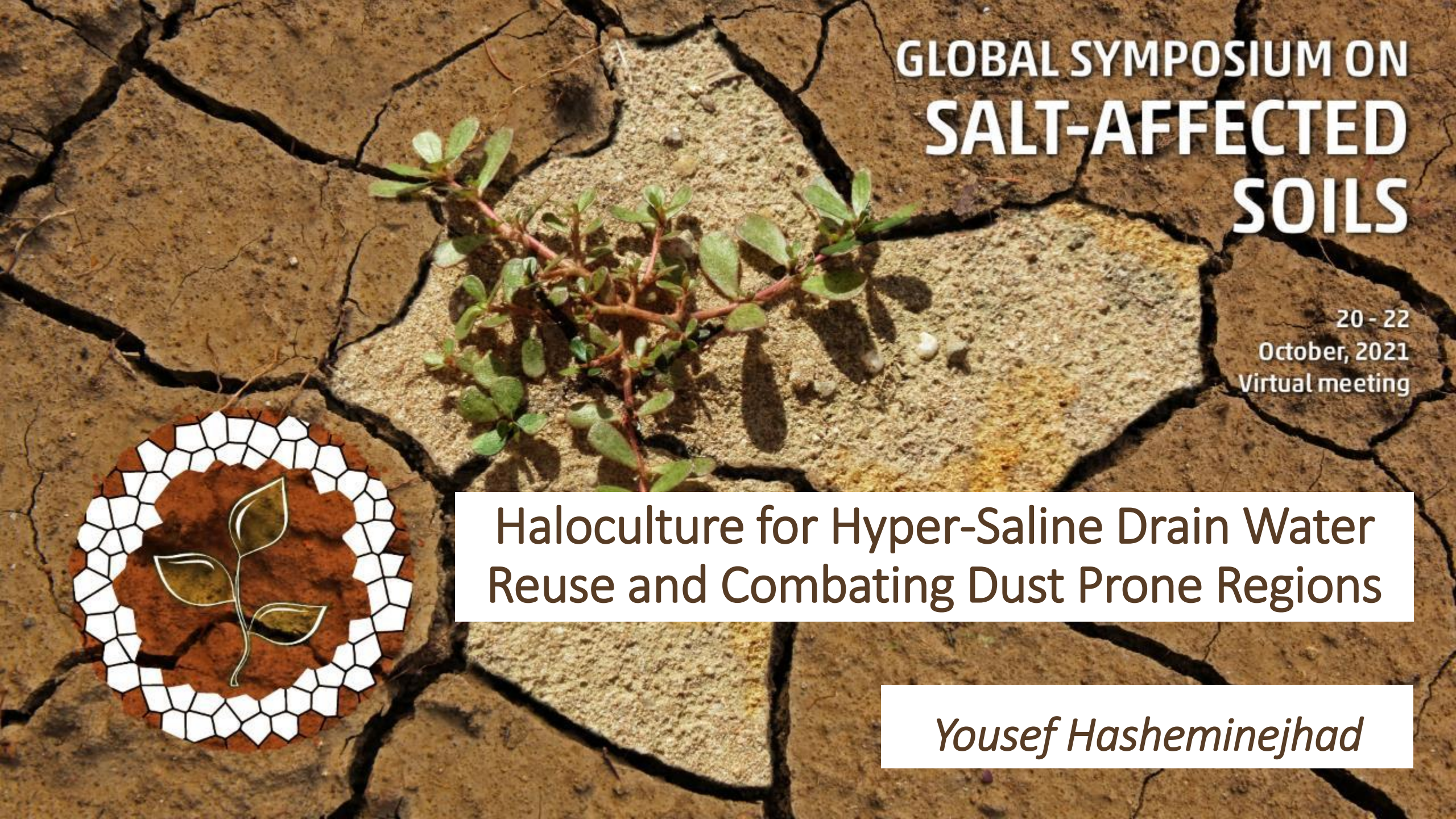
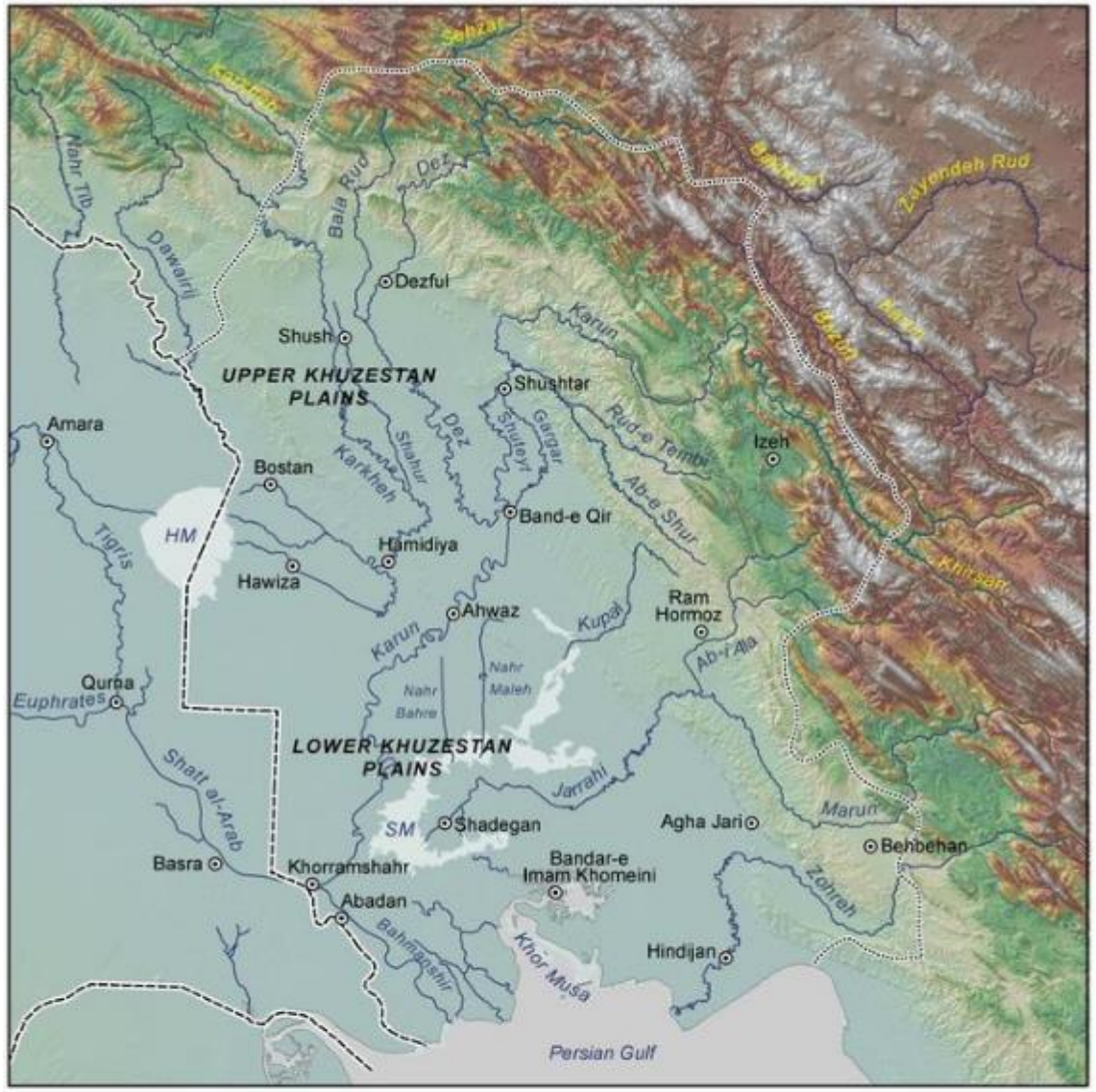
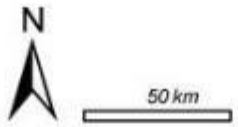


