

# Urban analysis

## Location

Za'atary is located in the north of Jordan. It is a Refugee camp close to the boarder with Syria and houses mostly Syrian refugees. The Syrian refugees are fleeing the violence of the Syrian civil war. It started in July 2011 with a hundred improvised tents. This was several months after the attack on Daraa. The refugee camp opened in 2012 and houses around 80.000 people. It was not planned to have this amount of people, which means the camp has expanded over the years. It also evolved from a temporary solution to a permanent one. (de Haas et al., 2020)

In terms of size, it is almost as big as the old city center of Amsterdam. The camp is located near the city of Mafraq, a city that was created because of the international trade routes to Damascus and Iraq. There is also a military airbase and a few universities nearby. The camp was placed here because of the good accessibility with regard to logistics and goods. When the conflict ends, the refugees can return to Daraa, just across the border.

Centuries ago, this area was a steppe, where the nomads let their cattle graze. The soil now consists mainly of clay with sand. The area is characterized by the amount of basalt blocks. It comes from the very old volcano 150 kilometers north of the region that was active thousands of years ago.



Image 1, Current situation Zaatari (ESA,s.d)



# Climate

The refugee camp is located at the transition between the temperate climate of the Amman region and the desert. The climate in the area of the refugee camp is dry and warm. The summers are long, hot, arid and the winters are cold & windy. Every year about 665 million liters of water falls into the camp. This is an average annual precipitation of 150-200 mm/year/m2, which can also be seen in the image below.

The inhabitants of Jordan and the refugees use more water than the amount it rains per year , because of this some groundwater levels have dropped more than 1 meter per year. Agriculture consumes around 60% percent of the water supplies, with more than half of the water estimated to be lost by theft and leaky pipes. Due to the many refugees in the country, the demand for water has also risen sharply. Extreme water scarcity and wide disparities in public water supplies are potent ingredients for conflict.

When it rains it falls in large quantities and at the same time, water is not collected and removed. This causes floodings in the refugee camp. This is partly because the soil quality is very poor. The soil consists mainly out of clay and is disturbed because the large group of refugees further disturbed the soil. The soil has become increasingly compacted, so that no more water infiltrates into the ground. The rain is damaging their fragile new homes and offers almost no protection against the harsh climate. It causes problems with housing, hygiene and creates health risks. (Vilsteren, 2019)

In the refugee camp, the water is pumped from the basin at three different places. The water from the basin is used for drinking water and water for irrigation of small vegetable gardens. This leads to even greater pressure on the water supply. The water is also additionally supplied with the help of trucks.

The image below shows that in the places indicated in blue, the water remains for more than 14 days after heavy rainfall. The blue lines indicate the flow direction of the water. The brown areas are the other areas where the water cannot drain well and creates large mud spots.

During the realization of the camp little or no account was taken of the existing landscape. The camp is located between a plateau and a depression of the landscape. The difference in height in the camp is about 20 meters. The higher parts are at approximately 667.5 meters and the lower parts at 647.5 meters. (Vilsteren, 2019)

