



## Lake Bardawil and Sinai Regeneration Initiative

*A unique large-scale nature-based project providing unprecedented climate change mitigation potential (including carbon capturing) through a holistic and inclusive approach with the local population of Northern Sinai, Egypt.*





## 1. BSI MEMBERS

### 1.1. Project Initiators

Together with a large dredging company is **The Weather Makers (TWM)** the initiator of the project.

TWM focusses on the restoration of water cycles by ecosystem regeneration. This will improve our livelihood and climate, increase biodiversity and create water and food security. We created the Weather Making Approach to regenerate ecosystems as a basis for restoring water cycles.

At TWM, ecology and engineering are used to identify and leverage cross-scale, cross-disciplinary synergies to generate positive, transformative change at local-to-global scales, with the ultimate goal to stabilize the climate system.



### 1.2. Implementation Strategist

**ORG Permanent Modernity** is a research, (implementation) strategy and design group, with offices in Brussels and New York City. Architects, engineers, urban planners, ecologists, economists, strategists, policy and process designers work together to tackle complex projects. The group thinks, designs and connects on multiple levels of scale: from architecture to regional and international systems.

They have developed integrated processes that work from research through implementation, across sectors for intelligent, well supported, successful programs. We apply innovation through collaboration; curating the insights of stakeholders to make projects the best they can be and get them built.

### 1.3. Funding Strategist

**R20: Regions of Climate Action Foundation**, a Swiss based NGO, has initiated the first international blended finance mechanism dedicated to Nature Based Solution sub national infrastructure: The Sub national Climate Fund (SCF).

R20 was assigned to develop a specific investment facility for Mediterranean sub national authorities within the PAMEX (Plan Mediterranean exemplaire 2030) framework. The PAMEX Locally Investment Facility (PLIFF), will be officially announced at COP 27 as a Finance Facility platform of different investments vehicles with a pilot phase period which contributes to the Bardawil and Sinai initiative.

R20 provides international recognition to the Bardawil and Sinai restoration initiative and initiates an international funding support.



## 2. BSI PARTNERS AND SCIENTIFIC & TECHNICAL SUPPORTERS

BSI can rely on a strong network of technical and scientific partners off which the most important ones are presented below.