Haloculture for Hyper-Saline Drain Water Reuse and Combating Dust Prone Regions

Yousef Hasheminejhad





Description

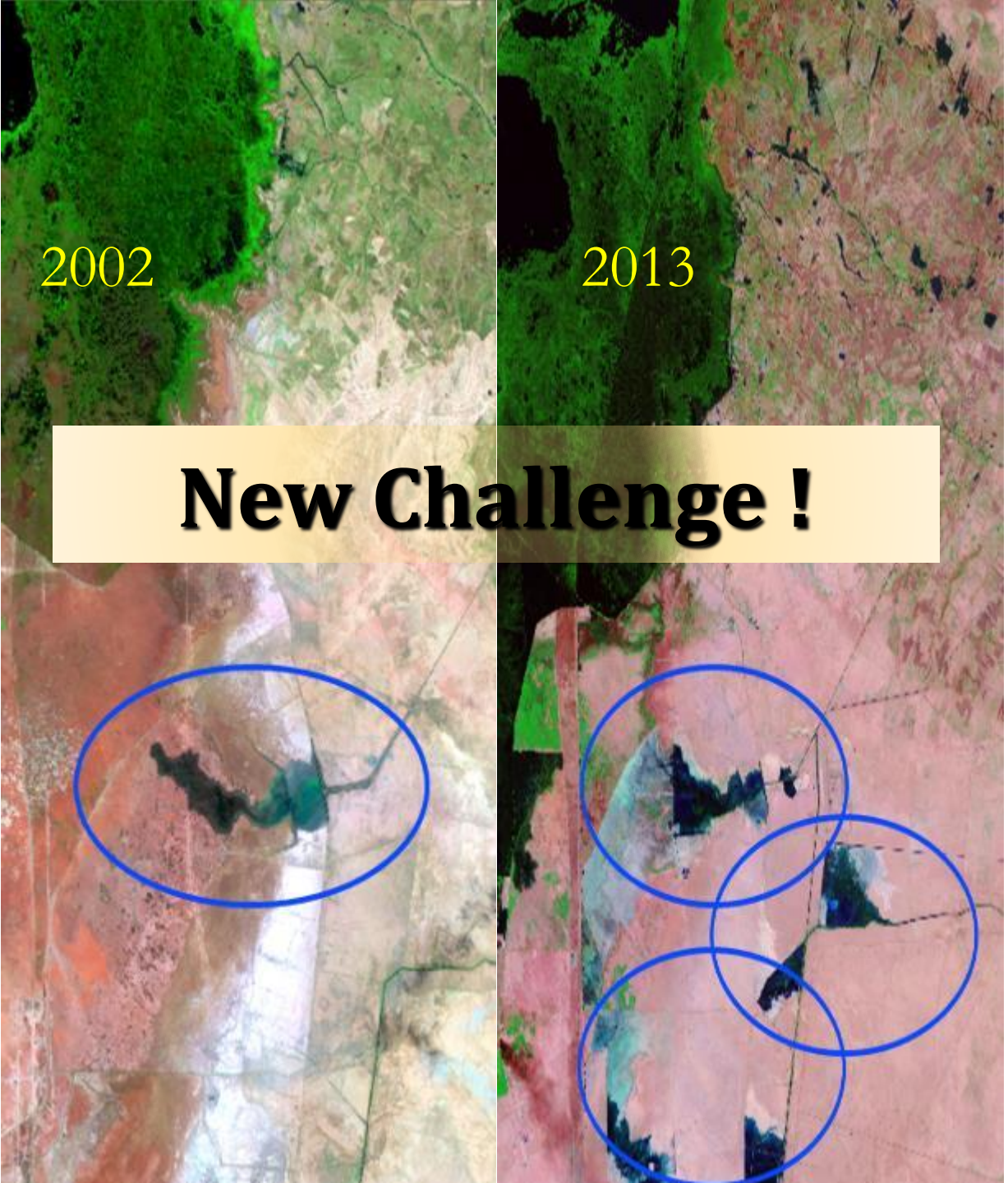
Khuzestan province is the bed of about one third of renewable surface water resources.

lowland deltas are suffering from salinity and waterlogging issues.

Description

Billions of cubic meters of drain water is expected to disposed by the completion of irrigation and drainage networks.

Drain water **salinity** varies between 6 to more than 50 dS/m.



Description

Discharge of this huge volume of water has developed new challenges for the downstream regions in which the slope is low and the flow of water in the main drains is stagnant.

Description

Pumping to the local swamps, evaporation ponds and the Persian Gulf is the measure has to be used.

