

UN/ARIDSCAPE

a water development model for the desert rural villages in the Arava Valle;
case study of kibbutz Elifaz (Israel)

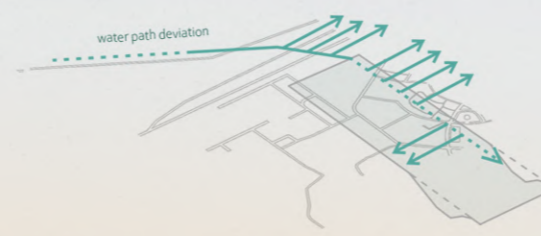
1. CURRENT SITUATION

during periods of rain the water
flows parallel to the settlement



2. EXCAVATION AND CHANNELLING PROCESS

in order to create floodwater catchment



3. NEW PROGRAMS

reactivation of the productive and
residential area



Country /City	Italy, Ferrara
University / School	University of Ferrara
Academic year	2019 /2020
Title of the project	UN/ARIDSCAPE: a water development model for the desert rural villages in the Arava Valle; case study of kibbutz Elifaz (Israel)
Authors	Claire Wright

TECHNICAL DOSSIER

Title of the project	UN/ARIDSCAPE : a water development model for the desert rural villages in the Arava Valle; case study of kibbutz Elifaz (Israel)
Authors	Claire Wright
Title of the course	Landscape architecture and infrastructure
Academic year	2019-2020
Teaching Staff	Luca Emanuelli, Gianni Lobosco, Marco Filippucci, Carmela Vaccaro Sarah Gansel
Department / Section / Program of belonging	Architecture department - Sealine research center
University / School	University of Ferrara



Written statement, short description of the project in English, no more than 250 words

UN/ARIDSCAPE is a landscape project based on designing a decentralized water management model for rural settlements in the desert of the Arava Valley, in the south of Israel, to meet the needs of a growing population. Israel's population is predicted to double reaching 15 million people by 2050 and 60% of Israel territory is desert; so Israel might explore the possibility to expand towards desert rural settlements, improving the quality of life in these areas. This project's aim can be achieved by a resilient design which develops around localized water solutions, enabling communities to be more sustainable, self-sustained and capable of meeting the challenges of population growth and climate change. The studies show there is enough rainfall to re-green an area as the Valley's arid ones, but more than 50% of rainwater is lost as it evaporates. The project starts by rethinking of that wastewater, through the reconsideration of its scarcity, in a place where every drop can make the difference. The main programs to be implemented are: flood control systems, water harvesting, effluent treatment and reuse of treated wastewater for crop irrigation and landscaping. The project examines the case study of the Elifaz kibbutz, suggesting a new land sharing plan, that relates agricultural production and development with a community life. The Elifaz kibbutz would be not a circumscribed case but it must be taken as a model, providing guidelines to be applied along the Arava Valley for a decentralized infrastructure network that will accompany the growth of settlements.

For further information

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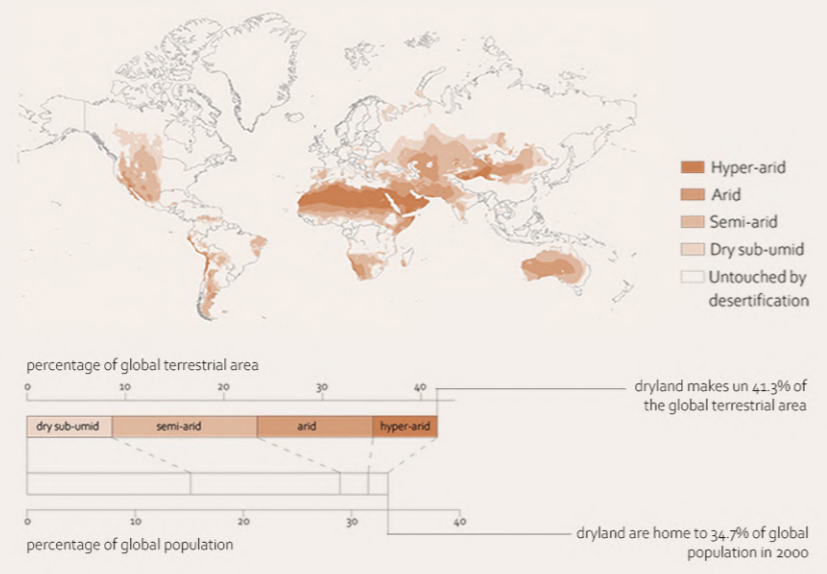
Barcelona November 2023