### 2.1. The Bardawil & Sinai Initiative coalition partners



### 2.2. Technical Supporters



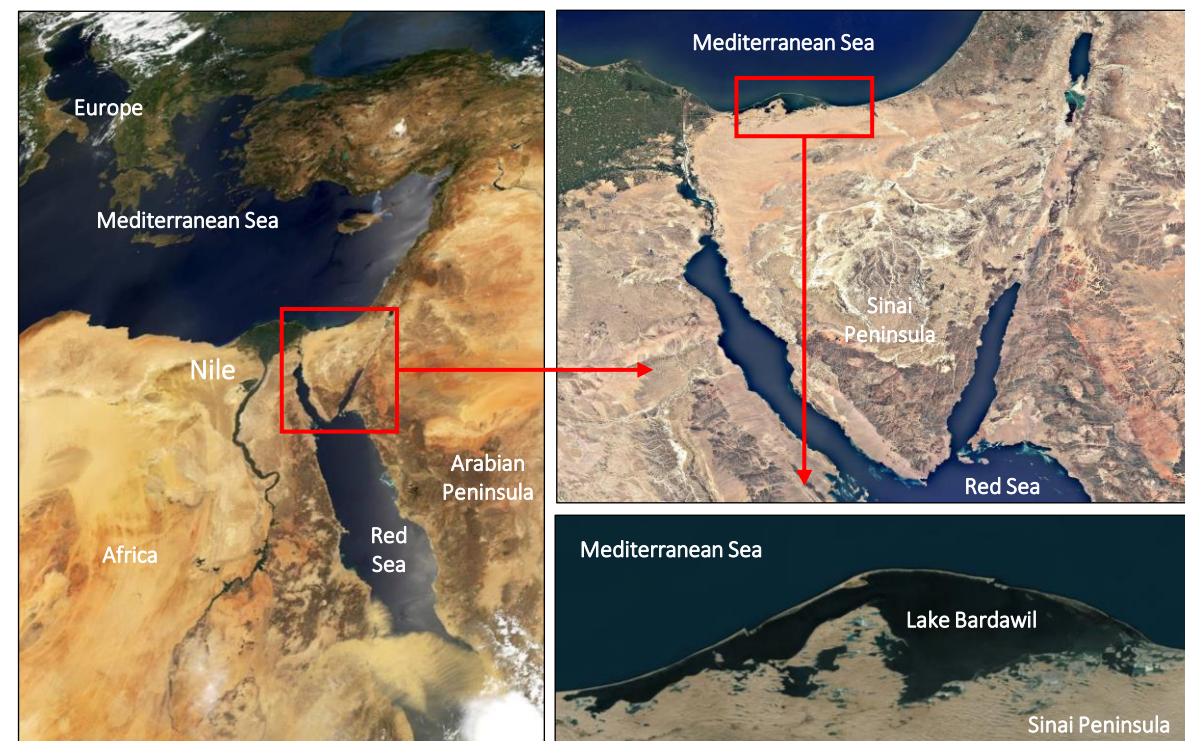
### 2.3. Scientific Supporters



## 3. STATUS QUO

### 3.1 Location and climate

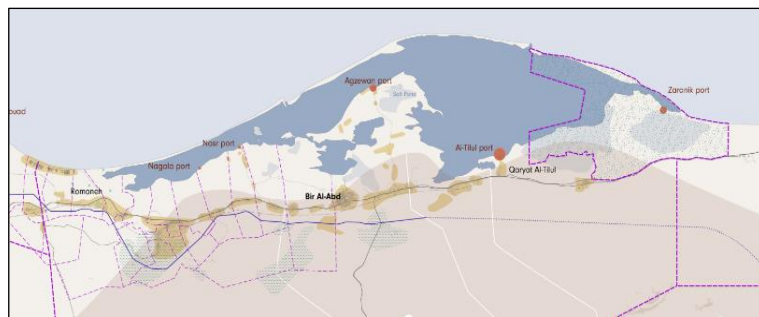
The Sinai Peninsula is situated in Egypt, with the Mediterranean Sea and Lake Bardawil to the north. The Sinai has an area of approximately 61,000 km<sup>2</sup> and is characterised by dune fields and sand sheets in the north and mountainous landscape towards the south, reaching an elevation of 2,642 m above sea level at the tip of Mount Catherine. The has an Mediterranean climate in the north (precipitation of 120 mm/yr) and desert climate towards the south (precipitation of 32 mm/yr). Maximum summer temperatures in the north and south vary between 28°C to 37°C and 31°C to 42°C, respectively. Winter day-time temperatures are usually between 10°C to 20°C, occasionally dropping below 0°C during night-time.





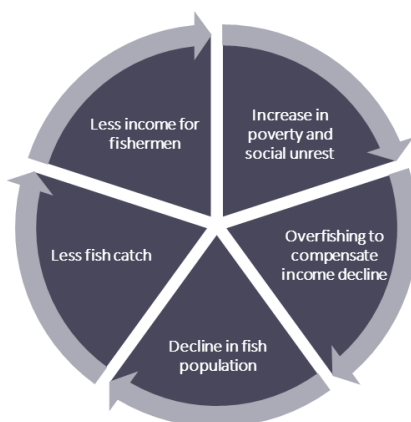
## 3.2. Coastal ecosystems in collapse

4,500 fishermen are depending on the natural resources of Lake Bardawil, but there is an overall decline of fish catch in tonnage and quality.



Decreasing tidal influence from the Mediterranean Sea has led to an increase of salinity levels and decreasing depth in the lake, combined with unsustainable fishing practices the fish population further declines.

Lake Bardawil	History	Today
Surface	680 km <sup>2</sup>	580 km <sup>2</sup>
Water Depth	20 – 40 m	1 – 2 m
Salinity	1035 kg/m <sup>3</sup>	1060 kg/m <sup>3</sup>

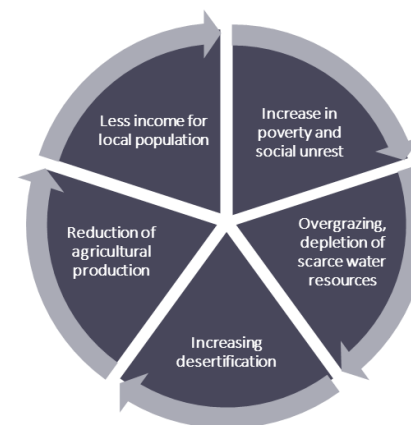


## 3.3. Land ecosystems in collapse

Historical overgrazing and depletion of water has led to increased desertification. The local population suffers from heat waves, sand storms and flash floods.

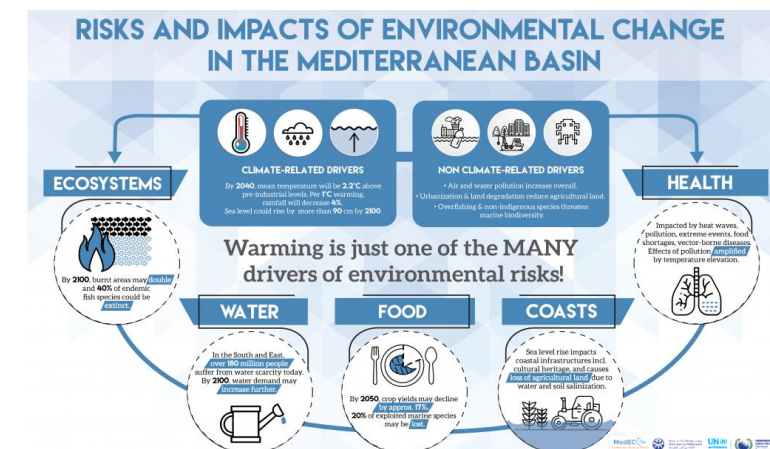


An extensive North Sinai floristic composition and structure survey performed in 2005 and 2006 revealed that the flora and fauna has dramatically changed in the past 40-50 years, in which more than 60% of species recorded in previous surveys were no longer found (Kamel et al. 2008)



## 3.3. Future pressures and risks

Climate change, combined with a fast growing population of Egypt, will accelerate the collapse of the ecosystems. Natural resources will further decrease, leading to food and water insecurity. All combined leading to degrading livelihood, less future perspective and potential instability in the region.



