 Moore
الكبيرجامع بني أمية

UMAYYAD MOSQUE
wall paintings of the river Barada in Paradise 706-715AD
An orchard is an intentional planting of trees or shrubs maintained for food production. Orchards comprise fruit or nut-producing trees grown for commercial production. Orchards are also sometimes a feature of large gardens, where they serve an aesthetic as well as a productive purpose.[5] A fruit garden is generally synonymous with an orchard, although it is set on a smaller non-commercial scale and may emphasize berry shrubs in preference to fruit trees.

Main fruits having been planted all over the city were oranges, limes and jasmin. These are also the traditional plants for courtyards. They were used both ways: traditional and industrial.

The satellite view shows several orchard farms close to Duma in the North-Eastern part of Damascus.
Widely cultivated for its flowers, jasmine is enjoyed in the garden, as a house plant, and as cut flowers. The flowers are worn by women in their hair in southern and southeast Asia. The delicate jasmine flower opens only at night and may be plucked in the morning when the tiny petals are tightly closed, then stored in a cool place until night. The petals begin to open between six and eight in the evening, as the temperature lowers.

Limes are a small citrus fruit, Citrus aurantifolia, whose skin and flesh are green in colour and which have an oval or round shape with a diameter between one to two inches. Limes can either be sour or sweet. Sour limes possess a greater sugar and citric acid content than lemons and feature an acidic and tart taste, while sweet limes lack citric acid content and are sweet in flavour.

Primarily grown for processing and juice production, Valencia oranges have seeds, varying in number from zero to six per fruit. However, its excellent taste and internal color make it desirable for the fresh markets, too. The fruit has an average diameter of 2.7 to 3 inches (70 – 76 mm). After bloom, it usually carries two crops on the tree, the old and the new. The commercial harvest season in Florida runs from March to June. Worldwide, Valencia oranges are prized as the only variety of orange in season during summer.
ANCIENT RIVER

Damascus is not documented as an important city until the coming of the Aramaeans, Semitic nomads who arrived from Mesopotamia. It is known that it was the Aramaeans who first established the water distribution system of Damascus by constructing canals and tunnels which maximized the efficiency of the Barada river. The same network was later improved by the Romans and the Umayyads, and still forms the basis of the water system of the old part of Damascus today. It was mentioned

19th century engraving of hajj pilgrims camping by the Takiyya al-Sulaimaniyya
Courtesy of the Institut Francais d’Etudes Arabes de Damas
Today, the ancient ruins at figeh spring proves that since at least three thousands of years, Syrians have known the importance of figeh to their lives and managed to draw figeh spring water to Damascus city. Thus, some ruins of the roman tunnel are still visible today in the versant of barada valley at basema’s village.

In addition, the ruins of the roman temple show that Syrians at the time have built it on the top of the spring in order to keep its water out of pollution. Figeh spring is considered one of Damascus glory, wealth and it is not an exaggeration to say that it is one of the important reasons of its existence and abidance till now as the oldest continuously inhabited city in the world.
TALE’ - WATER DIVISION SYSTEM

Tale’ are the ancient water division system for a neighbourhood area. Water is flowing out of the whole in the middle and divides the water do pipes for different fountains. There’s a double-hierarchy. First with the size of the pipes or the openings. This says how much water every fountain gets and also says which size the fountain has.
Second is a hierarchy in height. There are lower opening and higher ones. Mostly the lowest opening is for the Mosque fountain and the Hamams. So the lowest get always water if there is any and the top ones only if there is enough water.
This system also works on smaller scale, e.g as a sub-divider in a courtyard house.

Above: Top View to an ancient water division system
Bottom: The hole towards the street was a control opening to check if the amount of water for the specific house is correct.
Damascus is not documented as an important city until the arrival of the Aramaeans, Semitic nomads from Mesopotamia, in the 11th century BC. Noticing the agricultural potential of the still-undeveloped and sparsely populated area, they established the water distribution system of Damascus by constructing canals and tunnels which maximized the efficiency of the river Barada. The same network was later improved by the Romans and the Umayyads, and still forms the basis of the water and streetsystem of the old part of the city today.[6]

right: ancient roman pipeline, seen on the market in Damascus
Depending on the ancient division system of water, the
waterflow has to split up at least twice until it gets to
the fountain.
The main streets have the main canal and in earlier
times it was open. That way it was easier to control
the water division into the single neighbourhoods and
easier to handle the valves.
The Importance of Sabils in Damascus

For over 500 years a defining socio-cultural and architectural element of the landscape in Damascus’ Old City has been the sabil, or public water fountain. In addition to providing the valuable public necessity of water to the residents of the Old City, the sabils also served as important landmarks throughout the city. Pious Muslims and Christians would often make religious donations to pay for water to be provided to their neighbours as a form of continuous charity. In this manner the sabils, over the centuries became integrated into the unique architectural and cultural heritage of the Old City of Damascus.

Bottom: The map is showing the position of all sabil fountains in the Old City.
The Hamam ١٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠٠..
Ancient Middle Eastern gardens, dating back as far as 4000 BC, are depicted on decorated pottery, and had the cross shape which became the characteristic of the later Islamic garden. Middle Eastern gardens had underground channels and rectangular basins fed by wells, but it is not known if they had fountains which jetted or spouted water.