SCHOOL PRIZE

01. Issues : A growing population in a tiny and arid country

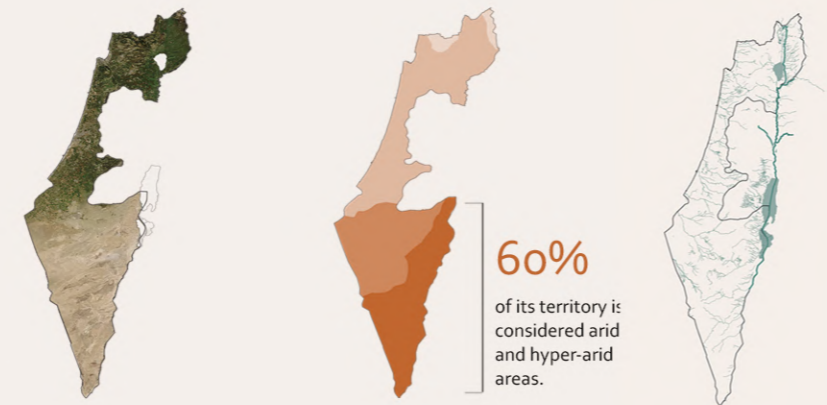
1.1 Aridity index

The world is currently facing severe desertification, as noted by UN sources. Drylands, areas with low freshwater availability, account for 40 percent of the Earth's land and they are inhabited by 2.5 billion people, which represent more than 5 percent of the current global population. In Israel the desert represents 60 percent of its territory and, at the present state, only 8 percent of the whole population lives in the arid areas of Negev and Arava regions. However, as the population continues to grow, space will be scarcer, and it will become more expensive to live around urban centres along the coast.



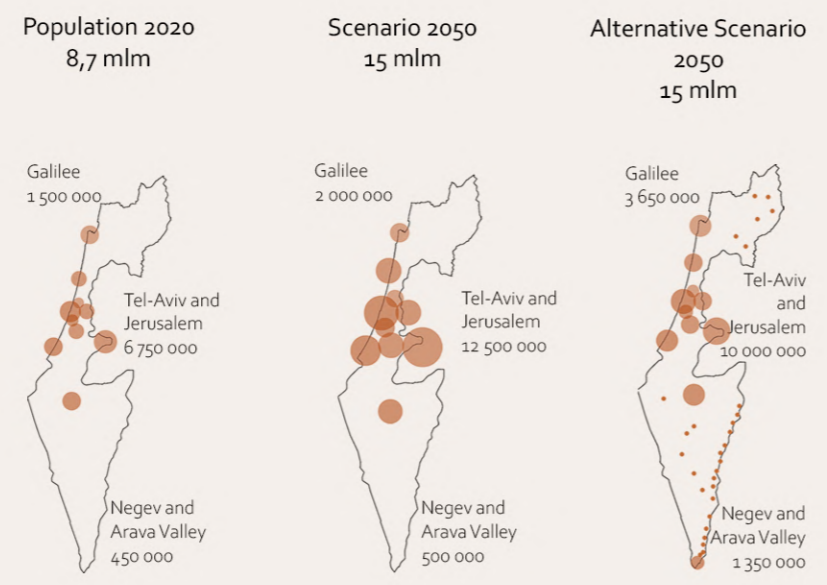
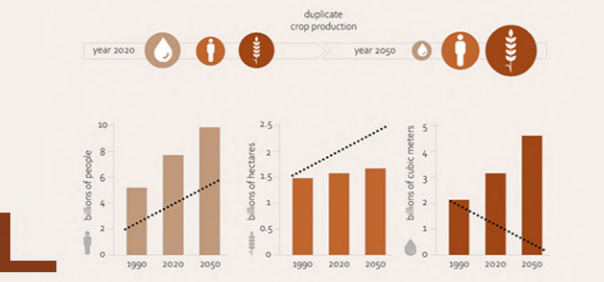
1.2 Water Stress

Despite a crisis of water scarcity, implementation of centralized programs has allowed Israel to achieve water security. This has been achieved through a massive increase in the production of non-conventional water sources and a legal framework that asserts strong governmental control over water resources and boosts public awareness about water conservation. Nevertheless, rapid urbanization, intensive agriculture, polluting industries and extensive afforestations accelerate the phenomena of desertification, and threaten the desert ecosystems and new sources of water are needed.