*"Our changing climate also comes with huge potential security impacts as the increasing droughts and floodings affect the food- and water security of complete regions in the world. This has a disrupting effect on societies, especially in fragile regions, resulting in internal friction, migration flows and new breeding grounds for extremism. New concepts are needed to turn that tide. The Bardawil & Sinai Initiatives can help restore the relationship between society and nature, and counter the disruptive security effects of our changing climate."*

**Tom Middendorp**  
Chairman of the International Military Council  
on Climate and Security





## 4. SHORT-TERM OBJECTIVES OF THE PROJECT

Creating a **large sustainable fish population** and a **robust food web** in the lake by means of **improving the water quality** through strategic dredging works.



**Sequestration of Carbon** through the increase of aquatic biomass.



**Boosting the aquatic and terrestrial biodiversity** due to holistic ecosystem development approach.



**Increase jobs & income** for the local population through the **increased fishing revenues** and **regreening** efforts in combination with **regenerative fishing practices** and management of the lake.



**Stabilizing coastlines and inlets** by creating a morphological stable system.



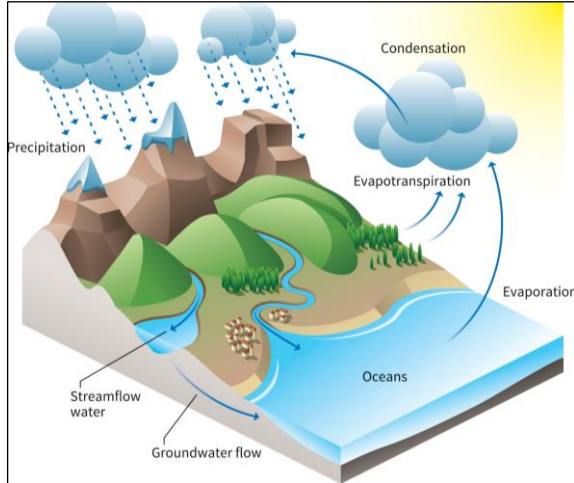
**Wetland restoration and development** in the vicinity of the Lake by re-use of dredged material.





## 5. LONG-TERM OBJECTIVES OF THE PROJECT

Reinstate the **hydrological ancient water cycle**, leading to a substantial increase in **water sequestration**, a **decrease** in land surface and air **temperatures** combined with an **unprecedented carbon sequestration**.



Stimulation of **agricultural and natural biodiversity** of the Sinai Desert.



Creation of **large-scale socio-economic benefits** by improving the **water quality**, **reducing poverty** and **improving food security**.



Improving the **livelihood & security** of local communities.



## 6. PROPOSED SOLUTION

### Regenerating Lake Bardawil

#### Marine Engineering

- › Deepening and widening inlets and lake gullies to improve tidal energy in the lake and water exchange with the Mediterranean Sea
- › Establish a morphologic stable system with minimal maintenance

#### Coastal reinforcement:

- › Strengthen natural suppletion processes along the coast
- › Intelligent re-use of dredged material for reinforcement

#### Wetland development:

- › Improve and restore lake shoreline wetlands
- › Increase surface area of lake wetlands (low lying areas)



### Regreening the Sinai Desert

#### Large-Scale regeneration:

- › Local and national embedded co-created masterplan based on a collaborative interscalar integral planning approach for regenerative landscape development of a total area of ~30,000 km<sup>2</sup>.

#### Resource Based Dredging:

- › Reuse fertile sediments for regreening
- › Sustainable sediment treatment

#### Fresh Water management:

- › Water Harvesting
- › Flash flood prevention



### Restoring the ancient hydrological cycle

#### Impact on local climate:

- › Increase of precipitation by strategic ecosystem regeneration and water retention
- › Improved climate conditions for water- and food security
- › Unprecedented carbon sequestration
- › Socio-economic benefits for a better livelihood and future perspective