<table>
<thead>
<tr>
<th>Amount of water a citizen gets from the city</th>
<th>Numbers of fountains</th>
<th>Size of the courtyard</th>
<th>Proportion of the house</th>
</tr>
</thead>
</table>

The fountain was responsible for a nice micro-climate in the courtyard. The size of the fountain also correlates to the size of the courtyard and the house. Water was a sign of richness and power.
All architectural interfaces as the smallest piece of an urban fabric are very much part of the development of the middle eastern city, especially for Damascus. The smallest element like the fountain, the tale’ or the canals are influencing an determining the whole city structure.

From the roman orthogonal canal grid, to the hamams as urban nodes, the sabils as public meeting points and representative architectural elements to the courtyard fountain as the end of a whole chain of division and separation processes. The fountain again is defining the size of a courtyard and so also the proportion of a house, which is part of the urban fabric of a neighbourhood and the whole city.

All these elements formed urban fabric and are only working by a system of ancient pipelines and the natural gravity. The water outputs are always on the ground floor, courtyard houses have only one source: the fountain. The symbolic meaning of water is also given, because there is a strong bonding between architecture and infrastructure which is not separable because none of it is possible to exist without the other one.

<table>
<thead>
<tr>
<th>Hamam</th>
<th>Courtyardfountain</th>
<th>Sabil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roman City grid</td>
<td>Watersupply</td>
<td>Tale</td>
</tr>
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© ETH Studio Basel
When Ecoshard planned it Ecochard was obsessed with the idea of an oasis, he wanted to keep the city green and protected big areas. Also the president kept areas under protection until today. These huge green zones are still embedded in the city structure and now already surrounded by city.
By 1968, Syria had been independent for more than 20 years. Damascus appointed the French architect Michel Ecochard to produce a master-plan, rounded on the principles of functional town-planning from the Athens Charter. Ignoring the realities of Eastern socio-history, everything was sacrificed to the great infrastructures of transport. The plan recommended that monuments should be seen in real perspective. For health reasons numerous ancient buildings within the city were denied any architectural value. Outside the ramparts, the Ecochard plan was hardly followed to the letter; inside, the concert of protests which it provoked quickly stopped the works. At the same time the value of age was beginning to be realised. [11]

Ecochard had already seen the spreading out of the city up to 2.5 Mio inhabitants and the shrinking or the Ghouta because of that. For certain areas especially in the south he also forecasted a spreading out of the desert and a decline of the green zones of Damascus. That's why he protected certain areas within the city as a small oasis.

THE CHANGE TO MODERN TIMES
INTRODUCTION OF WATERPIPELINE

In 1924 introduction of pipelines through French people two different systems are overlapping, the connection of the old systems which is depending on gravity can not be connected to the new pipesystem which needs pumps and electricity to bring the water up to the eighth floor.

The introduction also brought a new possibility to live; like apartment buildings.

The historical context got lost because a courtyard house didn’t make sense anymore, sabils couldn’t get connected to the new pipes. A division hierarchy of water got lost because everyone can get the same amount out of the tap. Canals got abandoned, the old infrastructure got dispensable. Public fountains (sabil) need to be restored very elaborate because they lost their point of existence.

The decline of the symbolism of the oasis begun, the visibility of water in the cityscape disappeared in the old known way. Big fountains (e.g. in roundabouts) became famous and a symbol of wealth and power.

The urban infrastructure, built up since roman time, got dispensable and so the city grid could also change. With the first introduction of the waterpipelines appeared also the French neighbourhood in the west part of the city. It was the first sign of European buildings in Damascus. The introduction was a cut in the “Islamic” history of Damascus.

With the introduction of water came also the Ministries and state observation of this topic. It became a topic of restriction and laws. It became a problem of strategy. Damascus grew more and more and is set in one of the most arid areas of Syria, so the water crisis is always getting bigger and it became a security issue, due to the responsibility of the state towards the population of Damascus.
Development of urban Morphologies

THE DEVELOPMENT OF URBAN FABRIC

The assumption is done, that most of the city parts developed out of a canal grid. So at the urban fabric of the city the history is still visible.

The agriculture field is strongly connected to traditions and heritage. The original field was probably a square or rectangle and was in possession of one farmer. The ownership allowed him to use the canal with a certain amount of water for a specific time during the week. In every village or city neighbourhood was a person in charge of the time schedule.

So when the farmer had sons, he had to inherit the fields in equal parts to them: long single strips came up because every field part needed a connection to the canal. If one son didn't use his agriculture field, he kept the right to irrigate his field when he returns. But in the meantime the water he didn't use got divisioned to all the farmers in the area, not only his brothers.

Often buildings were built along the mainstreet, which was built along the main canal. So the canal had to be redirected around the building areas to the fields. Over time the fields got less important and the canals dried out or got abandoned and streets were built on top of it. A block structure evolved.

The third step is that a total urbanisation of the agricultural area happened.

Most parts of the city are at step 2, that means at a status of change. Only the main city and its areas around are completely evolved. Midan is an example for a perfect change from agriculture to an central urban neighbourhood.