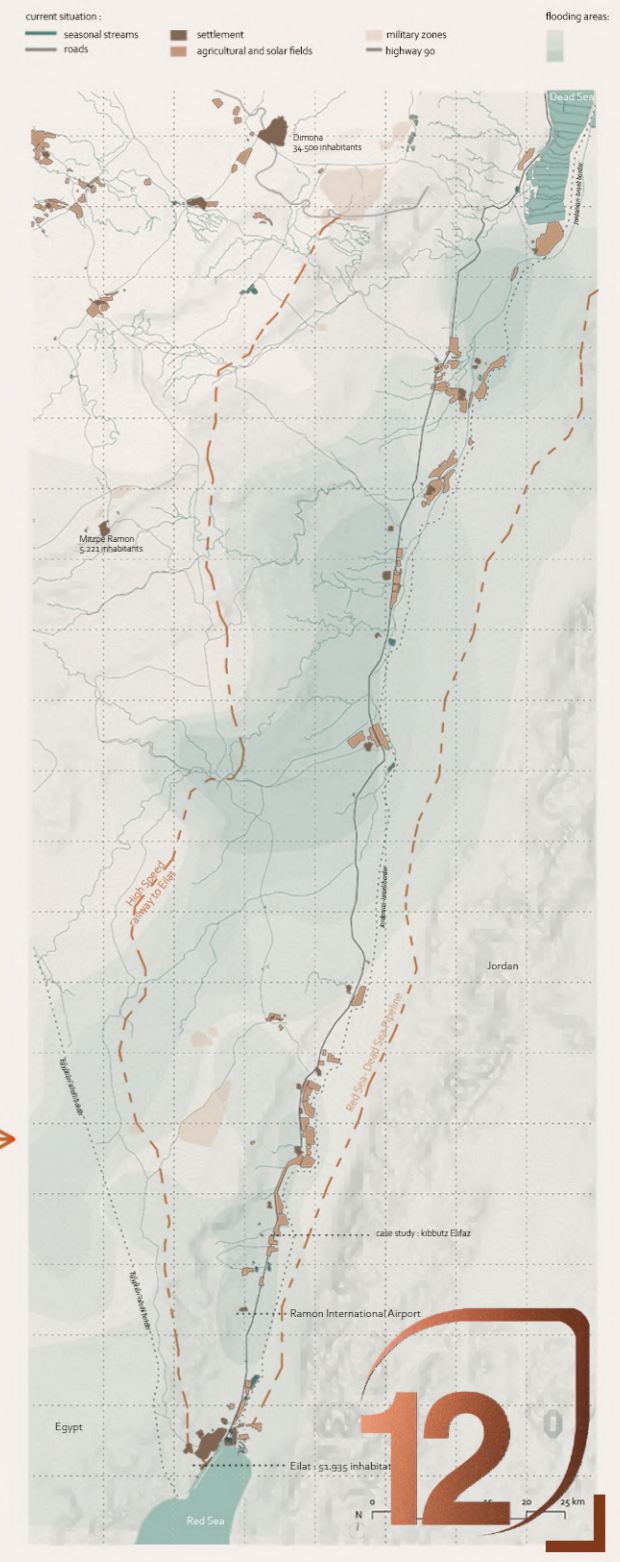
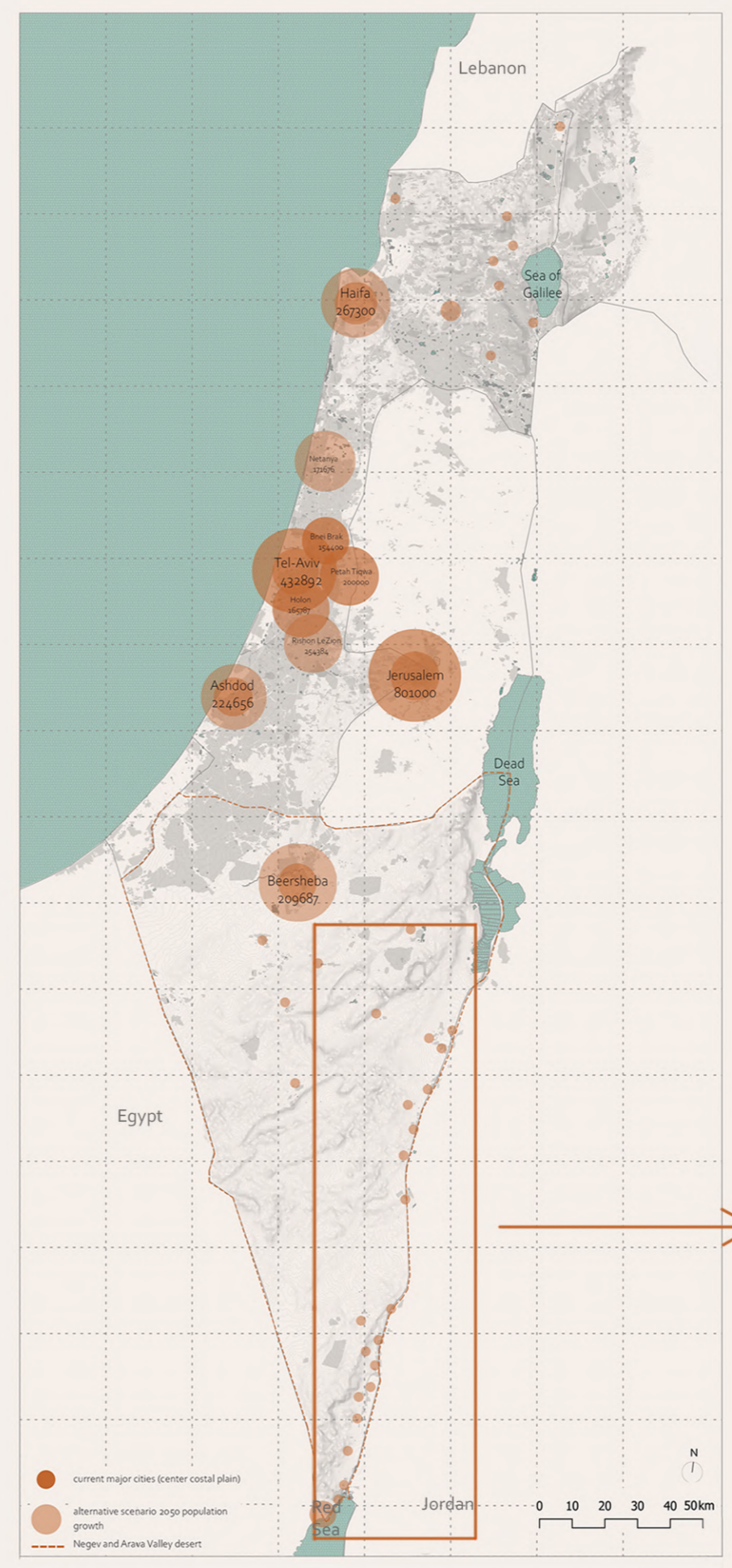
1.3 Population Density