## 6.1. Regenerating Lake Bardawil and start up of Land Restoration

### Phase 1: Early Works

#### Lake Regeneration

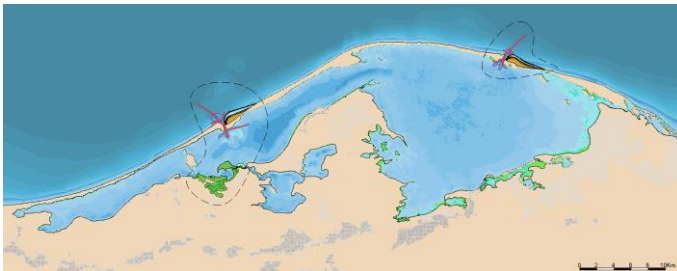
- › Deepening and widening 2 existing inlets
- › Coastal reinforcement works
- › Port infrastructure development
- › Fish supply chain upgrade works
- › Wetland development: 360 Ha
- › Regenerative fish management

#### Land regeneration

- › Regreening Pilot & co-creation of masterplan

#### Benefits

- › Regenerative fish catch: 11,000 T/Year
- › Carbon Sequestration: 110,000 T CO2 eq/Year
- › Job Creation: 5 – 8,000 Positions



### Phase 2: Upscale Works

#### Lake Regeneration

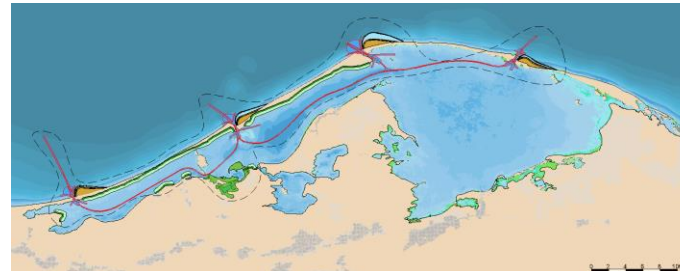
- › Creating 2 new inlets & Dredging inner gullies
- › Coastal reinforcement works
- › Port infrastructure development
- › Fish supply chain upgrade works
- › Wetland development: 2,500 Ha
- › Regenerative fish management

#### Land regeneration

- › Masterplan implementation

#### Benefits

- › Regenerative fish catch: 50,000 T/Year
- › Carbon Sequestration: 330,000 T CO2 eq/Year
- › Job Creation: 50 – 80,000 Positions



### Phase 3: Long-term development

#### Lake Regeneration

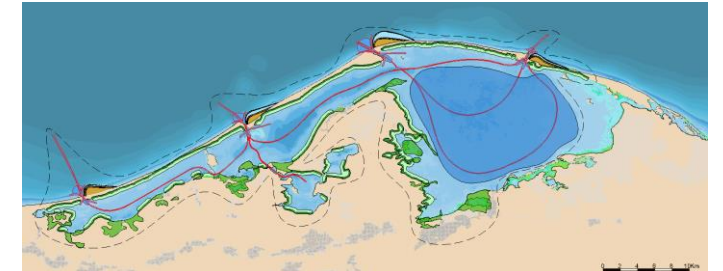
- › Resource based dredging
- › Upscale wetland development works
- › Port infrastructure development
- › Fish supply chain upgrade works
- › Regenerative fish management

#### Land regeneration

- › Scale up of masterplan implementation

#### Benefits

- › Regenerative fish catch: >70,000 T/Year
- › Carbon Sequestration: TBC T CO2 eq/Year
- › Job Creation: > 0.5 Mio Positions





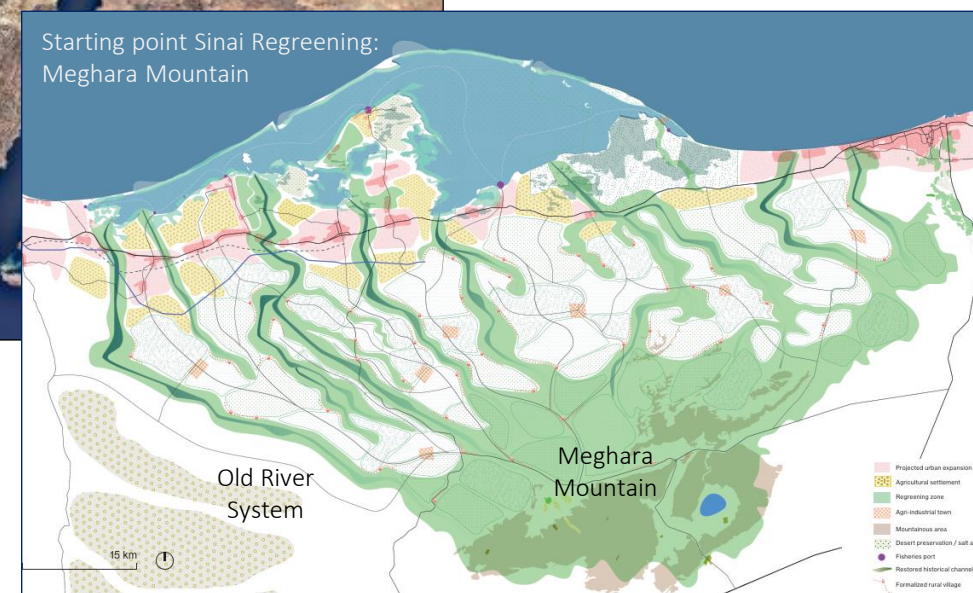
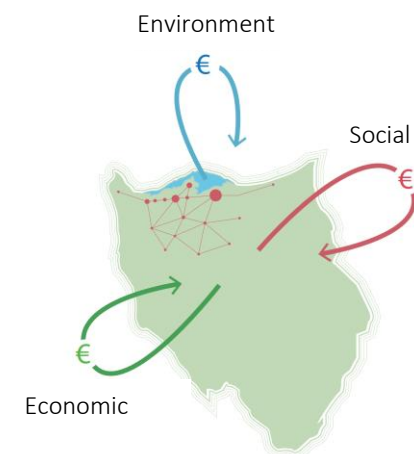
## 6.2. Regeneration of the Sinai Desert