Context

Origin of dust storms are supposed to be these fine textured, dry, flat, saline-alkali and structureless soils.

Context

Soils are heavy textured, flat and smooth on the surface, poor in organic matter, with shallow groundwater table and **highly saline-alkali**.

Proposed Approaches for Reclamation of Hot Spots

Activity	Implementation Phase/ Scale	Involvement of private sector
Petroleum derived mulches	Large Scale	-
Plant derived mulches	Research	-
Gravel mulches	Idea	-
Traps	Research	+
Flood water spreading	Development	+
Haloculture	Pilot Plan	++

Proposed Practice

Context

50 ha under command

30 lit/sec the diverted drain water

Input water salinity: 12- 37 dS/m

4 ha of Ponds

12 ha of Woody halophytes

24 ha of forage and grain halophytes

0.5 ha of discharge pond (Artemia)

Office and hangards

Plant Species

Artiplex Spp.	(potted seedling)
Kochia scoparia	(seeds)
Panicum antidutale	(Rhizome)
Tamarix aphylla	(cuttings)
Eucalyptus spp.	(potted seedlings)
Quinoa	(Seeds)
Barley, Cotton, …	(Seeds)
Salicornia and …	(Seeds)

Monitoring Activities







Soil Salinity Assessment

Before and during the project

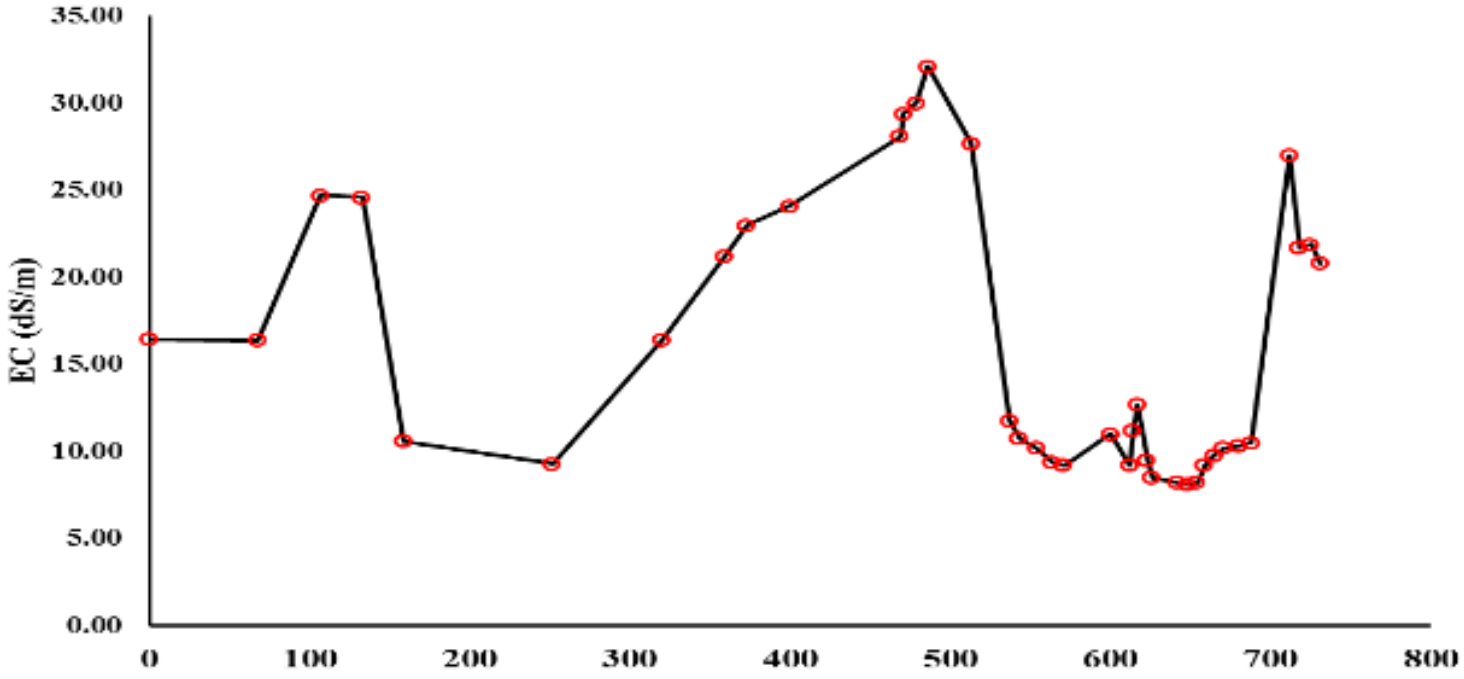
EMa measurements in combination with laboratorial analysis