Israel's population is predicted to grow by 15 million by 2050. Then with a housing crisis and high population growth in a tiny country, the country might look toward the settlements and the Negev Desert which is a desolate area, currently empty of people (just 8% of Israel's total population) but which has the potential to be densely populated.



02. Alternative Scenario : Towards an equitable density and self-sustained water solutions

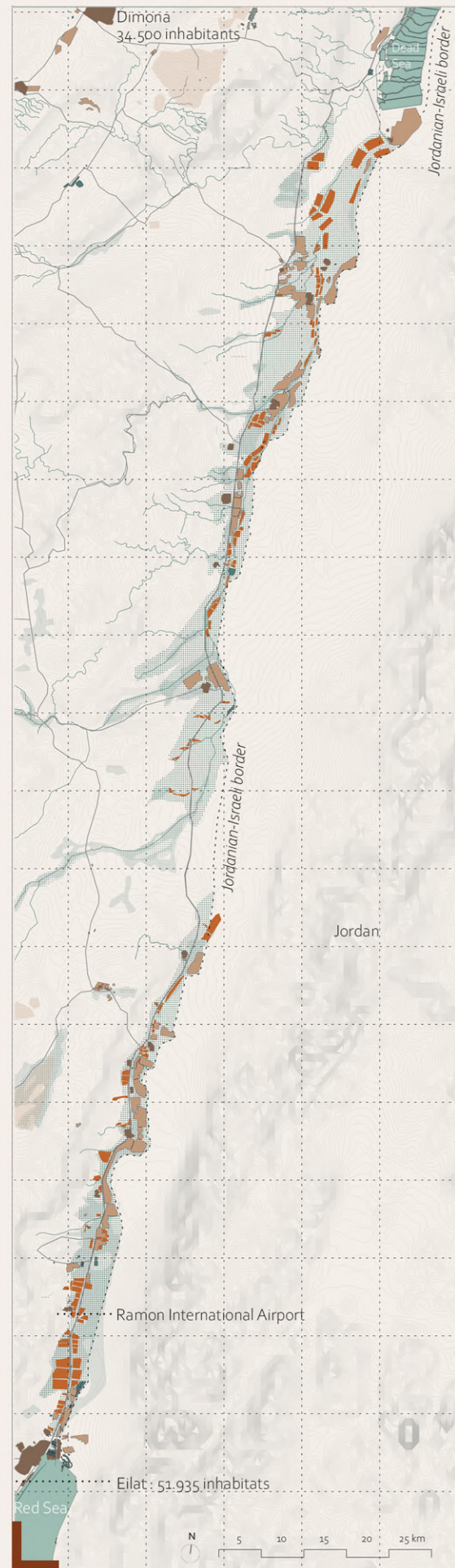
" > 50 % of the rainwater in the Negev and the Arava Valley flows down in the surface "