### Large scale regenerative landscape development

- › Substantial increase in water sequestration
- › Stimulation of agricultural and natural biodiversity
- › Large Scale employment
- › Improve water security
- › Reduction of poverty
- › Improve food security
- › Peaceful environment for local communities
- › Unprecedented carbon sequestration

### Benefits

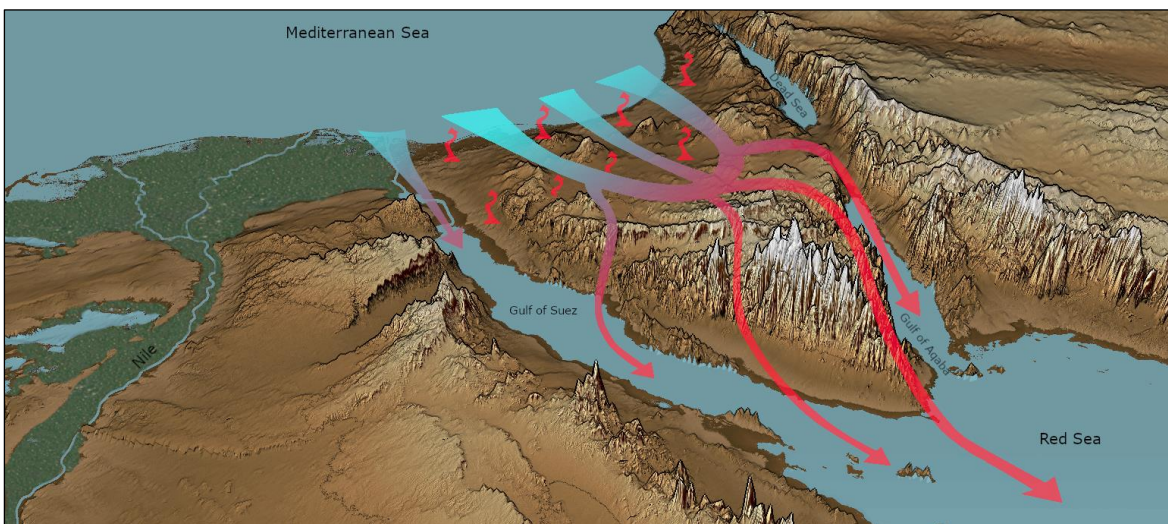
- › Employment: 500.000 – 1.500.000 Jobs
- › Economic development
- › Soil Restoration: Regreening
- › Food security: 1.000 – 15.000 km<sup>2</sup> agricultural land
- › Carbon Sequestration: 300 – 1.200 Mio Ton CO<sub>2</sub>-eq
- › Freshwater production by hydrological cycle: 10-100 Bio m<sup>3</sup>
- › Restored Biodiversity



### 6.3. Restoring the ancient hydrological cycle

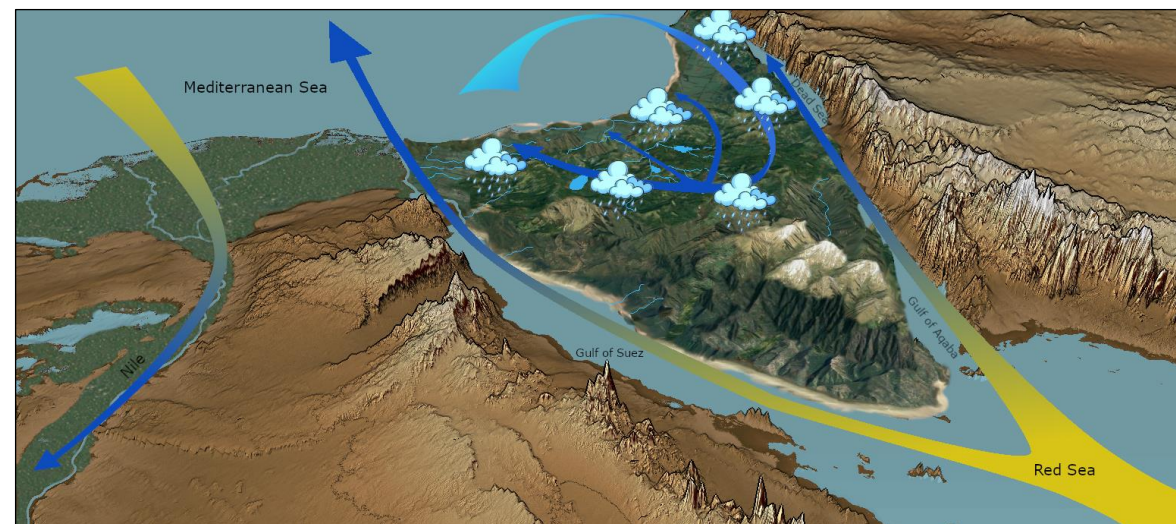
#### Status Quo: Broken hydrological cycle

