# The Hidden Oases:

## Uncovering Trophic Connectivity of Namib's Fog-Plant

Presentation by Huei Ying Gan

Senckenberg Centre for Human Evolution and Palaeoenvironment,

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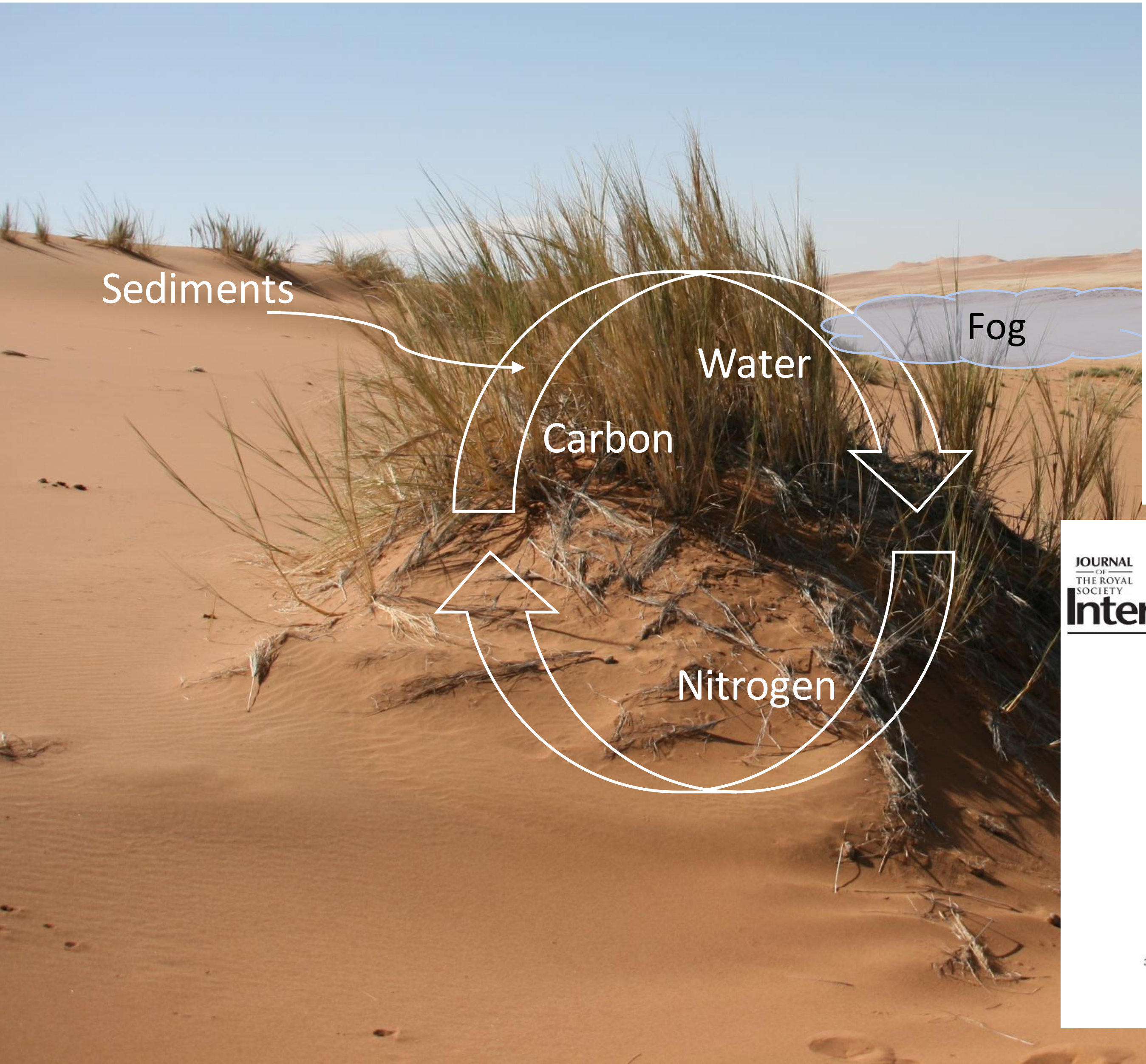
# Fog-Plant-Oases initiate the succession of mini ecosystems in the Namib Desert

# Fog-harvesting as the pulse of FPO

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## Efficient fog harvesting by *Stipagrostis sabulicola* (Namib dune bushman grass)