Impacts on Soil Salinity

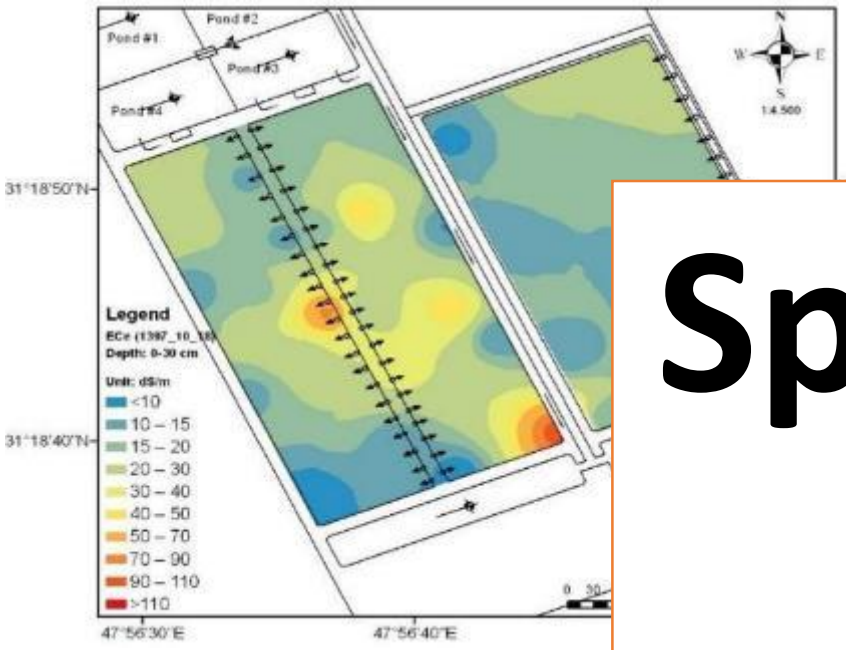
Input water salinity was variable with time

Canal water level was variable too

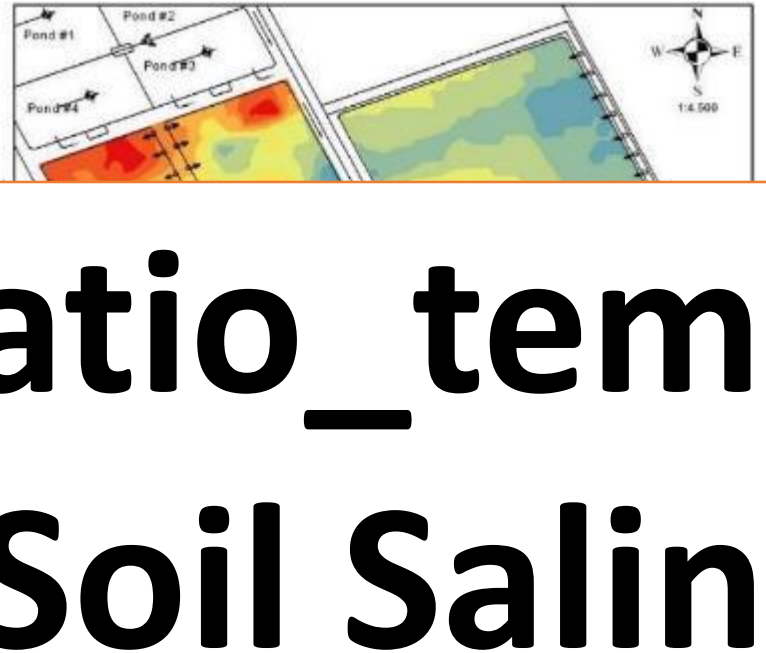
Sometimes pumping was necessary to divert water