- › Lack of vegetation and soil moisture
- › Increase in air and ground temperature
- › Loss of water vapor from the watershed
- › Desertification and social unrest



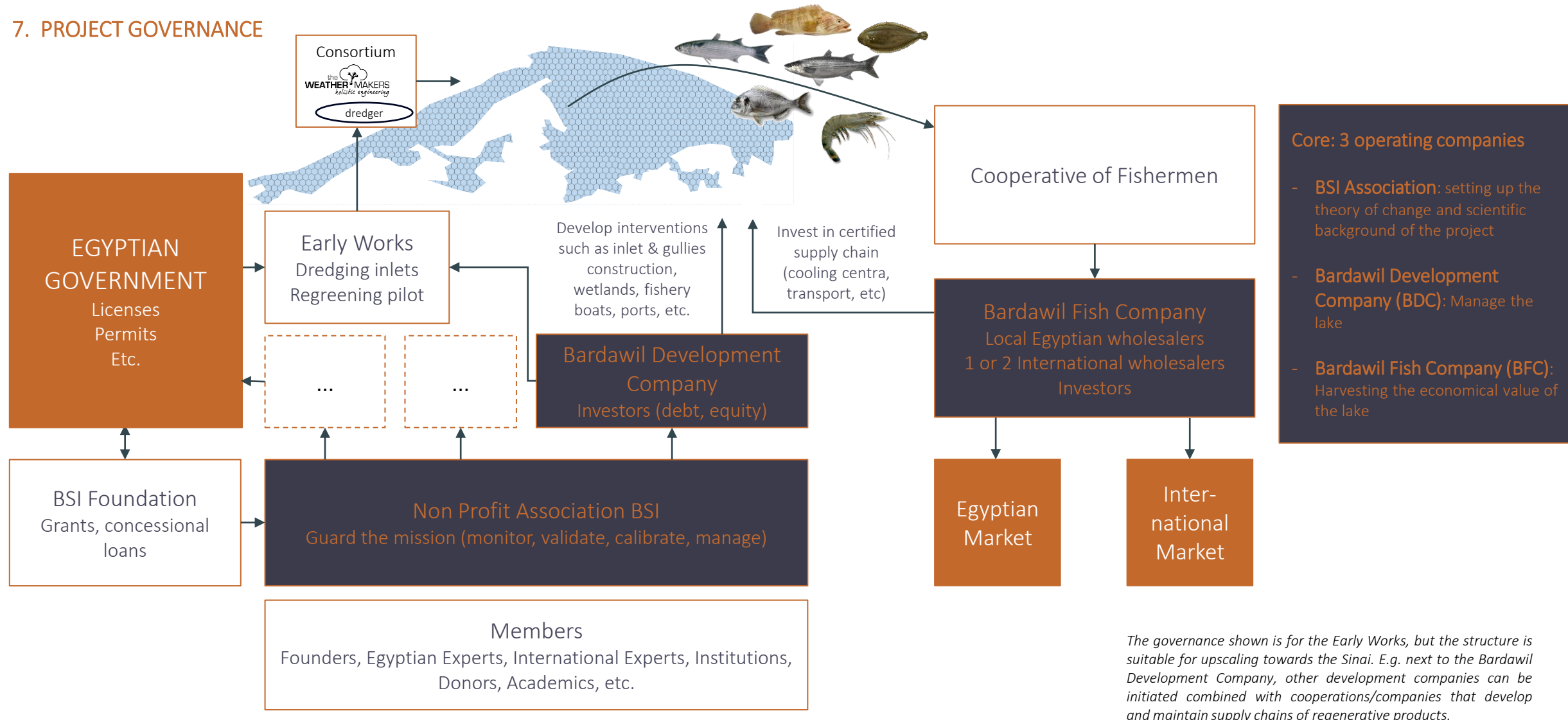
#### Long term vision: Restored hydrological cycle

- › Regenerative land use with optimized water management
- › Increase of local moisture recycling and precipitation
- › Stop excessive water vapor lost out of the watershed
- › Stopping desertification in the region

