

REHABILITATION OF A DESERTIFIED AREA: ENHANCING BIODIVERSITY, ECOSYSTEM FUNCTION AND ECOSYSTEM SERVICES

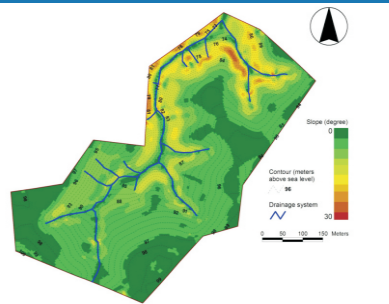
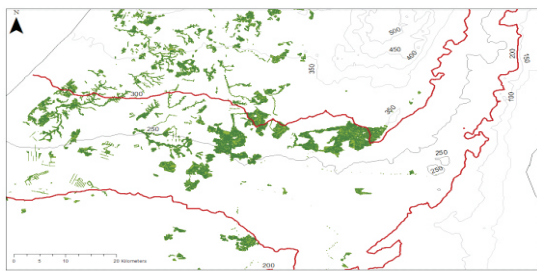
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Site characteristics:

1. Climate: mean annual precipitation 200 mm (Nov.-April); mean maximum summer temperature 34°C, mean min. winter temperature 6°C.
2. Vegetation: semiarid shrubland, rocky-loessial watersheds, ephemeral streams. Vegetation is dominated by patch-forming dwarf shrubs with species-rich annual winter vegetation in the intershrub and shrub patch understory.
3. Two types of management - livestock grazing by Bedouin sheep herds and runoff harvesting system for afforestation and for herding.

RESEARCH

Site research was focused on: 1. long-term experiments (30 years) for monitoring changes in abundance, diversity, species composition & distribution, development of biological soil crusts, perennial plants & winter annuals in relation to rainfall, soil disturbance, patch distribution, & livestock grazing, & 2. short-term experiments & surveys for testing hypotheses about processes, mechanisms & interactions involved in the dynamics and stability of shrub, biological soil crust & their feed-back with flows of materials through the landscape.



Map and the geo diversity of the main watershed of the site.



Shrub land: a patch mosaic of shrubs within a matrix of soil crust.



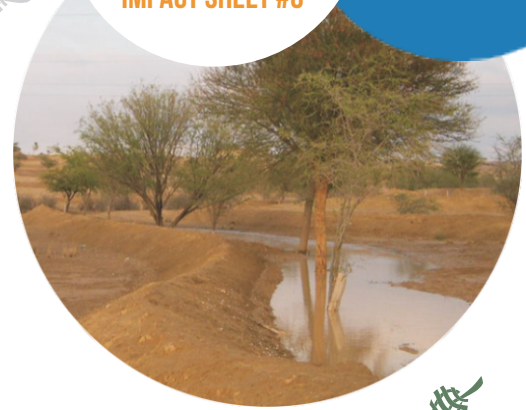
Collapsing of the shrub land: dieback of shrubs indicated by piles of snail shells.



State changes from shrub land to grass land: white patches are *Avena sativa* and green matrix is *Stipa capantis* on soil crust



IMPACT SHEET #6



AIMS

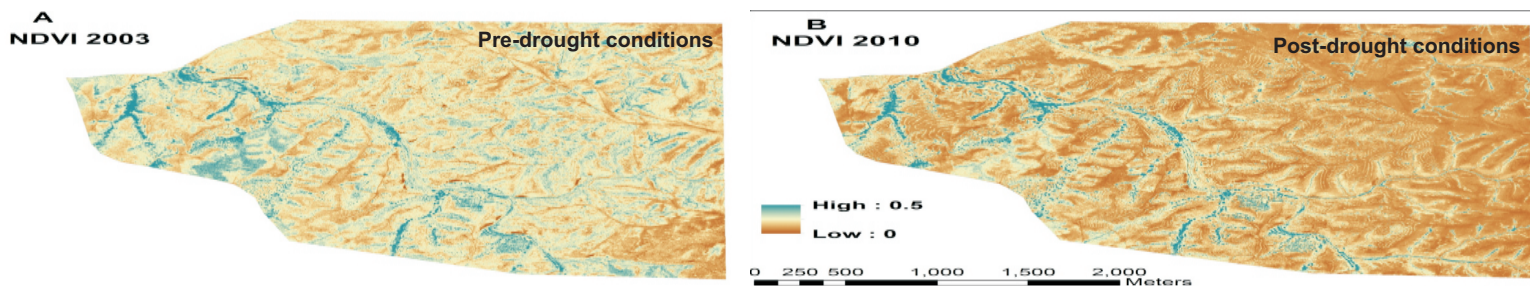
- Ecosystem research and management under land use and climate change;
- Scale dependent relationships among landscape, vegetation, hydrology, soil and nutrient dynamics;
- Sustainable land management of a desertified area;
- Temporal flora and fauna responses to variation in rainfall and runoff;
- Patch and pattern formation by dwarf shrubs, annual herbs and biological soil crusts; biological soil crust development, disturbance, function & species composition.

OUTCOME - IMPACT

- Improved soil quality;
- Functional restoration;
- Recreation of leisure spaces;
- Creation of a savanna like habitat in dryland;
- Increase primary production for local people;
- Development of rehabilitation methods for climate change mitigation.

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The effect of drought on a regional scale. Applying earth observation methods for upscaling site processes to regional scale (NDVI - normalized difference vegetation index indicating presence and often quality of green areas).



Studying long-term restoration processes: A. Preparation of a desertified area for functional restoration. B. Landscape pattern after restoration

PRIORITY THEMES



PRIORITY ECOSYSTEM SERVICES

PROVISIONING FOOD FOR DOMESTIC ANIMALS
REGULATING WATER, SOIL, NUTRIENTS, MICRO - CLIMATE
CULTURAL RECREATION, EDUCATION, AESTHETICS
SUPPORTING WATER CYCLING, NUTRIENT CYCLING, HABITATS, SOIL FORMATION

AREA OF RELEVANCE, ACCORDING TO SDG



SDG - UN SUSTAINABLE DEVELOPMENT GOALS

FURTHER INFORMATION

Shachak, M., Sachs, M. and Moshe, I., 1998. Ecosystem management of desertified shrublands in Israel. *Ecosystems* 1: 475-483.

Shachak, M. and B. Boeken, 2010. Patterns of biotic community organization and reorganization: a conceptual framework and a case study. *Ecological Complexity* 7: 433-445

Paz-Kagan, T., Panov, N., Shachak, M., Zaady, E., & Karnieli, A., 2014. Structural changes of desertified & managed shrubland landscapes in response to drought: Spectral, spatial and temporal analyses. *Remote Sensing* 6(9): 8134-8164



PROJECT - EUROPEAN LONG-TERM ECOSYSTEM AND SOCIO-ECOLOGICAL RESEARCH INFRASTRUCTURE
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