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A B S T R A C T

*Stipagrostis sabulicola*, an endemic grass species of the central Namib Desert, grows on dune fields under conditions of very low annual precipitation punctuated by regular nocturnal fog events. The objective of this study is to determine to what extent *S. sabulicola* relies on water supply by fog harvesting. The following parameters were monitored: 1) climate, 2) stem runoff, 3) leaf water potential (LWP) and 4) soil water content (SWC). Collected fog water was 5.0 L (liter) per $m^{-2}$ leaf surface and therefore a total harvest of 4–5 L per fog event for a medium-sized mound of *S. sabulicola*. SWC close to a mound increased substantially during a fog event, with SWC at about 2.2% within a mound. LWP of *S. sabulicola* ranged between −1.7 MPa and −3.5 MPa. On days without fog, LWP was highest during the morning and decreased during the afternoon. No significant decrease of LWP occurred during days following a fog event. The increase of SWC at the plant base during a fog event indicates that fog harvest of *S. sabulicola* occurs mainly via stem flow with subsequent absorption by the root system and that fog catchment therefore represents a substantial water source for this species.

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*Published online* 22 February 2012

## Leaf surface structures enable the endemic Namib desert grass *Stipagrostis sabulicola* to irrigate itself with fog water

A. Roth-Nebelsick[1,*], M. Ebner[2], T. Miranda[2], V. Gottschalk[4], D. Voigt[3], S. Gorb[3], T. Stegmaier[4], J. Sarsour[4], M. Linke[4] and W. Konrad[2]