In the following case studies you'll see four different examples in different areas of the city to see that this is a phenomenon happening all over Damascus.
According to a study about the development of urban fabric between the 1870’s and 1920’s it is assumed that irrigation system heavily influenced the urban morphology of Damascus. Overall here are four examples in different areas where this transformation happened.
KAFR SUSAH

In Kafr Susah you see right next to the irrigation canal, which is still in use both developments. In the east you have the orchards and agricultural fields with the traditional flood irrigation system and in the west is the urban development which changed according to type 3.
In Midan the change from agriculture to an urban fabric completed successfully. While other parts are mostly stuck at step 2, here the process is finished. The river disappeared completely.
HARASTA

In Harasta, north-east of the city, close to Duma, the progress is at beginning of step 2 and the change just started. Agriculture is still an important component.
TRADITIONAL IRRIGATION SYSTEM

In Syria as in many other countries of the Near East region, water is becoming progressively scarce as future demand is coming close or even surpassing available resources. Hence water use efficiency in all sectors is becoming a matter of economic, social and political concern, and water policies are at the core of the nation’s economic policy discussions. This crucial issue is particularly relevant for the agricultural sector in Syria, which uses up to 85 percent of all the available water resources in the country.

Irrigated agriculture has increased steadily in Syria over the last decades, almost doubling since 1985. This mounting pace has responded to the nation’s food security policy objectives to satisfy the food production needs of an increasing population that features one of the largest growth rates in the world (3.50 percent in 1985 and still 2.54 percent from 1995-2000) (FAO-MAAR, 1999, 2001). Recently, the notion of food security, formerly assimilated to food self-sufficiency, has been redefined into a more flexible concept oriented to increase production of certain crops that profit from comparative advantage. Consequently, exports of these products can counterbalance the need to import other commodities.

In the public irrigation systems, operation and maintenance costs of the irrigation and drainage networks are charged through a flat fee of SP3 500/ha for permanent irrigation and SP600/ha for winter irrigation. These fees were determined under a legal regulation established in 1999. It is interesting to note that the national average coincides practically with the amount charged as a flat rate. Actual cost of operation and maintenance for pump irrigation is considerably higher (SP5 594/ha) than for gravity irrigation (SP1 708/ha) as could be expected, and it has been reported that the percentage of payment of the established Operation and Maintenance (O&M) fees is close to 90 percent, which is very high for world standards. Beneficiaries from the public irrigation systems are also subject to a fee, which intends to recover a percentage of the investment costs and ranges between SP2 000 to SP7 000/ha. The capital costs fees are regulated by several legislative decrees issued to recover the cost of the specific irrigation projects. [7]
Division of parcel under Muslim and Ottoman laws

Main horizontal canal

Draining off canal is vertical

Orthogonal irrigation grid as dispersion

Annulation of the border-lines of derelict land

New formation of parcels during modernity.
TRADITIONAL VALVES
until today there is a strict regulation when which field is allowed to be irrigated
DIVISION

every agricultural field has its own connection to the canal and can so easily be irrigated
Figeh development network was expanded of al-woroud’s tank from 1500 m³ up to 10,000 m³. 1960 the Figeh water-pipe network installations in Damascus has been finished, with a length of 600 km, and another 14 tanks were erected with a capacity of 36,000 m³, and the storage capacity of all tanks at that time amounted to 50,000 m³. 1968 the duplication of tunnel has been installed to store the surplus of water quantities which were amounted to 450,000 m³ / day to the city, as well as the installations of 11 new tanks with total capacity of 125,000 m³ cover the new areas in the city with a new network with a length of 850 km.

In newer settlement areas the state is installing the basic infrastructure as water, electricity and sewage. Informal areas as Al-Salihiyya get a basic infrastructure at certain edges or through the main street of the neighbourhood but the private connection to the house needs to be done by the inhabitants. All the area of Damascus is connected to Water- and Sewage water systems. But because no one is strictly controlling the installations, there is still an abuse and untreated water can access agricultural fields and groundwater aquifers.

**PIPED WATER AND GRAVITY WATER**

Piped water and gravity water systems are not compatible and so both systems existed side by side until the roman pipe system was not used anymore. To run lines you don’t have to take care of the geography and incline. Highrise buildings evolve and the city grows into the desert.
Water system at Al-Salhiyya, MAM Report
Visible in the buildings of the French Mandate area is that the courtyard disappeared completely. The first time it's possible to create apartments on one level, stacked onto each other. The building became a closed volume and the private exteriors changed from the courtyard to balconies. The private exterior got minimised but there started to be an collective exterior in form of public parks.
FIGEH SPRING FACILITY

Figeh spring is considered one of the most famous springs in the world because of its physical and chemical specifications. It has been always pure and free from any pollution, thus doesn’t need any treatment. The spring annual average flow is 250 million cubic meters which is a tremendous quantity that always supplied Damascus with its needs of drinking water.

The water which has been flowing from figeh’s spring to Damascus, is now distributed for the first time over 400 taps around the old city. 1924 the first co-operative accusation in the country’s history is founded to distribute figeh water by tubes and taps into houses. The completion of figeh water project with a cost of 270,000 golden pounds. The project was composed of tanks, 18 km tunnel, and drainage 3 m³ second, the water is distributed all over 4000 participant households.
DOMESTIC WATER

The infrastructure for the domestic water changed together with the French pipesystem. From the open watersource „fountain“ it became infrastructure shaft within a wall or in combination with other infrastructure systems.