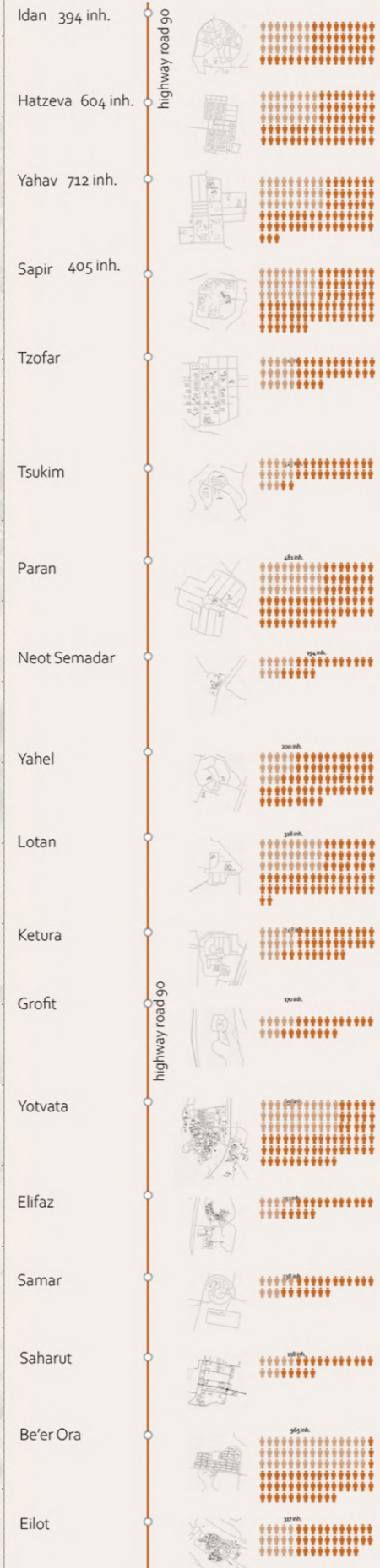
03. Strategies

Desert Rural Perspective :
from a desolate periphery to a key of changes

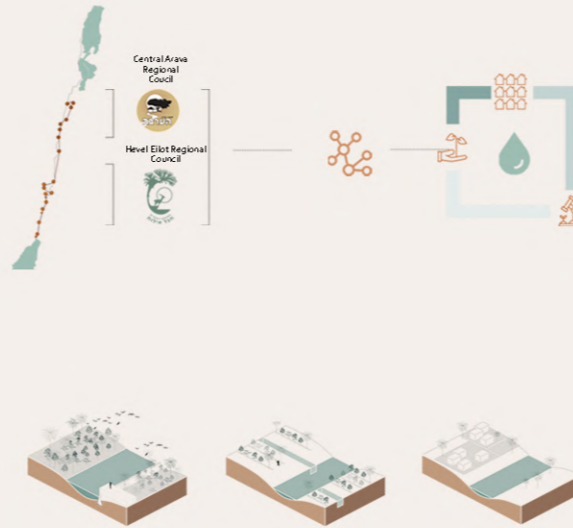
Arava Valley : settlements and flooding area