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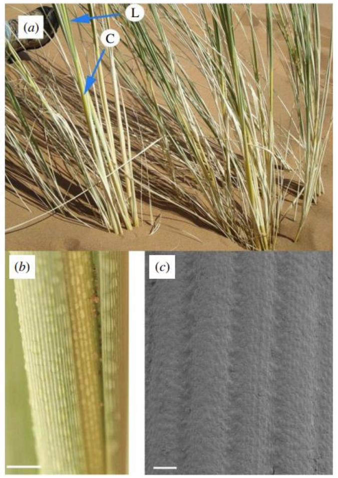
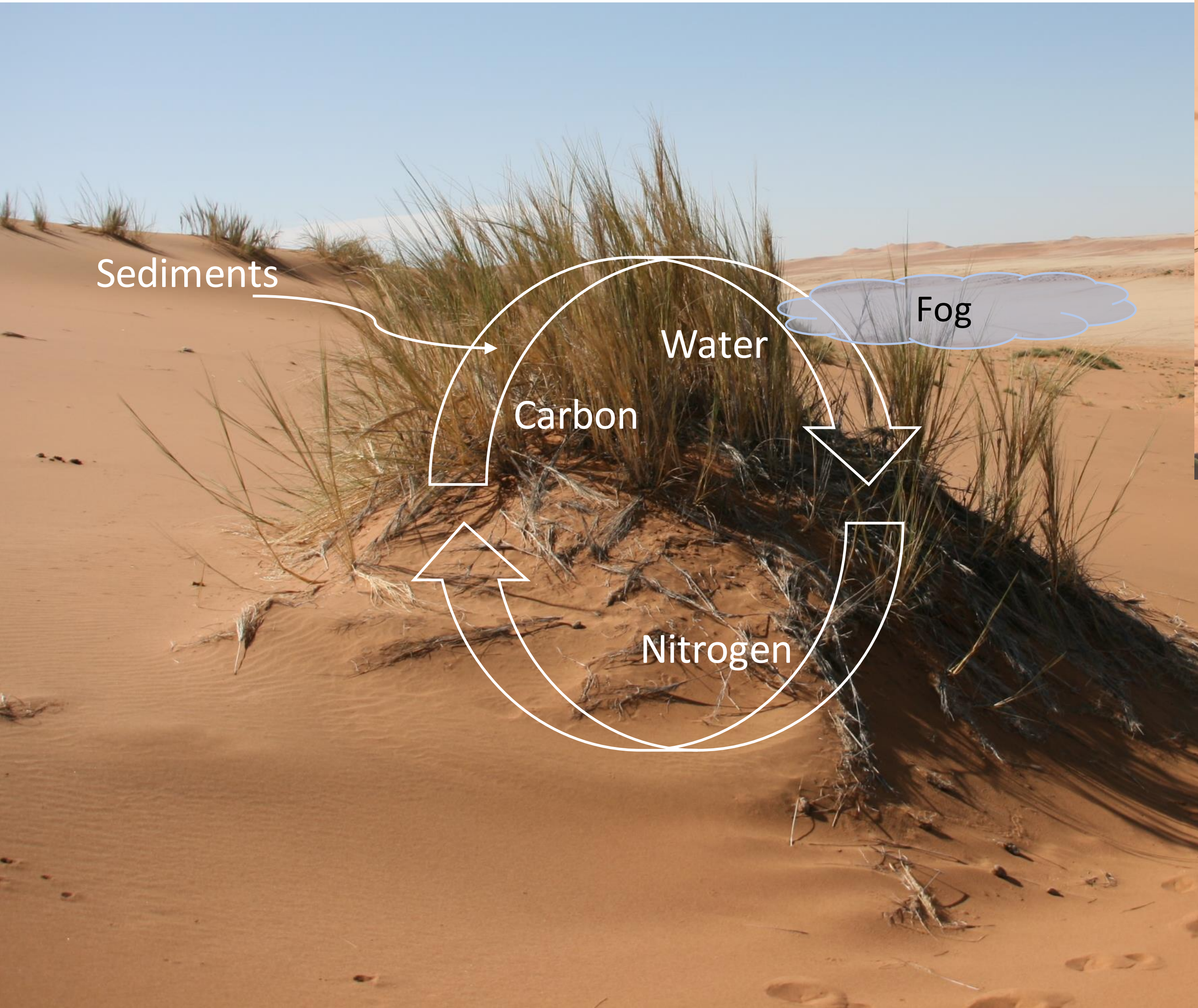
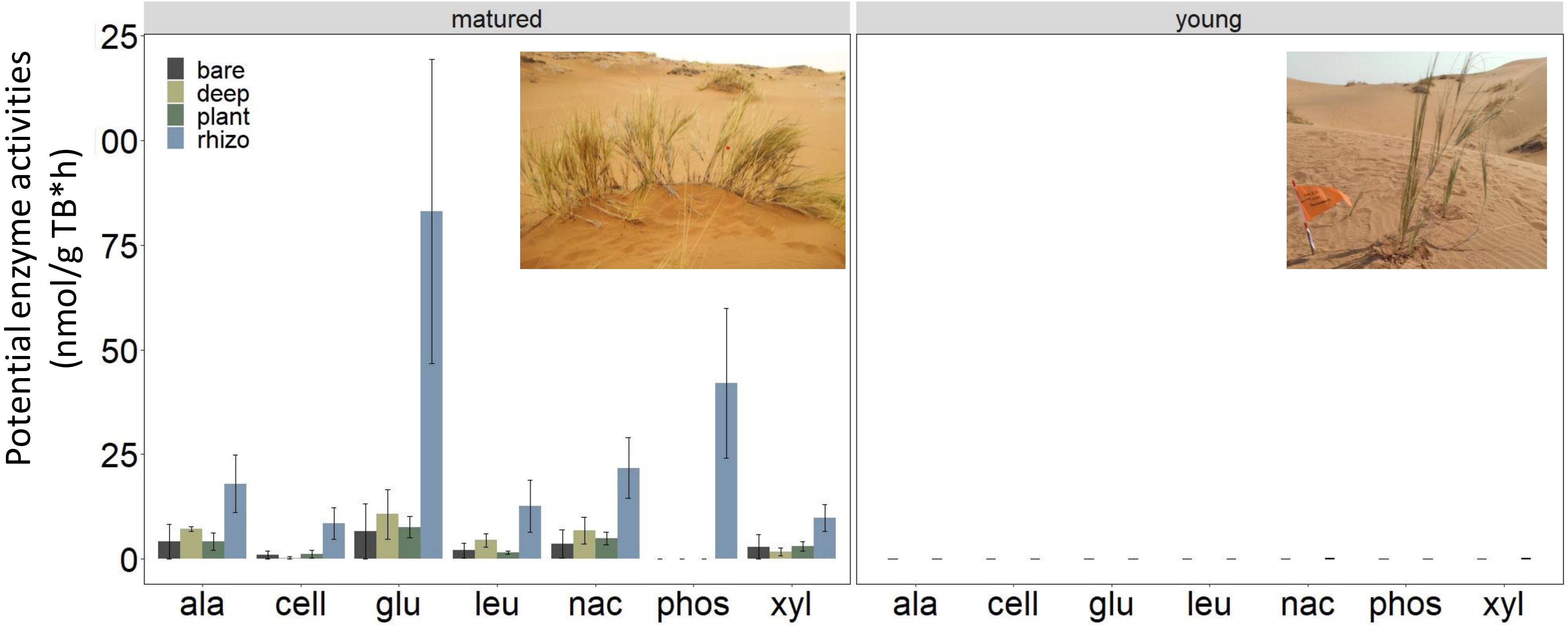