A pump is needed to bring the water up to the top floors, because gravity doesn’t work anymore.

The water only appears when needed out of a tap, otherwise it’s invisible in the wall and the pipes.

Apartments also have a secondary division of water: a primary one from the main pipeline at the street to every flat in the apartment building and within the apartment building to every tap.

So there was a shift in scale from the canals to highrises.
Today the remarkable legacy of the sabils is under fire. many of these once-magnificent fountains lie in a state of crisis and neglect - crumbling and without water - and facing the threat of extinction. One of the big problems is the connection to the new pipewater system. Since ancient times the fountains only worked with the Tale’ as division system. At the moment a german organisation is repairing sabil fountains all over the city to keep a heritage of the city. The problem is that sabils don’t have the same necessity as in earlier times because of the pipeline system to every house. They get abandoned by not using them and also the idea of sponsoring or supporting a sabil doesn’t have the same prestige as it once had.

Above: The note says 'out of order'
SEWAGE WATER SYSTEM

All the areas of the Damascus city included in city zoning planning are connected to the sewerage network. The overall percentage of connected households is 73.8%. Sewage water is treated in the newly built Adra wastewater treatment plant (capacity of 485,000 m³/d). However, operational problems are frequent, as industrial wastewater is often discharged to the public sewerage network without proper treatment.

The discharge of untreated sewage to lands and water bodies has led to the deterioration of the aquatic ecosystems of the river, its lakes (Barada Spring and Otybeh), and of groundwater bodies. In addition to increased health risks, this results in direct or indirect economic losses, drop of real estate values and necessitates future investment for developing alternative water supplies, safe for human consumption. Contamination with sewage water further reduces the recreational value of surface water bodies.

The hole area of the old city is only connected from the outside to the sewage water system. There are still leaks and for most houses it is not even figured out if it is connected to the system.

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Due to the character of soils and sub-soils, relatively limited plant selection and the need to limit the use of water on planting, it is difficult to make recommendations on the amounts of water required on gardens. Much will depend upon the manner in which the watering system has been installed as a thoughtful installation will save water while encouraging optimal growth. However, the figures given here might be a useful guide in decision making and are based on trickle irrigation systems for the plants and sprinkler systems for the grass:

**Water**

<table>
<thead>
<tr>
<th>Plants</th>
<th>Water Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees</td>
<td>45 litres per day per tree</td>
</tr>
<tr>
<td>Shrubs</td>
<td>9 litres per day per m²</td>
</tr>
<tr>
<td>Succulents</td>
<td>4.5 litres per day per m²</td>
</tr>
<tr>
<td>Grass</td>
<td>27 litres per day per m²</td>
</tr>
</tbody>
</table>

Where trickle systems are not used, compensation will need to be made for additional quantities of water over a trickle requirement:

<table>
<thead>
<tr>
<th>Installation Type</th>
<th>Additional Water Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sprinklers</td>
<td>160-200%</td>
</tr>
<tr>
<td>Hose systems</td>
<td>200-250%</td>
</tr>
</tbody>
</table>

Bear in mind that the amount of watering for grass recommended above takes into account the additional suggestion in this lower table. The advice given above relates to summer requirements. Winter requirements will be lower and the systems selected should, therefore, be capable of a degree of flexibility in order to respond to the differing conditions throughout the year as well as different growth rates of the species selected. [9]
NECESSARY REQUIREMENTS OF GARDENS

Such considerations, together with the descriptions set out in the Holy Quran and hadith, produce the five elements of design suggested by Hala Nassar necessary for incorporation into a garden if it is to resemble the descriptions of the Garden of Paradise. These are:

Quadripartite layout
The traditional design of an Islamic garden with which we are familiar was developed in Persia and, later, is likely to have been based on both the Holy Quran as well as the need to irrigate the garden. Its two-dimensional characteristic lies in its quadripartite design, by which it is divided by four water courses which are said to represent the rivers to be found in paradise – 047:015:

...in it are rivers of water incorruptible; rivers of milk of which the taste never changes; rivers of wine, a joy to those who drink; and rivers of honey pure and clear.

These four rivers tend to be brought together at a central fountain or pool, a feature and focus of the garden.
Water

Water is a central element of Islamic garden design where it has both a physical and metaphysical importance. Islam was established and grew in a part of the world which has a hot, harsh climate and where water brings life to the desert and those who live in it. The Holy Quran talks of the garden – 056:031:

…wherein are two fountains flowing.

and – 055:050:

…water flowing constantly.

and these concepts, both conceptually and physically, are central to the use of water in the garden.