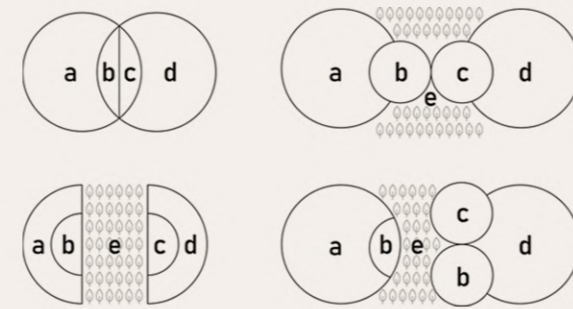
settlements along road 90,
current and future population



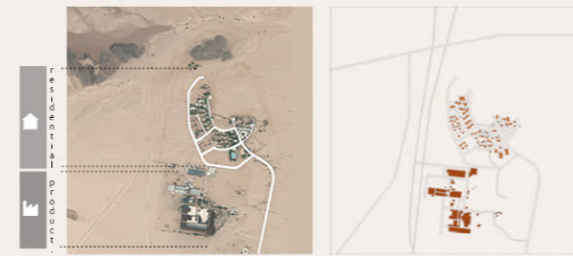
04. Case Study : Kibbutz Elifaz an incomplete kibbutz



Elifaz is a small kibbutz which has issues related to the scarcity of population and water. The project defines a new land sharing plan, that relates agricultural production and development with a life in community. Therefore, it will be proposed a strategy at different scales based on the attempt to develop a decentralized water management.



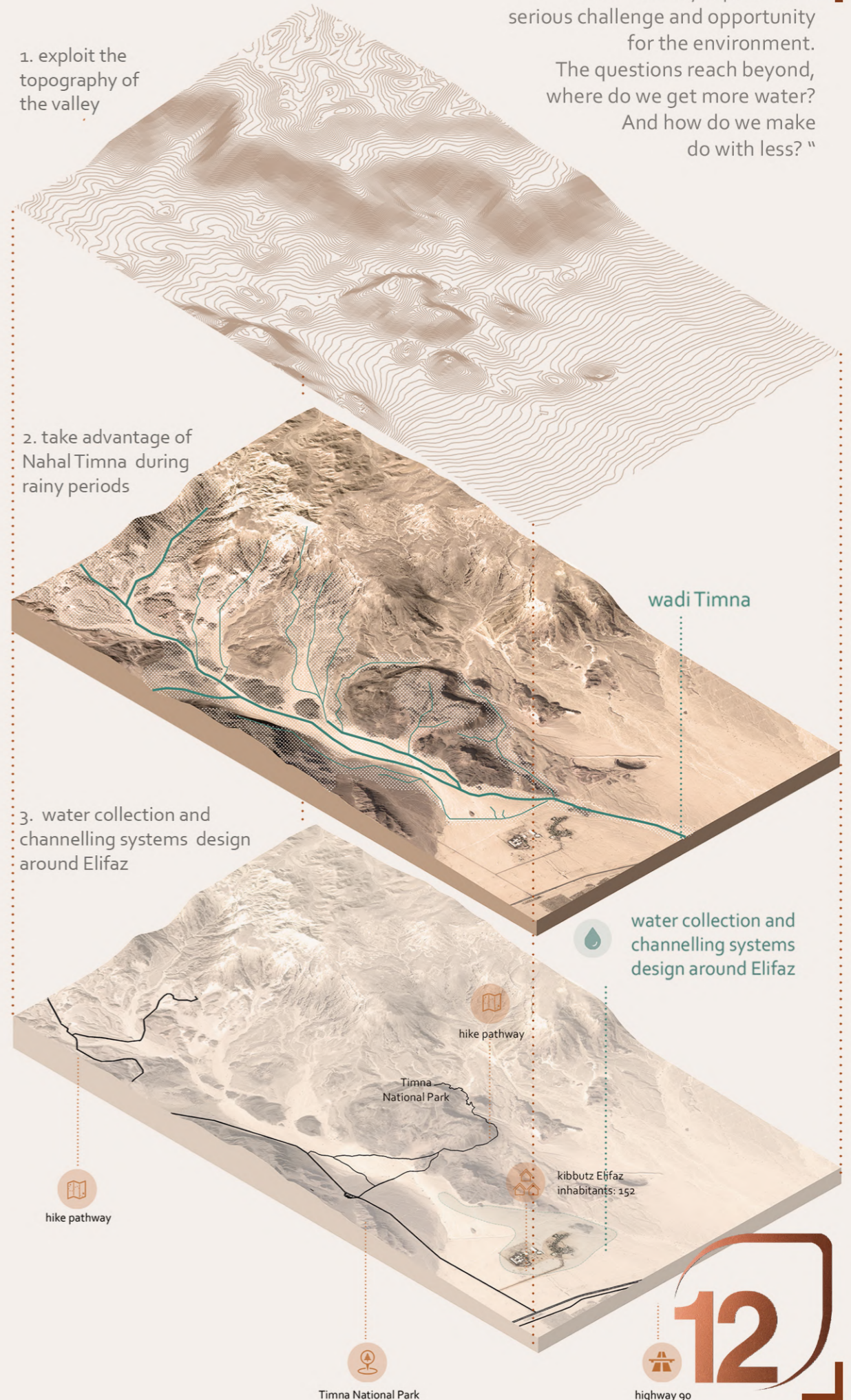
a - residential zone d - productive zone
b - social center e - green belt
c - productive center