Figure 1. (*a*) Young tussocks of *S. sabulicola* in their natural habitat. C, culms; L, leaves. The culms are tightly enveloped by involute leaves that end in acute tips. (*b*) Drops on involute leaves of *S. sabulicola* after a fog event. The striations correspond to the grooves within the surface. The droplets are sitting on the abaxial (i.e. lower) leaf sides that became the external sides because of the involute state. (*c*) SEM image of the abaxial leaf surface of *S. sabulicola*. (*b*) Scale bar, 1000 µm; (*c*) scale bar, 100 µm. (Online version in colour.)

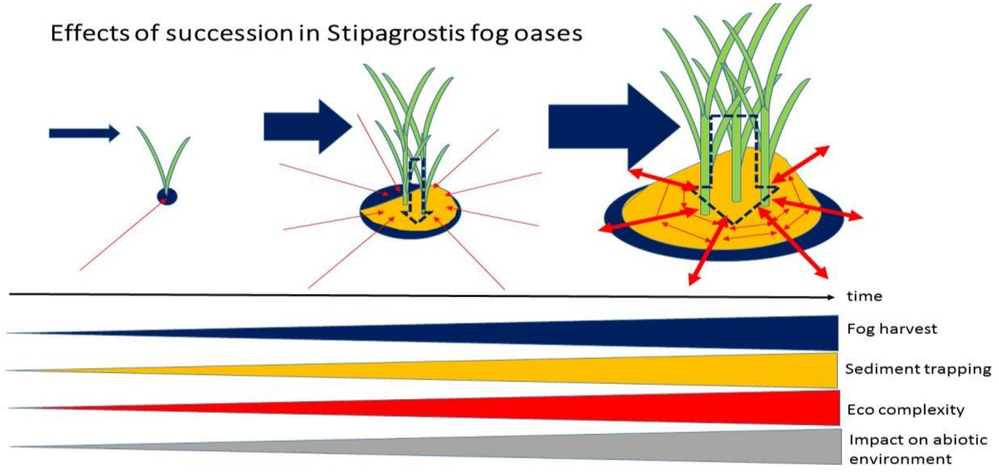
# Structure and functioning of FPOs



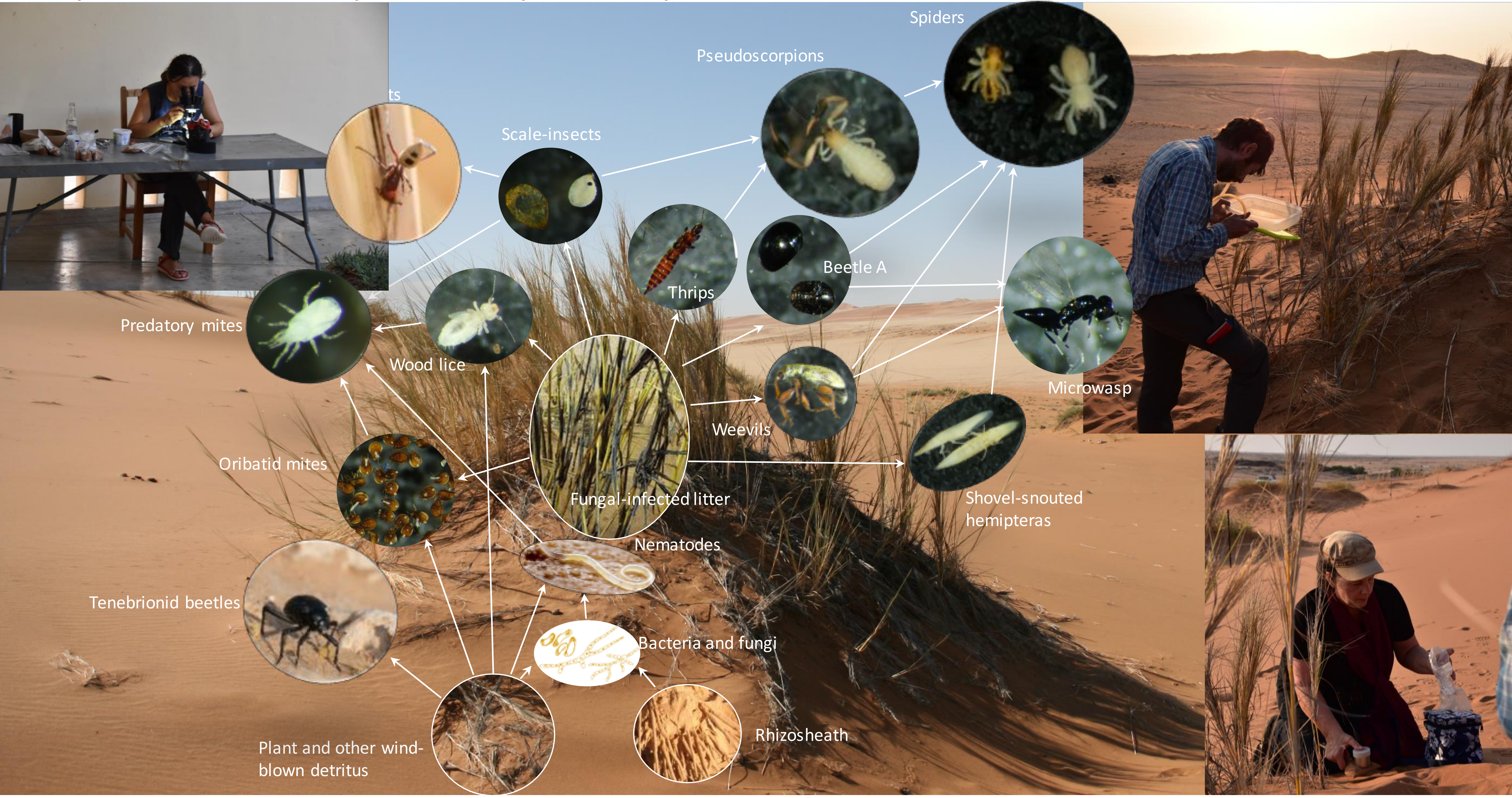

# FPOs activate soil biogeochemical cyclings



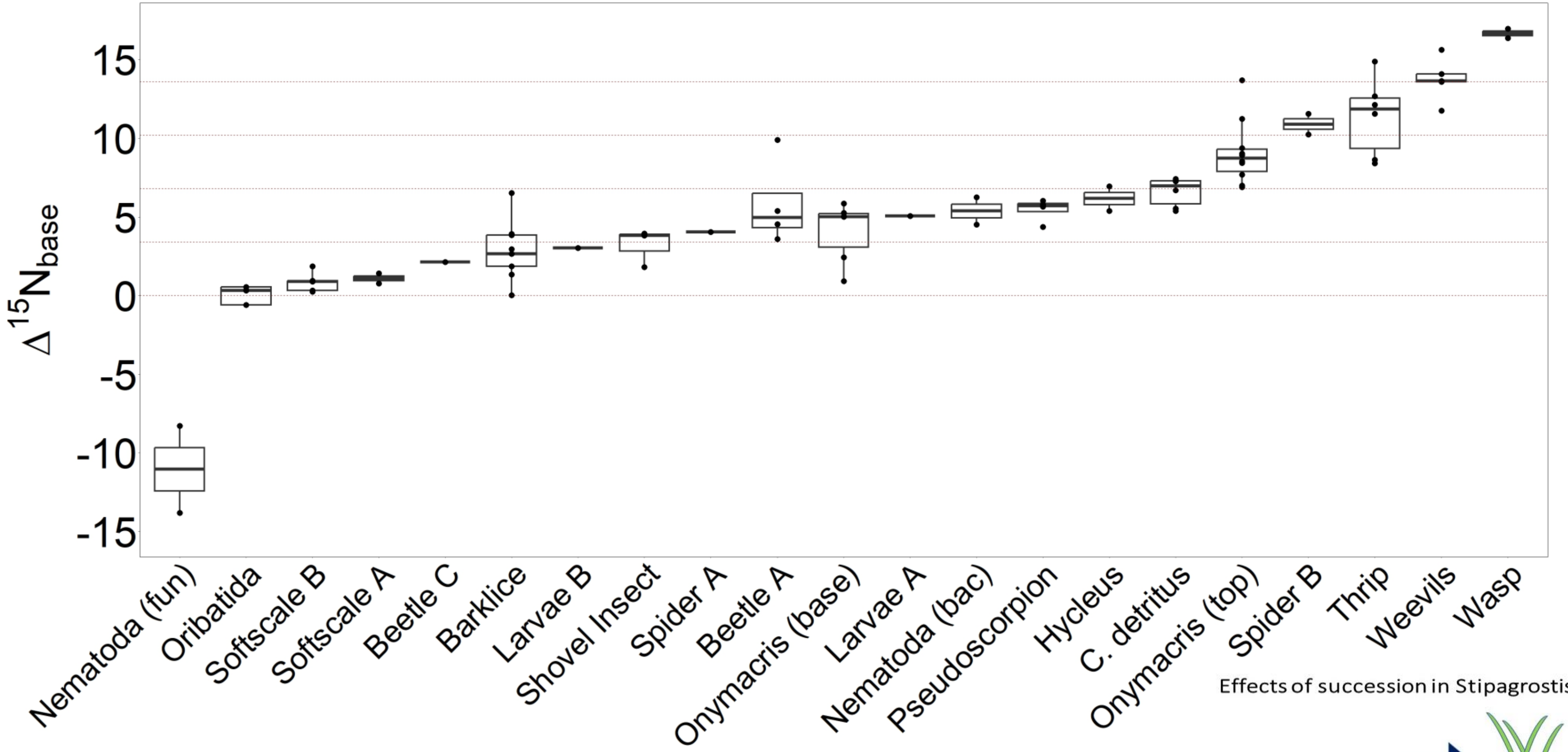


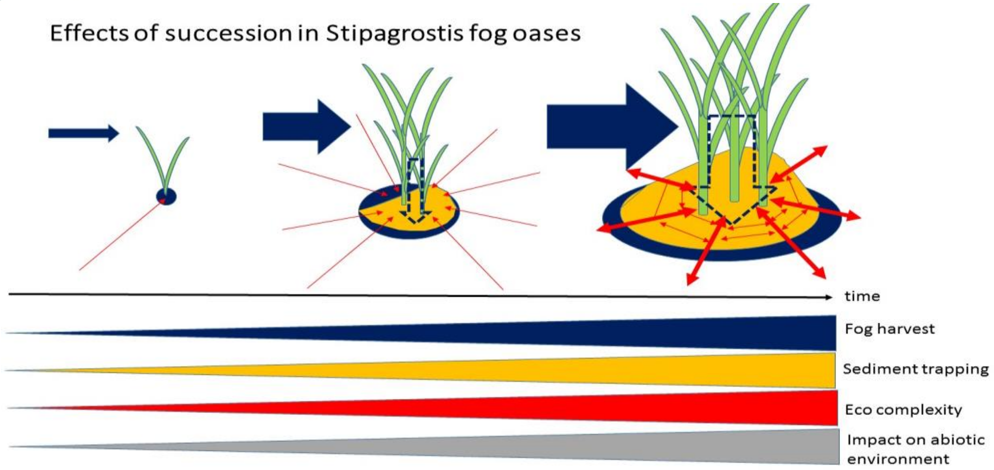


# Trophic connectivity in a unique ecosystem



# Complex trophic structure of soil life



# Fog-harvesting for water supply in rural villages

HOSTED BY ELSEVIER
Annals of Agricultural Sciences
Volume 61, Issue 1, June 2016, Pages 105-110

## Fog water harvesting providing stability for small Bedwe communities lives in North cost of Egypt

O.M. Harb, M.Sh. Salem, G.H. Abd EL-Hay, Kh.M. Makled

JOURNAL ARTICLE

## Water harvesting through fog collectors: a review of conceptual, experimental and operational aspects

Nathalie Verbrugghe, Ahmed Z Khan

*International Journal of Low-Carbon Technologies*, Volume 18, 2023, Pages 392–403,
https://doi.org/10.1093/ijlct/ctac129
**Published:** 28 March 2023 **Article history**

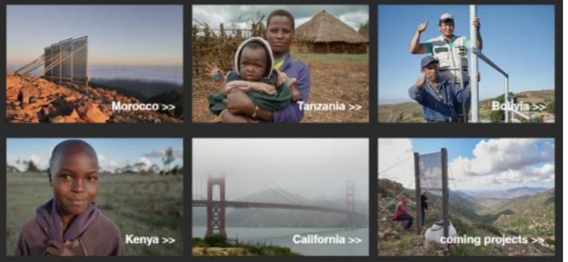
## Floating springs
Harvesting drinking water with fog nets