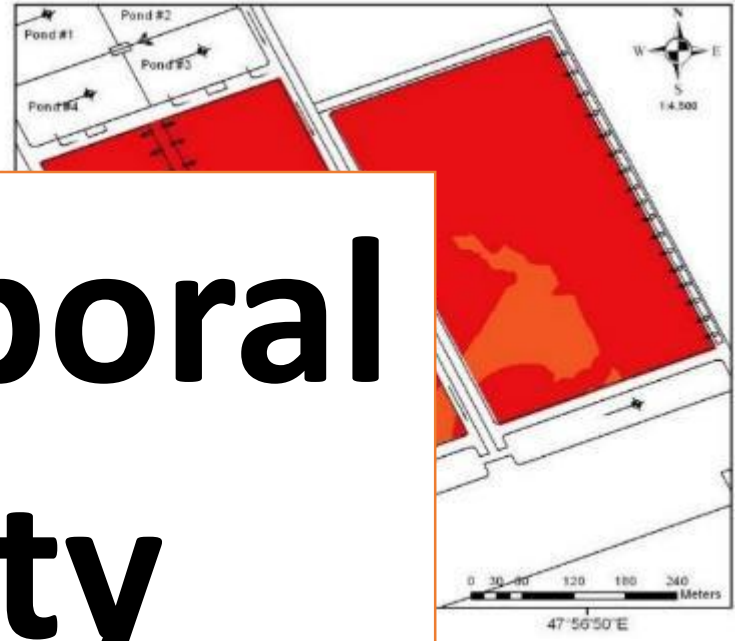


Spatio_temporal Soil Salinity changes

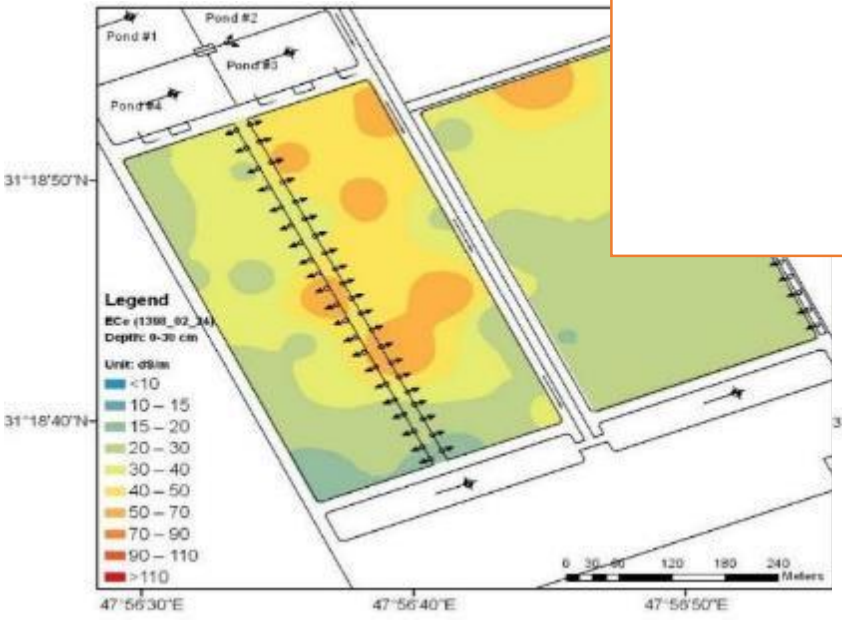


Early January 2019, Mean ECe= 21

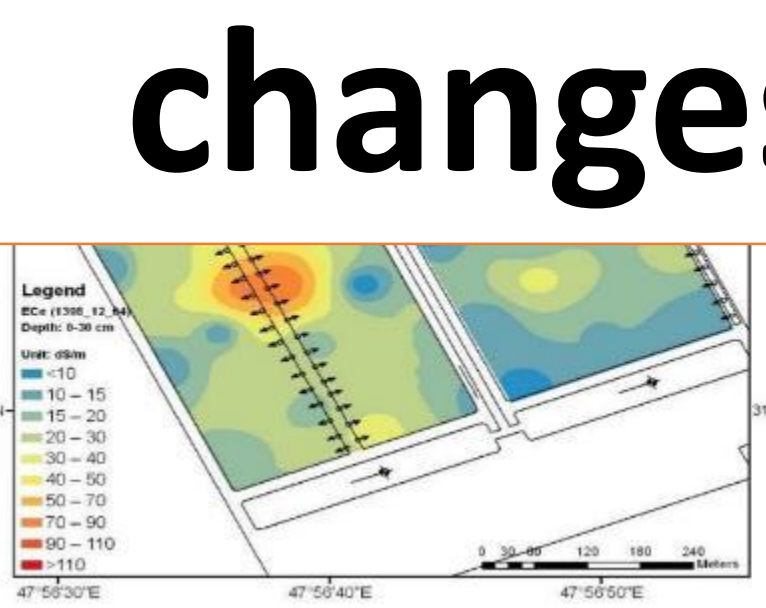




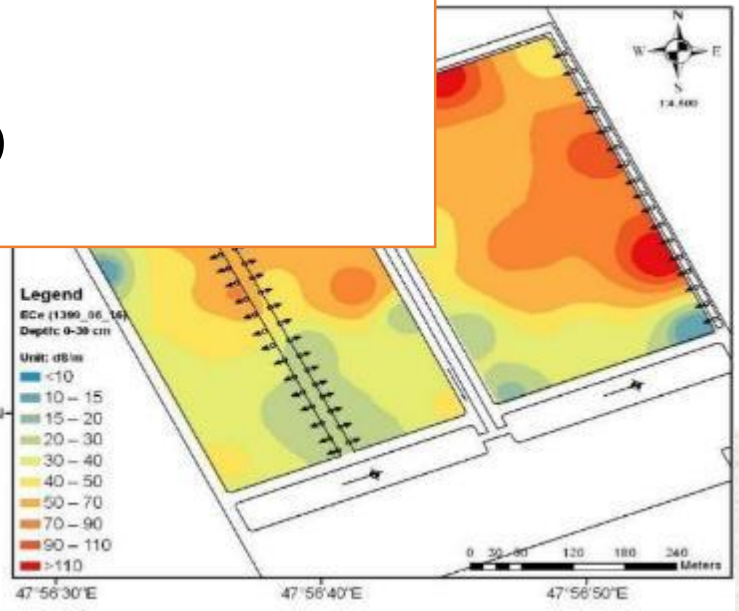
ECe= 106 dS/m



Mid May 2019, Mean ECe= 33 dS/m



Late Feburary 2020, Mean ECe= 23 dS/m



Late August 2020, Mean ECe=46 dS/m

Other Benefits

- Stabilizing dust storm producing soils in the extent of the project
- Producing forage through different halophyte species including *Atriplex lentiformis*, *Kochia scoparia* and *Panicum antidutale*. The forage could be fed *by the camels which are widespread in the region.*
- *Producing Quinoa grain while leaching the soils to reduce salinity and sodicity*
- *Producing wood and bio drainage using Tamarix bushes*
- *Technology transfer to the local communities and experts for maintaining the project*
- *Direct job creation for 4 persons in the project*

a year later

Tamarix aphylla: **This species is not invading and used widely as a woody plant**

Eucalyptus

Project and neighboring area from satellite sensors eye (Google Earth)

Costs and Benefits

Installation of the project costs for an area of 50 ha about $35000 USD which in comparison with other environmental projects like mulch and flood spreading seems high at a glance. But regarding the socio-environmental services and economic benefits of the project in the long term it is quite low. The same area could produce at least 40000 Kg of dry forage, 4000 Kg of quinoa grain, 2000 Kg of fish and shrimp and 20000 Kg of tamarix wood annually after complete establishment which the value of its products is at least $10000 USD annually. These benefits could depreciate the capital investments during 3-4 years after full establishment.

Challenges for scaling up

Rural community involvement in the development programs.

Capacity building among the youth and the women should be considered.

Alternative products such as Cashmere wool has to be studied.

Intensive camel production plan is an opportunity to increase productivity.

More detailed environmental assessment is needed

Acknowledgements

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GLOBAL SYMPOSIUM ON SALT-AFFECTED SOILS

20 - 22
October, 2021
Virtual meeting