1. exploit the topography of the valley

2. take advantage of Nahal Timna during rainy periods

3. water collection and channelling systems design around Elifaz



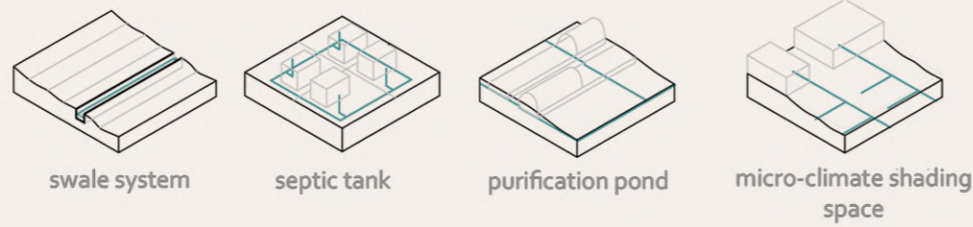
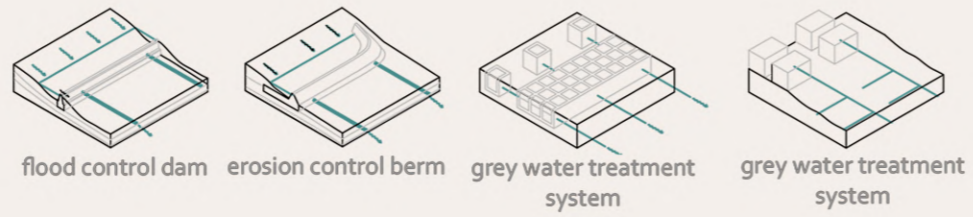
“Water scarcity represents a serious challenge and opportunity for the environment. The questions reach beyond, where do we get more water? And how do we make do with less? ”

4.1 Typologies of water intervention

The project focuses on the need to improve the quality of life in the Arava Valley in order to attract and retain residents, and it achieves this through the inclusion of a off-grid water infrastructures which will subsequently lead to agricultural, tourism and research development.

The main programs to be implemented along the valley, based on a decentralized water management for crop irrigation and landscaping are:

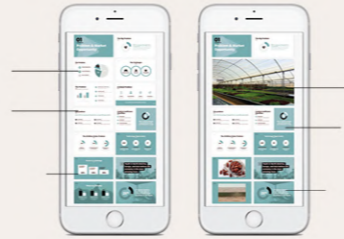
- flood control
- water harvesting
- reuse of treated wastewater for crop irrigation and landscaping



4.2 Smart methods of water control

The project involves online and remote monitoring systems of flood and greywater treatment. It includes the development of a website with smart phone application for real time water quality monitoring for farmers, regulators and researchers. In this way the maintenance problem is reduced through a precise technology which is then entrusted to the control of each inhabitant of the kibbutz through an app.

floods monitoring
crops monitoring
purification control system



farm news
research news
guest applications

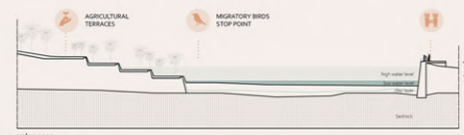
FLOOD CONTROL DAMS

EROSION CONTROL

SWALE SYSTEM



FLOOD WATER CONTROL DAMS



EROSION CONTROL



SWALE SYSTEM