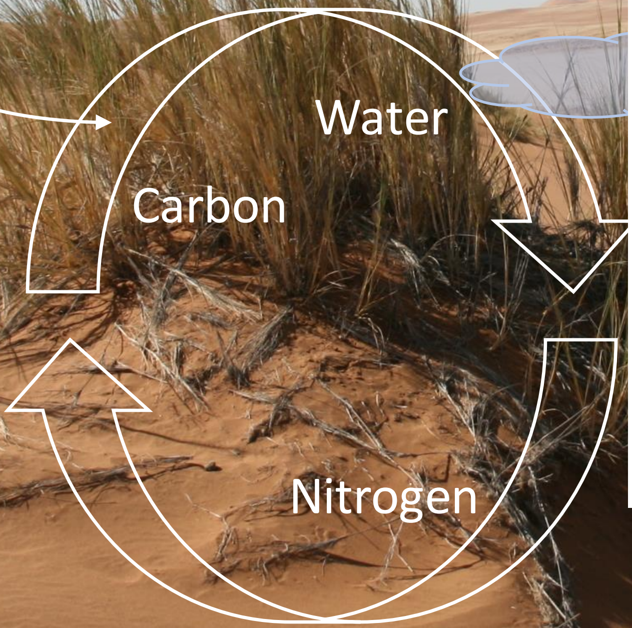
Each FogCollector is quick and easy to install while requiring no maintenance. The collectors are carbon-neutral as they are operated without energy. All materials are food-safe.
aqualonis FogCollectors produce high-quality drinking water (approved by WHO standards) and can provide water for agriculture and forestry.

Please note that we do not vend to private individuals. aqualonis FogCollectors are intended for the use of NGOs, public bodies and corporations.

* formerly known as the CloudFisher ®, a registered Trademark of the WaterFoundation


### Projects

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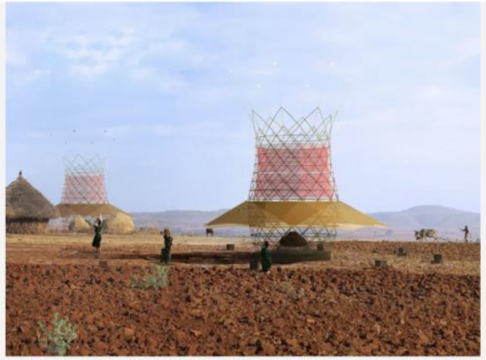
## A Bamboo Tower That Produces Water From Air

The structure is designed to wring water out of thin air, providing a sustainable source of H2O for developing countries.



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WATER

## The Fog Collectors: Harvesting Water From Thin Air

BY RENEE CHO | MARCH 7, 2011 Comments

Today nearly two people in ten have no source of safe drinking water according to the U.N. Millions of people, most of them children, die from diseases associated with inadequate water supply, sanitation, and hygiene each year. But in some desert areas, where there is very little rain, fog and dew are abundant sources of humidity that are being harvested to produce fresh water.

Fog or dew collection is an ancient practice. Archaeologists have found evidence in Israel of low circular walls that were built around plants and vines to collect moisture from condensation. In South America's Atacama Desert and in Egypt, piles of stones were arranged so that condensation could trickle down the inside walls where it was collected and then stored.


Photo credit: FogQuest

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## Harnessing fog could help farmers in a changing climate