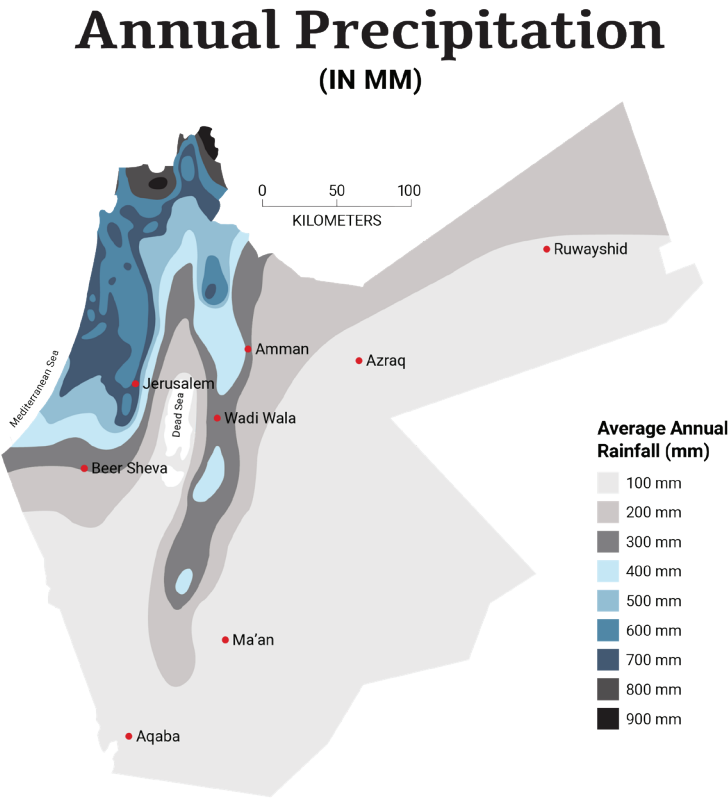


Image 2, Annual precipitation Jordan (cbsnews,s.d)



Image 3, Floodings Zaatari (weather, s.d)

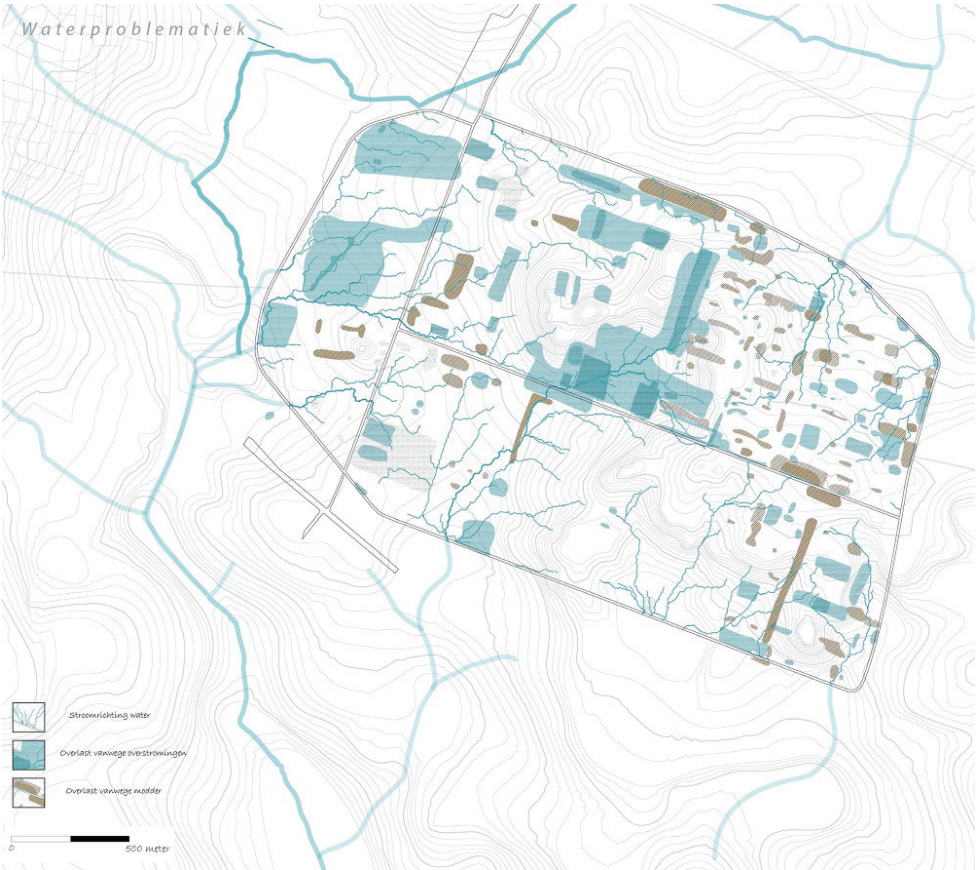


Image 4, Waterproblems (Vilsteren, 2019)



Economy

The economy of the area is mainly linked to agriculture, small-scale livestock and trade that has developed along the various international roads. Typical of the agricultural system is that the agricultural land is used temporarily. After two years the ground is exhausted and people move to a new piece of land. In relation to Jordan, the region of Al'Zaatari is poor in raw materials and economy. This is partly due to the higher regions being better anchored due to historic trade routes, such as the Silk Road.

