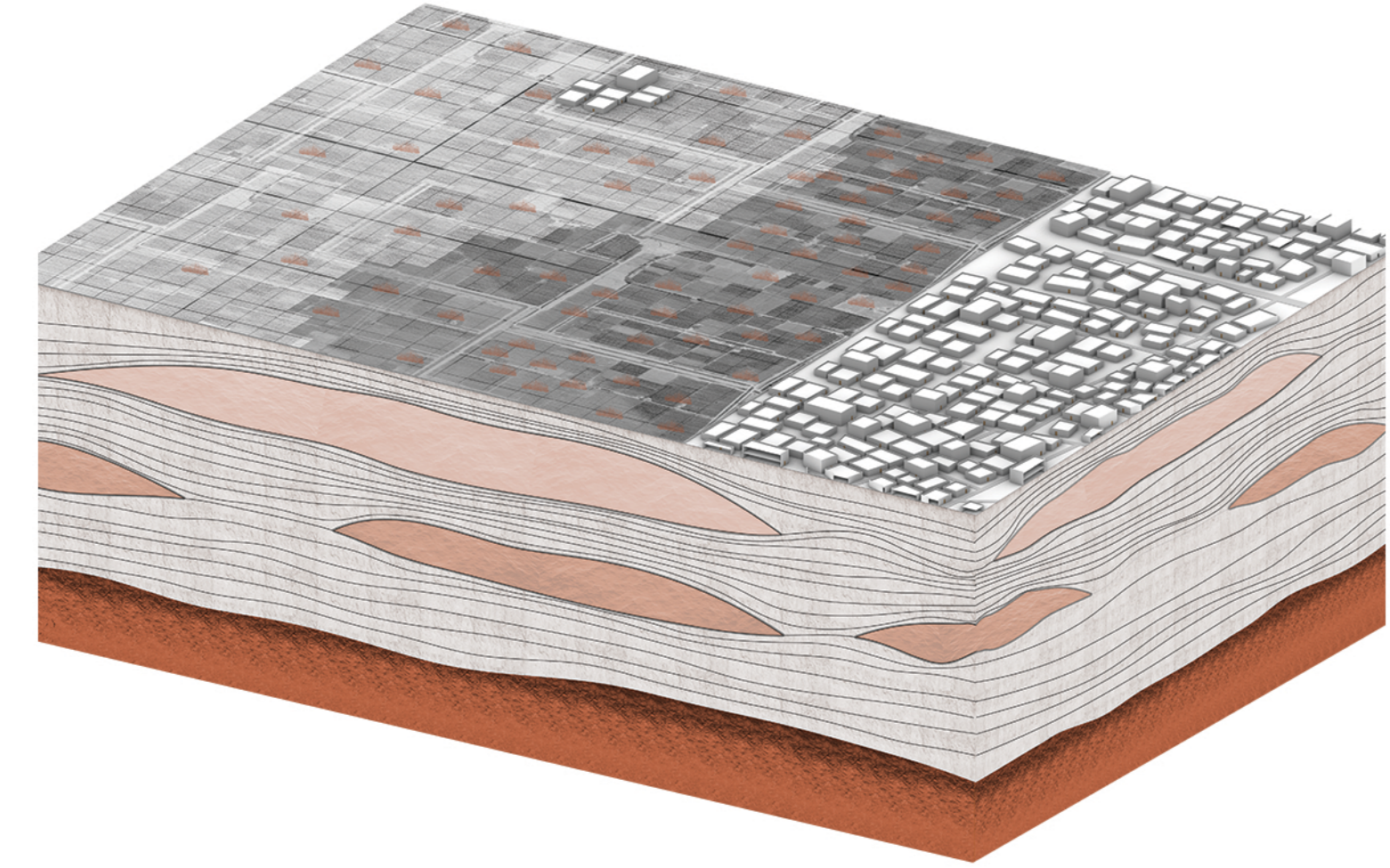


Problem

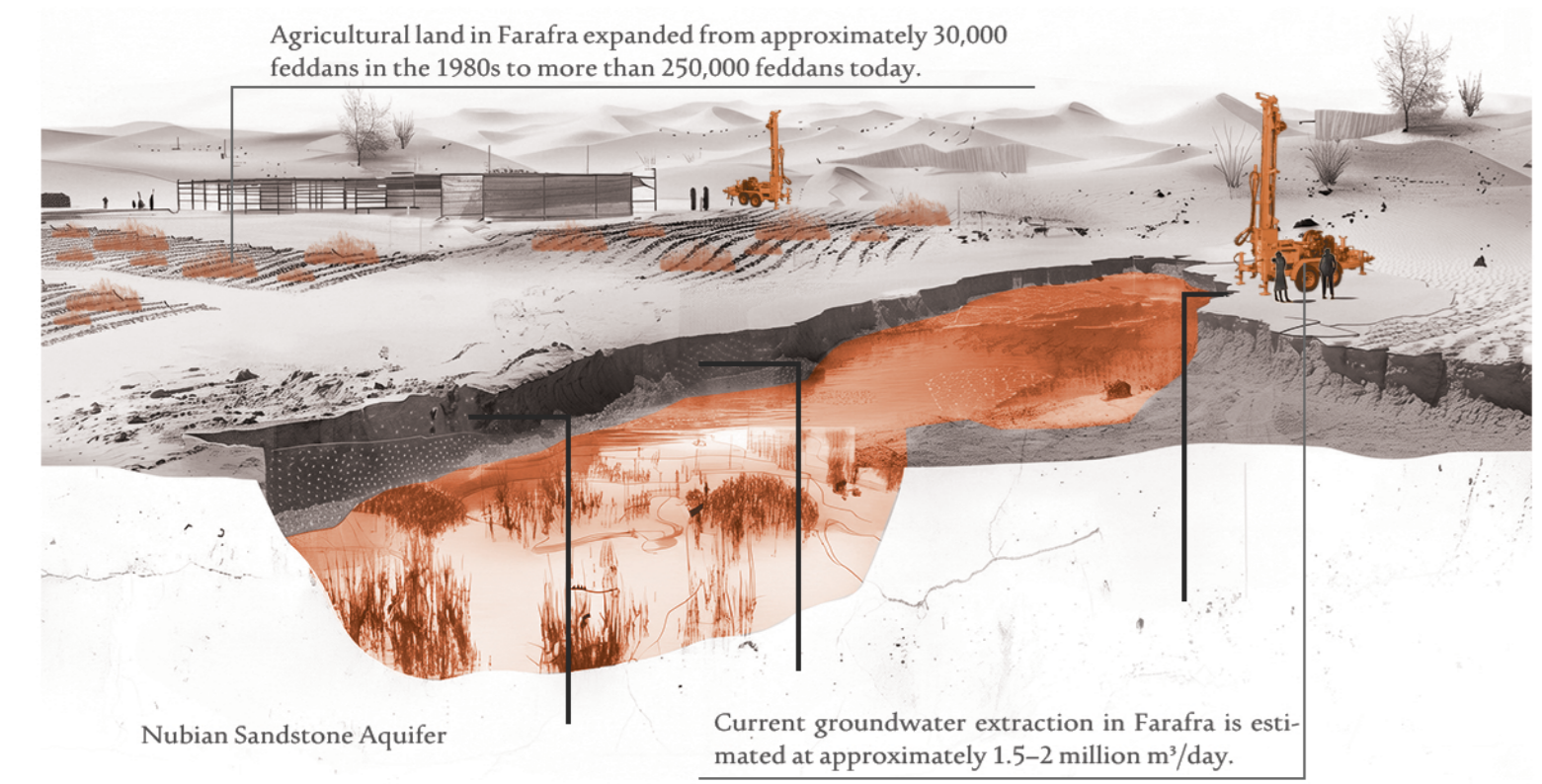
Farafra Oasis faces a growing water vulnerability despite its historical reliance on groundwater. The wider region requires approximately 18,250 m³ of drinking water annually (based on 2.5 L/person/day). However, this demand is entirely dependent on underground aquifers, with minimal natural recharge due to the hyper-arid desert climate and low annual rainfall.



Increasing agricultural expansion and population growth are placing additional stress on this limited resource, creating a long-term risk of depletion and reduced water security for the community.