ISSUE:
Summer 2019

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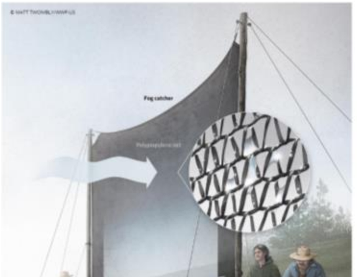
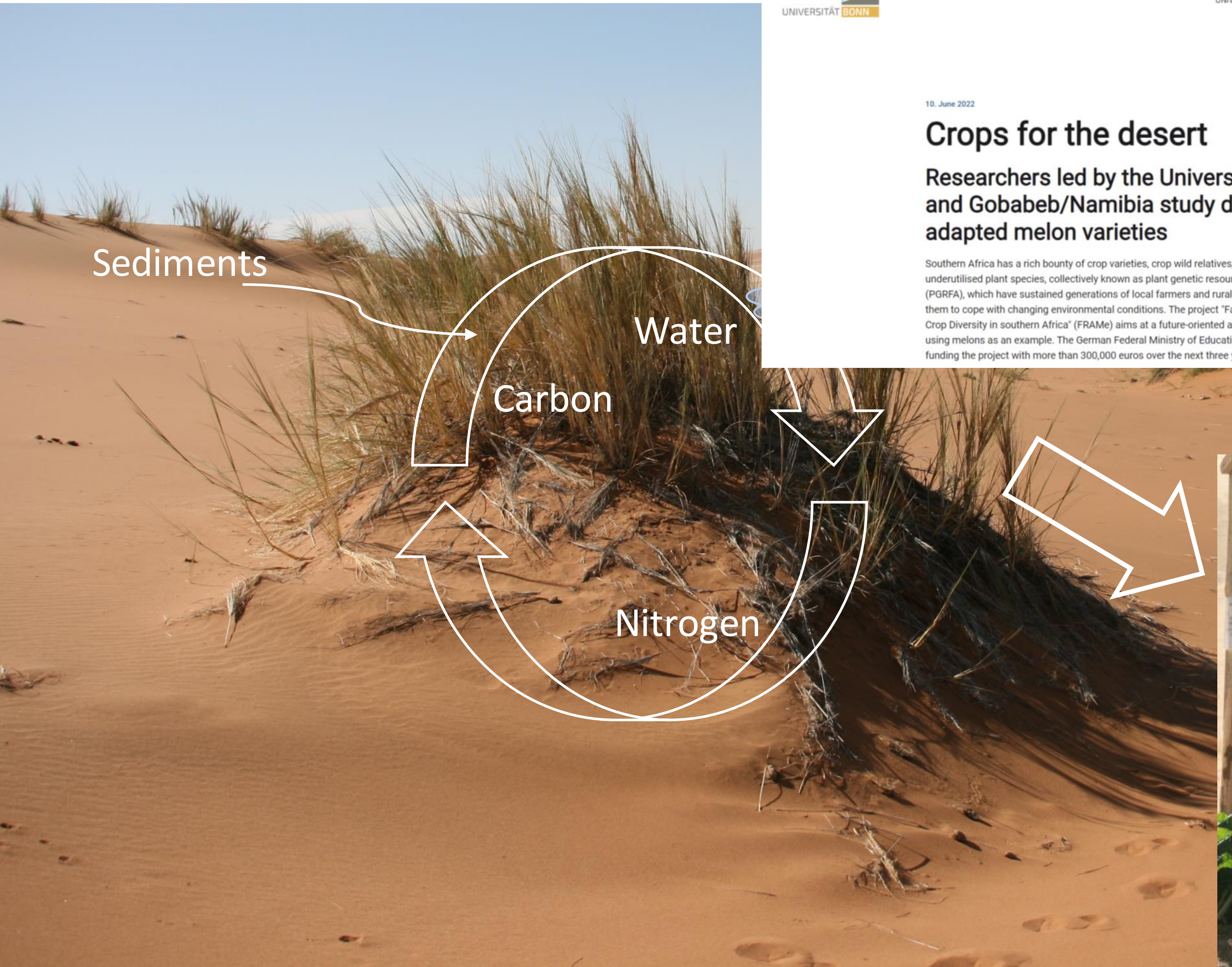
The town of Santa María Yucuhiti lies in the forested mountains of Oaxaca, in southwest Mexico. Most of its 6,500 residents make their living cultivating small plots of land, though the region's dry climate has always made farming difficult. Now, due to more intense droughts and frosts caused by climate change, it's getting even harder. But two agricultural tools could help farmers boost the resilience of their crops by harvesting an untapped resource: fog.




**AGRICULTURAL COOPERATIVE**
From 2017 to 2018, Espacio de Encuentro de las Culturas Originarias (EECO), a local NGO, partnered with Santa María Yucuhiti's farmers to test the effectiveness of combining fog catchers and water channels. Climate Crowd, a WWF-led initiative, provided funding and technical assistance.

**WATER WORKS**
Fog catchers collect water from the atmosphere through condensation. Water channels store that water (along with heat from the sun) next to the fields, creating a microclimate different from surrounding atmospheric conditions. Water channels have been shown to boost crop survival by creating more moderate nighttime temperatures, reducing the impacts of drought, providing irrigation, and reducing soil erosion.

# FPO as a model for the establishment of self-contained human oases

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10. June 2022

## Crops for the desert

### Researchers led by the University of Bonn and Gobabeb/Namibia study drought-adapted melon varieties

Southern Africa has a rich bounty of crop varieties, crop wild relatives, orphan crops and underutilised plant species, collectively known as plant genetic resources for food and agriculture (PGRFA), which have sustained generations of local farmers and rural communities and enabled them to cope with changing environmental conditions. The project "Farmer Resilience and Melon Crop Diversity in southern Africa" (FRAMe) aims at a future-oriented agriculture of crop diversity using melons as an example. The German Federal Ministry of Education and Research (BMBF) is funding the project with more than 300,000 euros over the next three years.


# Thank you for your attention

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