In the refugeeecamp the shops, community centres and other facilities are located along the red lines in the picture below. As can be seen these are found on the edge of the camp and along the two main roads in the camp. More and more illegal shops have established themselves near the two main roads. There are currently about 3000 illegal/legal shops in the camp with a monthly economic value of 10 million dollars per month (Rettman, 2014)  
.Almost every product is available in the camp. Even people from outside come to the camp to get certain products. The main legal general facilities, such as the hospital, are mainly located in the center of the camp near the central road so that it remains easily accessible to everyone. (Vilsteren, 2019)



Image 5, General facilities

Current water storage

Water is currently stored in small water towers and some wells. As can be seen from the picture below, most of the wells can be found on the east side of the camp (the less population dense area). The westside (old part) of the camp is the oldest part of the camp and was created without a structure. The new part has been set up with a structure. A water purification installation has been realized outside the camp. When draining the dirty water, no distinction is made between gray and black water. This puts even more pressure on the groundwater level.

Amount of water what can be collected

In the image below, the camp is divided into 8 different districts. To see how much water we can collect, it has been calculated for each district how large the water basin must be to collect all the water. It has been taken into account that all the water is collected and nothing disappears into the ground or evaporates. In order to collect all the water, the size of the basins for the different districts is as follows:

District nr.	Hectares	capacity (m³)	Required size water basin (m)
1	107	128800	100 x 8 x 161
2	51	61600	100 x 8 x 77
3	64	77600	100 x 8 x 97
4	34	41600	100 x 8 x 52
5	76	92000	100 x 8 x 115
6	72	87200	100 x 8 x 109
7	65	78400	100 x 8 x 98
8	35	43200	100 x 8 x 54

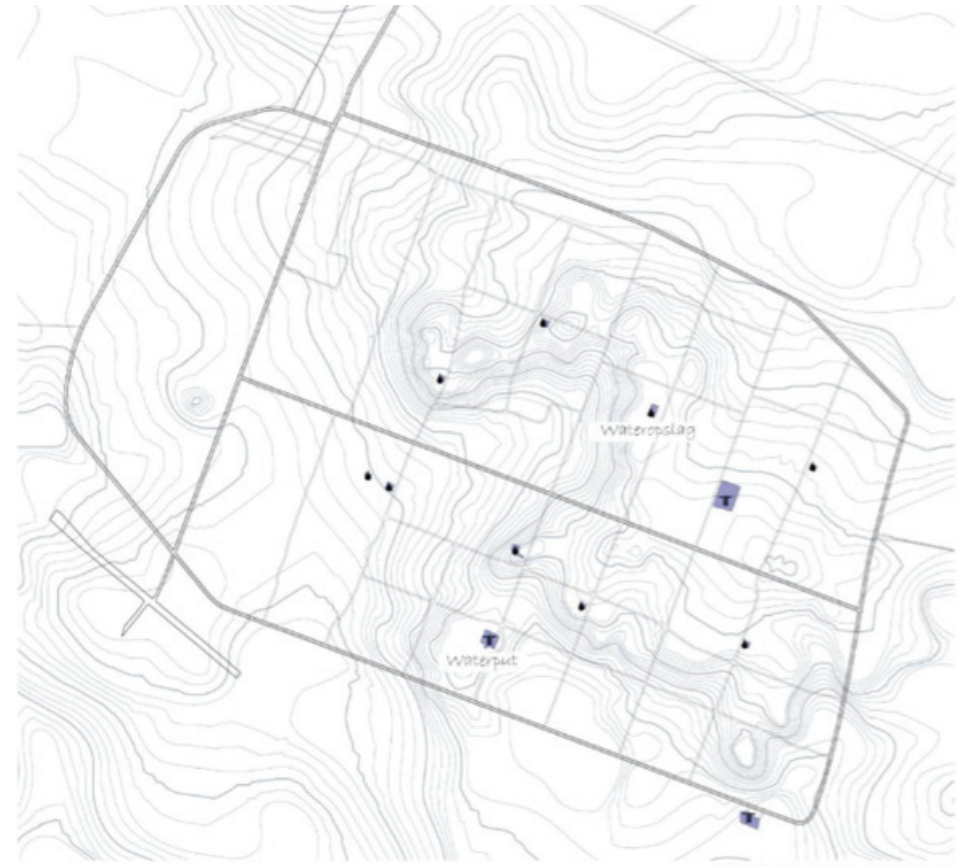


Image 6, Water storage (Vilsteren, 2019)



Image 7, Amount of rainwater per year (Vilsteren, 2019)