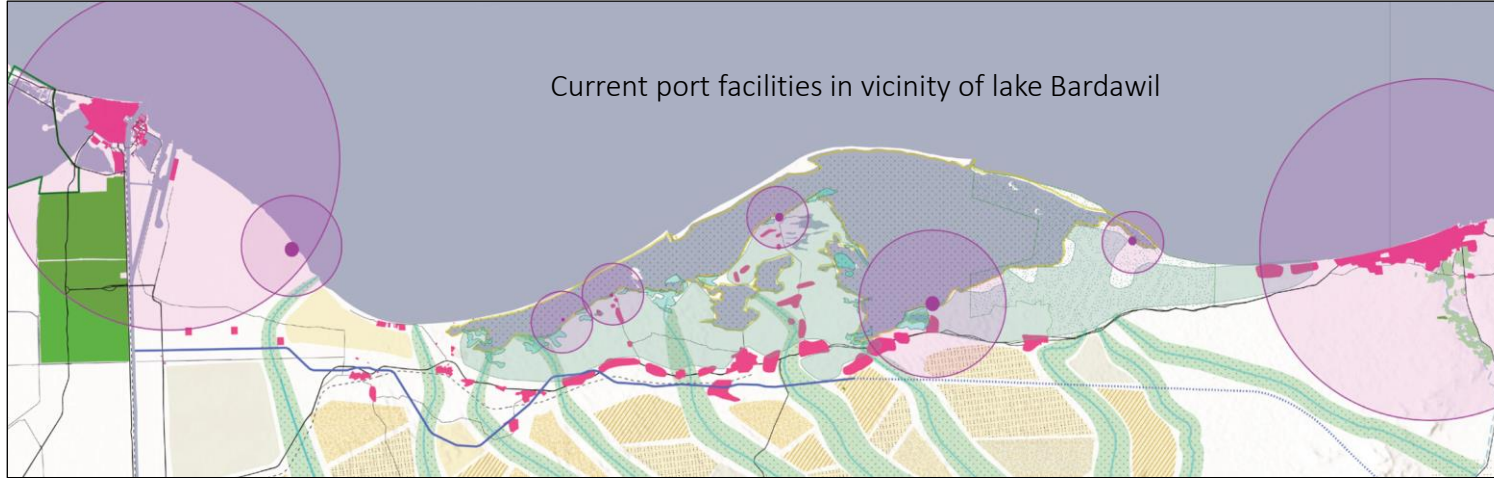




## 7. PROJECT GOVERNANCE



## 8. INFRA & FOUNDATION STRUCTURE – EARLY WORKS CAPEX ALLOCATION



### Project development

- › Early Development
- › Foundation/Further Project Development

### Lake Development Works

- › Engineering
- › Boughaz 1 and 2 Dredging works
- › Wetland Development Works

### Lake Management

- › Testing, monitoring and digital twin
- › Regreening pilot
- › Regenerative fish management
- › Seagrass expansion
- › Eco Oasis

### Plants for fishing & Fishing Gear

- › Boat construction
- › Foam box plant
- › Fish collection and distribution centers
- › Gas & Fuel distribution center
- › Fish gear supply plant

### Port development works

- › Port construction works
- › Onshore facilities



## 9. PROPOSED PROJECT FUNDING



### Grants:

The BSI activity catalog is being finalize

### Concessional loans:

The funding model and related investments are being finalized

### Direct funding from Egypt:

Egypt to invest in the rehabilitation project of the lake ecosystem

### Equity & commercial debt:

Raising equity and commercial debt to fund the Bardawil Development Company and Bardawil Fishing Company

### Public and Private Catalytic Funding:

Using carbon credits as collateral to incentivize catalytic public and private investment into the project (DFI, MDB and corporates)

## 10. SOCIAL ENGAGEMENT STRATEGY

### 10.1. Socio-Cultural Environment – Northern Sinai

The majority of North Sinai's population is from Bedouin origin. The Sinai Bedouins are groups of tribes that arrived from the Arabian Peninsula between the 14th and 18th century. Currently, the Bedouins constitute around 70% of the whole Sinai Peninsula's population, which is roughly 300,000 people.



Leverage points:

- › Boundaries: well, 'wadi' or tree
- › Customary law
- › Bedouin ILKs: practical, changing, evidence-based
- › New knowledge may be easily adopted

### 10.2. Onboarding of the social engagement strategy

#### Knowledge building by a Demonstration Project

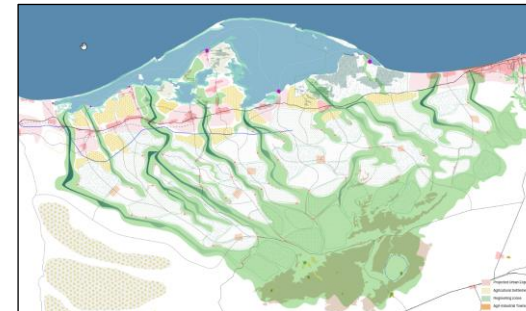
- › Workshops
- › Research
- › Training
- › Internships