Current situation

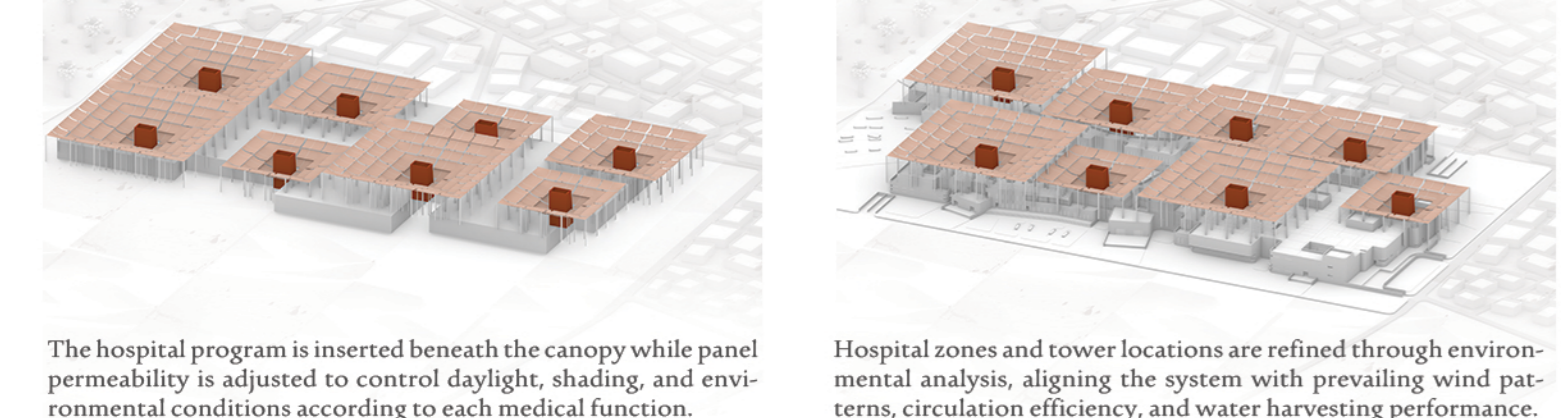
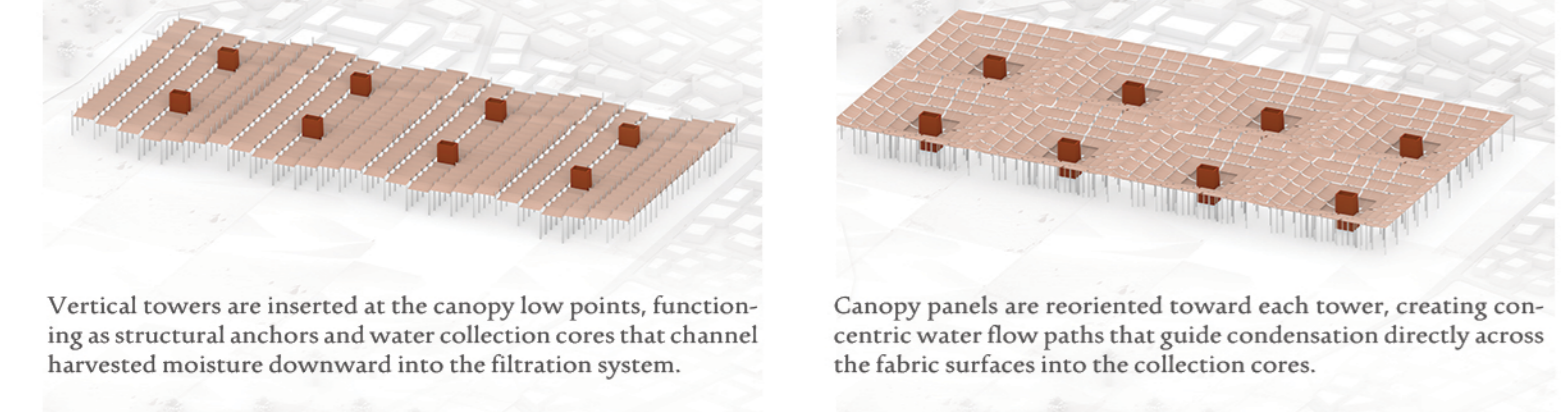
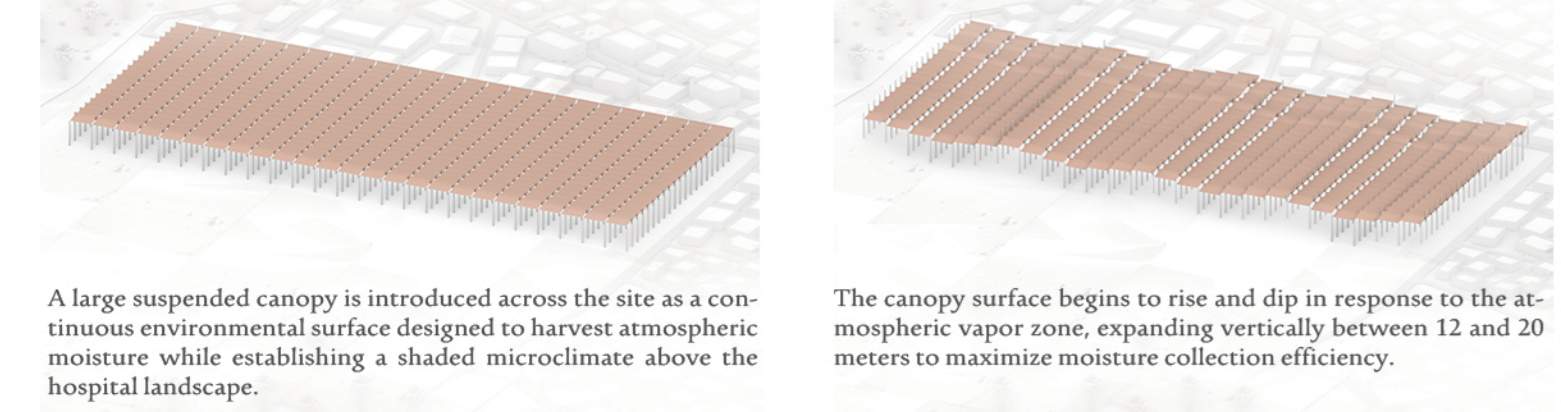
The primary water source in Farafra is deep groundwater extraction through wells tapping into the Nubian Sandstone Aquifer System. While this provides a stable supply, it is largely non-renewable on human timescales.