[...]Vegetation and Shade[...]
[...]Pavilions[...]
[...]Gates and Walls[...]
[10]
As a second step after the decoupling of water from architecture was a different understanding of gardens, coming along with the French Mandate. The garden became something collective and shared, a social meeting pot. It's something totally new in the understanding of public space in the city, since the garden or also a „private exterior“ was always clearly defined who it belongs to.
COLLECTIVE GREENSPACE

urban dwellers

recreation
INTERACTION RIVER - CITY

CASE 1 CITADEL
CASE 3  INTRA BUILDINGS

old city

extra muros

© ETH Studio Basel
CASE 4 AL-ZABANI

old city
Mahmoud Shebadah Khalil street
extra muros

urban map with red arrow pointing to a specific location.
CASE 4 DUMA
As a conclusion of the historical overview and the contemporary situation in Damascus it can be seen, that after the French came into the city there was a change in the structure of the whole social and architectural life in the city.
The main inventions and developments of the city which made Damascus the longest permanently inhabited city were made since the neolithic revolution until the 1920's.
The period is of course very wide spread but the infrastructural system didn't change much. Canalisation already happened at the beginning of its history to dry out the swamp.
The romans connected the city with a pipesystem to the Figeh spring and got the city the best spring water in the Middle East. Later on the Sabils were built in the city which gave all the inhabitants the possibility to get fresh water.
There was a very thoughtful installation of canals. The size of the fountain was determined by the amount of water every house gets and the courtyard fountain determined the size of the courtyard itself and that determined the proportion or architecture.
There was a coupling of water and architecture. After the installation of a modern pipesystem the decoupling of water from architecture started and continued by the french master plan by Ecochard which changed the cityscape from Damascus totally.
Umayyad/Abbasids
Ottomans 1516-1918
French Period 1918-1946
New Figeh/Pipeline 1924
Ecochard 1968
Watertreatment 1984

UrukJericho
CayönüCatalhöyük
Habuba Kabira
Ur
Mari
Al-Lahun (Kahun)
Alexandria
Troy
Hattusha
Babylon
Jerusalem
Kish
Persepolis
Beirut
Damascus
Pasargadae
Megiddo
Sidon
Sardes
Milet
Kanesh
Karkemish
Ugarit
Byblos
Memphis
Amarna
Abydos
Theben
Eridu
Zemaki Tepe
Niniveh
Assur
Eshnunna
Nimrud
Susa
Lagash
Dur-Scharukkin
Agade
Byzantion
WATER
Tell Ramad 2683 l/s
GROUND WATER
wells & other springs
~2835 l/s
30‘000 wells in ghouta
BARADA CATCHMENT

- altitude: 1250M.ü.M.
- area: 350km²
- wells: 32

FIGEH CATCHMENT

- altitude: 1500M.ü.M.
- area: 1200km²
- wells: 1
BARRADA CATCHMENT in the area of Zabadani is the Barada basin located within the Anti-Lebanon mountains.
FIGEH CATCHMENT
in the middle of Barada on the way to Damascus Figeh spring is located. Since roman times the spring is meeting the Barada here and making the valley green and fertile.
BARADA
lake 2683 l/s
FIGEH
spring 8499 l/s
1. QEWAN CANAL

2. KAFR SUSAH IRRIGATION CANAL
3. CITADEL TOURIST CANAL

4. MARYRS’ SQUARE CANAL
7. DUMA TREATED WATER CANAL

8. BAB TOUMA CITY CANAL
RIVER ENTERS THE CITY

Impressions of the Barada river at the entrance of the city
ANTI LEBANON MOUNTAINS       WADI BARADA
WATER CIRCULATION BARADA BASIN

Reason for groundwater aquifer:

FIGEH
BARADA

Groundwater recharge:

1. Rainfall
2. Inflow from aquifers in the Quasiun Mountains
3. from treated sewage water (low oxygen level) mixed with surface water
4. from irrigation losses (mainly in upper Quaternary areas)
5. ancient times also from Barada and its side channels, today only during rainperiod

The circulation in the basin is very important to keep the groundwater level up. Because of the high nitrates and low oxygen values in the groundwater, it is important to mix it up with fresh springwater.

It is also important to know, that the water system in Damascus is split up in two different systems.
- water for domestic use
- water for irrigation

During rainperiod the state is taking care of the groundwater level of the whole Ghouta area by pumping water the Barada aquifer from the overproductive Figeh spring. The volume is about 2MCM/year (Million Cubic Metres per year)

The Damascus area has the big advantage of having a big limestone area underground which is the aquifer of the basin.
Densely populated city
Loosely populated city
Few Tree plantations, cereals, some vegetables
Tree plantations, vegetable fields
Dense Tree Plantations; some undergrowth of various crops
Reduces irrigation, some open fields with cotton, cereals, vegetables, some trees
Local irrigation, abandoned fields, predominant cotton, some cereals, few gardens with border trees
Bare soils
Lack of vegetation
Neogene Basalt
1. INTRA CITY AGRICULTURE

2. INTRA CITY DESERT
5. **INTRA CITY DERELICT LAND**

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6. **CITY MOUNTAIN**

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PORTRAIT OF THE RIVER BARADA
The modern water treatment facility in Damascus is the only one in the whole area. Treated water from the whole city comes into the facility. After going through regular water treatment, the water is set back into the ghouta by an irrigation canal. Additional to sewage treatment the factory also gains methan to run the factory self-sufficient and createx fertilizers out of dried left-over.

The main problem of sewage is that it is contained with heavy-metals, which can't be cleared out of the water. If the water is polluted too heavily they discharge it straight to a second output wich leads to the dried out Al-Ateibeh lake.