Studies indicate that extraction rates in desert oases often exceed natural recharge, leading to declining water tables and increased pumping energy over time. In agricultural zones, water consumption can reach 3,000-6,000 m³ per feddan annually, significantly accelerating depletion.

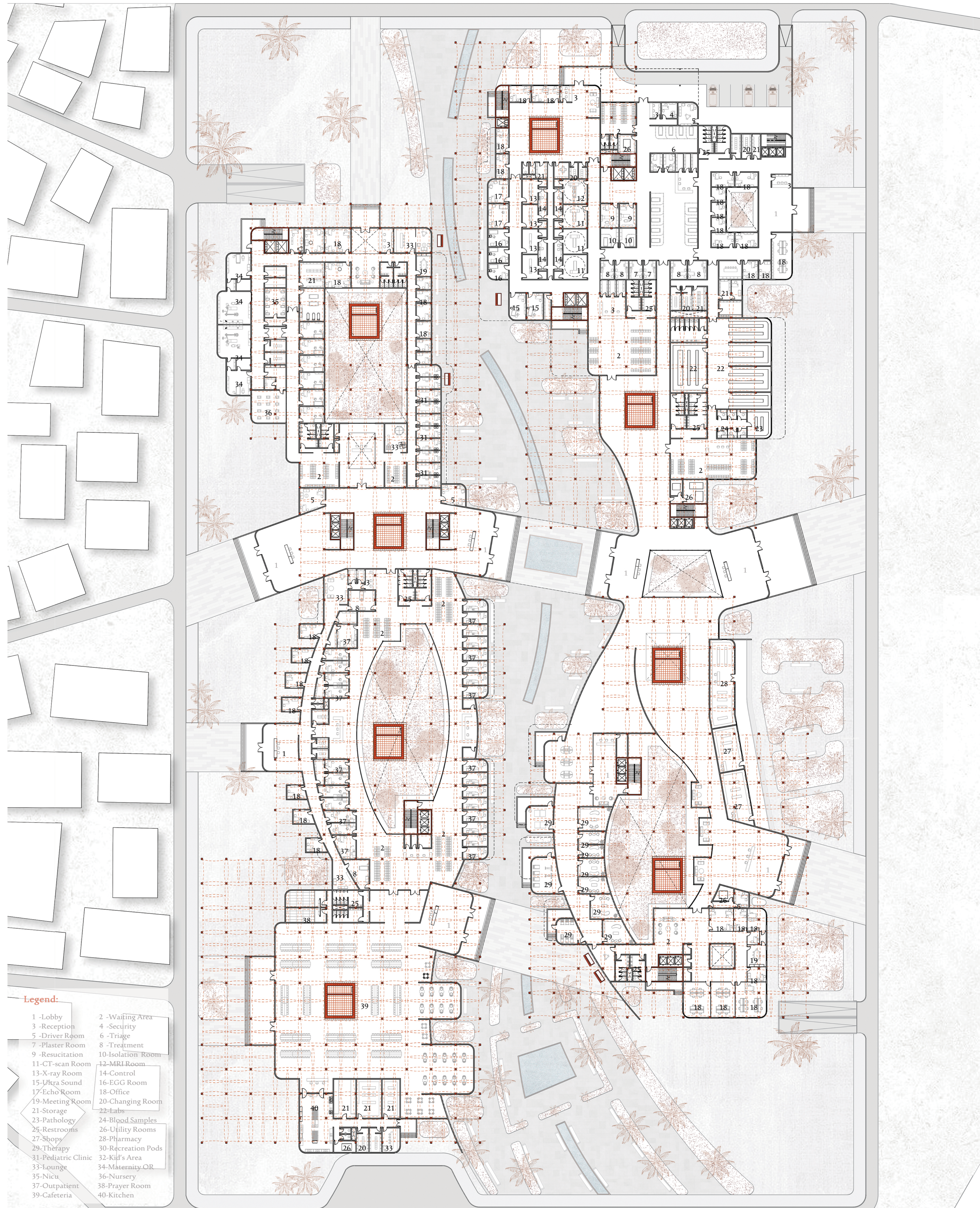
Solution Generation

The project introduces an atmospheric water vapor harvesting system integrated within the hospital's canopy structure. Through computational environmental simulation and climate-based analysis, the intervention is capable of generating enough potable water to supply approximately 30% of Farafra's population annually.



Vapor Formation

Solar heating causes warm, moisture-laden air to become lighter and rise from the agricultural landscape, concentrating atmospheric moisture between 12-20 meters above ground where cooler conditions promote condensation and water capture.



Legend:

- | | |
|---------------------|--------------------|
| 1 -Lobby | 2 -Waiting Area |
| 3 -Reception | 4 -Security |
| 5 -Driver Room | 6 -Triage |
| 7 -Plaster Room | 8 -Treatment |
| 9 -Resuscitation | 10-Isolation Room |
| 11-CT-scan Room | 12-MRI Room |
| 13-X-ray Room | 14-Control |
| 15-Ultra Sound | 16-EGG Room |
| 17-Echo Room | 18-Office |
| 19-Meeting Room | 20-Changing Room |
| 21-Storage | 22-Labs |
| 23-Pathology | 24-Blood Samples |
| 25-Restrooms | 26-Utility Rooms |
| 27-Shops | 28-Pharmacy |
| 29-Therapy | 30-Recreation Pods |
| 31-Pediatric Clinic | 32-Kill's Area |
| 33-Lounge | 34-Maternity OR |
| 35-Nicu | 36-Nursery |
| 37-Outpatient | 38-Prayer Room |
| 39-Cafeteria | 40-Kitchen |

Ground Floor Plan Scale 1:300

Urban Fabric

Farafra Settlement
A compact urban fabric shaped by proximity to water sources and agricultural activity.

Desert Landscape

Arid Desert Edge
An arid and water-scarce landscape characterized by minimal vegetation and extreme climatic conditions.



Hospital

Atmospheric Water Hospital
A healthcare and water-harvesting infrastructure that bridges the settlement and oasis while transforming atmospheric moisture into a community resource.

Palm Grove Oasis

Agricultural Oasis
Dense palm groves and cultivated fields form the productive heart of the oasis and a main source of atmospheric moisture.

Layout Scale 1:800