Also a problem is the fertilizer they produce, because it's also polluted and so they put it on the ground again, reconnecting to the groundwater.
input sewage water from the city
output untreated water into dried out al-ateibeh lake
output methan for energy production
output treated water for irrigation
output untreated water for irrigation
output drying field for fertilizer
output untreated water for irrigation
output drying field for fertilizer
AREA IRRIGATED BY THE WATER TREATMENT FACILITY
WATER POLLUTION

Water pollution is one of the main problems in the hole ghouta area. People are not sensibilised to this topic yet. So a lot of contaminated water from industrial areas, tanneries but also the use of too much fertilizer in agriculture can access groundwater very easily by inattentive behaviour of the population. People from Damascus have to rely on the quality of groundwater because of the shortage of spring water it is needed to pay more attention to this step of sensibilisation. Already existing are contamination maps and a wide spread network of observation wells in the whole area.
GROUNDWATER NITRATE CONTENTS

- Very high
- High
- Medium
- Very low
- Low

Suitable to marginal: 25 - 50 mg/l Nitrates
No Restrictions: < 25 mg/l Nitrates
Groundwater unsuitable due to high salinity: > 50 mg/l Nitrates

RISK OF GROUNDWATER CONTAMINATION

- High
- Medium
- Low
- Very low

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FUTURE PROJECTS FOR WATER SUPPLY
The Water Crisis in the Middle East

ANCIENT FERTILE CRESCENT

The term “Fertile Crescent” was coined by the University of Chicago archaeologist James Henry Breasted in his “Ancient Records of Egypt”, around 1900.[1] The region was named so due to its rich soil and crescent shape.

Now, this “Fertile Crescent” had changed to desert, gradually.

WATER SHORTAGE IN MIDDLE EAST

Owing to climate change, many countries in the middle east face the water shortage problem. The resources of these countries are lower than the cut-off point of 500 m3/inhabitant per year, considered to be the threshold for the absolute water scarcity. This threshold presents these countries where resources per inhabitant are very limited. [11]
Watershortage, amount of water is less than 500m$^3$/inhabitant m$^3$/inhabitant
WATER CRISIS IN DAMASCUS

Syria’s Ministry of Irrigation (MOI) issued a report in 2001 entitled “Work Strategy at the Irrigation Ministry.” It shows that in 2000 water balance in the Barada/Awaj Basin was a negative 762 million m³, after two years of sever drought conditions. The World Bank Report on the irrigation sector in Syria of August 6, 2001, quoting the 1997 JICA study, showed that the water balance was estimated in 1997 at a negative 450 million m³. The balance was also a negative 311 million m³ for 2000, according to a study on irrigation policy in Syria conducted by Consuelo Varela-Ortega and Juan Sagardoy, based on an FAO project, quoting data from Syria’s Ministry of Agriculture and Agrarian Reform in 2001.

RAINFALL IN BASIN THIS WINTER
This winter, especially in Barada-Awaj basin, it seems very dry so far. For instance, according to the observation data of precipitation in Zabadani observatory which is located in the upstream area of Barada River which runs through Damascus city, total amount of precipitation in the period of Oct.06-Jan.07 is only 28%-51% of the corresponding amount in the same period of previous years from 2002 to 2006 (refer to Graph-2). In the previous years of 03/04, 04/05 and 05/06, annual amount of precipitation was average level as shown in Graph-1, which has even caused considerably long suspension of water supply in night time in Damascus city for about 7 months in 2006. Therefore, if this situation of very small precipitation continues in this winter, the year of 2007 is likely to be much worse than last year in terms of water supply, groundwater level, and so on. These observation data are warning of more serious shortage of water this year.

The long-term average annual rainfall at the western margin of the Damascus plain is about 250 mm (Meteorological Dept., 1977). The amount of rainfall decreases rapidly towards east and reaches only about 100 mm in the area of Al-Dmair, NE of the study area. Though the rainy season usually lasts from October to April, the main rainfall occurs from November to March with a maximum in December and January (JICA, 1996). Normally, there is no rainfall from June to September. Below two figures show the annual variations of rainfall at the climatic station of the old airport in the western outskirts of Damascus and at the Kharabo station at the center of Damascus Ghouta.

The average yearly maximum temperature ranges between 23 and 25 OC and the average yearly minimum temperature between 7 and 10 OC. The average potential evaporation and the evapotranspiration reach about 1,800 respectively 1600 mm/a in the Damascus area (JICA, 1996) and more than 2000 mm/a further to the east (Meteorological Department,(1977). According to the Emberger classification the climate in the study area can be described as arid to very arid. [13]
Future Water Projects in Syria

INTER COUNTRY BASIN PIPELINE

The water supply of Damascus City and Countryside depends today on local springs and wells. The present deficit is supposed to increase in the years 2020 and 2040 to 323 and res. 732 MCM/y. On the other side the Mediterranean coastal area of Syria from the Turkey border to the north and the Lebanon Border to the south is rich on precipitation. The project intends to withdraw the water surplus from the coastal area (surface runoff, groundwater) and to transport it by a 270 km long pipeline to Damascus.[11]

The Coastal Basin has a positive water balance according to the three sources. The largest estimate, however, is rather modest for the task of inter-basin transfer to the Damascus Region. The other two are dangerously small. ERM (1998: p.11) estimated that under the condition of a minor drought, predicted to occur in one out of every five years (i.e. a 20% probability each year), the Coastal Basin would be only 127 million m3 in surplus in 2015. Furthermore, the heavily mountainous terrain of the basin and its dispersed water sources would make harvesting the waters difficult and expensive.

This may explain the Basin’s rather low water utilization rate. While the seven basins in Syria have an average water utilization rate of 89%, the Coastal Basin’s rate is 65%, second only to the Steppe Basin, which has a 60% rate (MOI, 2001: table 8). It is highly unlikely that the Coastal Basin water sources would make it a viable alternative for solving the water crisis in Damascus.[12]
PROJECT DESCRIPTION
The water supply of Damascus City and Countryside depends today on local springs and wells. The present deficit is supposed to increase in the years 2020 and 2040 to 323 and res. 732 MCM/y. On the other side the Mediterranean coastal area of Syria from the Turkey border to the north and the Lebanon Border to the south is rich on precipitation. The project intends to withdraw the water surplus from the coastal area (surface runoff, groundwater) and to transport it by a 270 km long pipeline to Damascus.

An important part of the water surplus within the range of about 7 m3/s will be withdrawn from the karst aquifer. The hydrogeological study is one of the focus points of the study. The objectives are:

• assessment of the characteristics of groundwater resources
• study of the submarine springs near the coastal line
• assessment of the groundwater quantity and quality to be used for DAWSCA by drilling and testing works
• define the localities for the groundwater intake
• design the facilities (large diameter wells) of the intakes
• outline the conflicts with existing groundwater use
• outline possible seawater intrusion and define the countermeasures
• laying out a seasonal management plan for groundwater withdrawal

Discharge measurements of Banyas spring versus precipitation

<table>
<thead>
<tr>
<th>monthly precipitation (mm)</th>
<th>discharge (m³/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>0.001</td>
</tr>
</tbody>
</table>
THE EUPHRATES RIVER
The Euphrates River is the third longest river in the Middle East, after the Nile and the Tigris. It has an average flow of some 1,050 m³ per second, or 33 billion m³ per annum. The Euphrates River has over the millennia been Syria’s major supplier of surface water. With over 700 km of its 3,000 km within Syria, it is the largest among the country’s 17 rivers. It supplies about 50% of Syria’s total water use of 14.7 billion m³ per annum. On July 17, 1987, a protocol for the distribution of the Euphrates water, seen by Syria as temporary, was signed between Syria and Turkey to release a total flow of 500 m³ per second to Syria and Iraq, or 15.8 billion m³ per annum. On April 17, 1989 Syria and Iraq signed a memorandum, became effective on April 17, 1990 whereby Syria committed to give 58% of all incoming waters from Turkey to Iraq. As such, Syria’s share of the Euphrates waters would be around 6.6 billion m³ per annum. To this should be added 1.05 billion m³ in return wastewater and return drainage from irrigation for a total of 7.65 billion m³ in total surface water availability.

TRANSBOUNDARY WATER ISSUE
Turkey’s phased construction of the giant GAP project in Southeastern Turkey since the mid 1960s and its future expansion plans have rendered the volume of Euphrates River’s flow from Turkey undependable. The GAP project “envisages the construction of 22 dams and 19 hydroelectric power plants on the Euphrates and Tigris rivers and their tributaries. It is planned that at full development over 1.7 million hectares of land will be irrigated and 27 billion KWH of electricity will be generated annually with an installed capacity over 7,500 MW”. Turkey began constructing the Keban Dam on the Euphrates in 1966 with electricity generation starting in 1974. The GAP project has caused a substantial decrease in the river’s flow into Syria and Iraq. This has become the cause of a serious water dispute among the three countries. GAP enhanced Turkey’s ability to alter the flow of the River into Syria and Iraq. Notwithstanding pretensions to the contrary this has given the Turkish government a newly found leverage in dealing with her two neighbors. Even small variations in the water flow might now be interpreted as politically inspired. The age-old share of Syria and Iraq in the Euphrates waters has become a decision of Ankara’s politicians.
15.8 billion m³ per annum
From Turkey

7.157 billion m³ per annum
To Euphrates Basin

0.493 billion m³ per annum
To Damascus Basin

58% To Iraq
Comparing Project in Egypt - pipeline along the Nile

„Let the desert blossom“, said President Mubarak in 1997 as he launched at Tushka, thirty-six years after the laying of the first stone for the high dam. The Egyptian press have nicknamed it „the inverted pyramid of the year 2000“. „New cities will be created and new power stations built,“ added the Prime Minister. [14]

DESERT PROPOSAL

This project advances the case for a proposed super-highway west of the Nile from the Mediterranean Sea coastline to Lake Nasser. The proposal would provide numerous opportunities for the development of new communities, agriculture, industry, trade and tourism around a 2,000 km strip of the Western Desert.

The proposed project includes the establishment of the following:

1. A superhighway to be built using the highest international standards, 1,200 km in length, from west of Alexandria to the southern border of Egypt,
2. Twelve east-west branches, with the total length of approximately 800 km, to connect the highway to high-density population centers along the way,
3. A railroad for fast transport parallel to the superhighway,
4. A water pipeline from the Toshka Canal to supply freshwater, and
5. An electricity line to supply energy during the early phases of development.[15]

New City- Al-Rehab City, New Cairo
It is set on an area of 10 million m² in New Cairo to accommodate 200,000 inhabitants.
NEW DESERT CITIES?

a selection of ideas...

Garden City

Garden cities were intended to be planned, self-contained, communities surrounded by greenbelts, containing carefully balanced areas of residences, industry, and agriculture. The garden city would be self-sufficient and when it reached full population, a further garden city would be developed nearby. Howard envisaged a cluster of several garden cities as satellites of a central city of 50,000 people, linked by road and rail.

--Take again the idea of an oasis set up in the desert

Socialist City

The socialist city is defined by mass housing (mostly for workers), collective urban spaces as parks, clubs and so called „palaces of culture“. Social activities were important. The main building construction were prefab-concrete slabs.

--Mass housing to move out the surplus inhabitants of Damascus

Gated Community

In its modern form, a gated community is a form of residential community or housing estate containing strictly controlled entrances for pedestrians, bicycles, and automobiles, and sometimes characterised by a closed perimeter of walls and fences. Mostly built for upper class.

--Better financing because of the wealth citizens
Modern irrigation techniques
With the objective of reducing water use, the Government of Syria (GOS) has decided that all irrigated areas will be equipped with modern irrigation techniques in four years. The Agricultural Cooperative Bank is providing loans to the farmers to purchase modern irrigation equipment at subsidized interest rates, with higher subsidies for cooperatives. Most of the new systems are of line canals from the headwork to the farm gate.

Four scenarios
As water resources vary greatly across basins in Syria, it can be expected that water policies will have distinct effects on the different basins. Therefore there has been analyzed in a study four different policy scenarios to assess the effect of water development and water conservation policies at country level and at basins’ level. These policy scenarios have been simulated along the years 2000-2015 horizon to evaluate the effects of several policy alternatives on the short-, medium- and long-term availability of water resources in Syria. The below 4 figures represent schematically the process of simulation.

Scenario 1. Current policy. Modernization (4 years) and irrigation expansion (15 years)
Scenario 2. Modernization policy with no irrigation expansion
Scenario 3. Long term policy. Modernization and irrigation expansion (15 years)
Scenario 4. Differentiated policy. Modernization in all basins, no expansion in critical basins
Reduce Water use in Barada Basin
A drop of water saved is like a drop of water found, most often at a much lower cost. A priority here is to rehabilitate the Region’s potable water distribution network.

The relatively modest volume of water householders typically need. Of the water used by householders and industry the majority would be returned to irrigation in the form of wastewater. After treatment, the volume is estimated at 75% of the original volume. These two groups not only used in 1997 a modest 32% of the region’s total water use but they returned to irrigation about 75% of the water they used in the form of treated wastewater.
Comparison among the estimated capital investment and water unit cost of the Euphrates, Coastal and the Barada/Awaj solutions. It is clear that the Damascus local solution is the most efficient. It is less expensive to build and simpler to operate.
Conclusion

What is the definition of an oasis or what is an oasis in a contemporary meaning? During the whole research we looked at a city which is defined because of water since its origin. Damascus is or was part of the fertile crescent and exists because of the Barada river, the Quasiun mountains and the oasis conditions. But at least one of the three foundaments is most of the year missing: the Barada. It was used too heavily and too much sewage was put in that it can be used as a “natural” environment. Although Barada was never “natural”, already in the earliest times Barada had been canalised due to the swamp that existed there before. Without canalising the Damascus area would have never become an oasis. So the Barada always was a technical instrument of the inhabitants of Damascus and they made it work for their interests. But now the condition Barada doesn’t exist anymore. But they found another source: Figeh spring. Also Figeh spring was connected to the city water system at roman times and it’s one of the most productive springs in the whole Middle East. The water is guided in pipelines into the city. It is invisible and not part of the environment anymore until it comes out at a fountain or the tap. And this is the huge paradigm shift that happened in time: Pipelines are the reason for the new apparatus.
building, highrises, parks (e.g. Tishreen). The growing of the city was mostly just possible because of pipes. And the pipes are also a reason why Barada lost its importance. People didn’t need to worry anymore about water, it just comes out of the tap.

The biggest problem the city has is that it lost a river, but it is losing a symbol. The river is an abstract symbol for the oasis and people try to keep it, even as a river, man-made and filled with water that sometimes not even come from the spring.

The abstract symbol of the river is important to keep the political power of water and the romantic dream of an oasis existing.

Although the city is getting more and more green with parks and on smaller scale, the ghouta, the agriculture belt, shrinks permanently.

So the future is very unsettled, but the shortage of water is a fact. That’s why the main acting point for future development is to bring more drinking water from other sources to the still growing city. Ecocchard planned his city for 2.5 Mio people, now there are living about 4 Mio.

The water shortage is a problem Syria can’t solve on its own, although there is enough water in the country itself, the problem is a Middle Eastern one. Except the coastal regions, all the other parts are suffering from the crisis. This geopolitical problem has to be solved on a higher level than local politics, an international dialogue has already started but needs to be continued.

Main aim of the people in Damascus should be to protect the groundwater to create a sustainable coexistence with the water circulation.

That’s a way they won’t loose their adjunct: Oasis City...
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p.25, abb.2-5 wikipedia, abb.6, flickr.com
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