Now



#### Integral Planning & Regenerative (Landscape) Development

Series of holistic planning workshops to prepare a fully integrated holistic plan that includes social, environmental, and economic agendas



Egyptian scientists

Policy makers

International experts

Local Bedouin tribes & fishermen



### 10.3. Six steps engagement strategy

#### 1. First steps on the ground

- › Identify grassroots partners & communication of the vision

#### 2. Building a grassroots partnership

- › Bardawil regenerative Collective & Frameworks

#### 3. Co-visualizing the landscape

- › Community participatory mapping
- › Multifunctional habitat restoration

#### 4. Building capacity

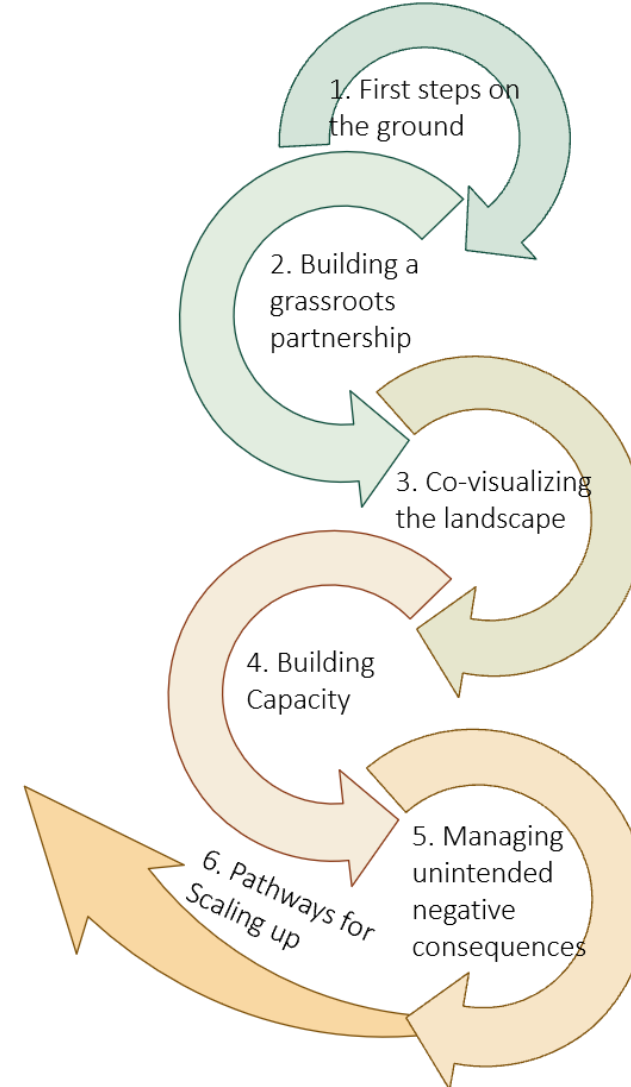
- › Developing the principle “Rule of Law”
- › Community-based management
- › Compensation mechanisms

#### 5. Managing unintended negative consequences

- › Lessons learned from previous experiences
- › Securing diversified employment

#### 6. Pathway for scaling up

- › Co-visualizing the larger-scale landscape
- › Indigenous and local knowledges as ‘engines’ to other stakeholders



## 11. FULL MATCH 17 SDG'S

 <p><b>1 NO POVERTY</b></p>	By increasing the standard of living of over <b>100,000 persons</b> (at short term). Creating about <b>500,000-1,500,000 jobs</b> on the long-term	 <p><b>7 AFFORDABLE AND CLEAN ENERGY</b></p>	By developing the region's infrastructures through the economic growth of the fish and agroforestry industries.	 <p><b>13 CLIMATE ACTION</b></p>	Cooling of area, reduction of extreme weather Sequestration of greenhouse gases: <b>300-1,200 Mio [Ton CO2-eq]</b> in 30 yrs
 <p><b>2 ZERO HUNGER</b></p>	Aiming at sustainable fish stock & agroforestry products for Egyptian population. <b>2,4 Mio Ton Fish &amp; Development 10.000-15.000 km² agr. land (30 yr)</b>	 <p><b>8 DECENT WORK AND ECONOMIC GROWTH</b></p>	Strong <b>business case</b> based on direct and indirect returns reducing drastically poverty level in the Sinai region.	 <p><b>14 LIFE BELOW WATER</b></p>	<b>Healthy marine ecosystem</b> with abundance of biomass and fish.
 <p><b>3 GOOD HEALTH AND WELL-BEING</b></p>	By introducing <b>clean water</b> , healthy ecosystems, income, future perspective, <b>good health and well-being</b> will increase.	 <p><b>9 INDUSTRY, INNOVATION AND INFRASTRUCTURE</b></p>	Diversified industries.	 <p><b>15 LIFE ON LAND</b></p>	Large-scale greening of the desert results in <b>cooler areas</b> with <b>less dust</b> and availability of fresh water.
 <p><b>4 QUALITY EDUCATION</b></p>	Intensive training of farmers and fishermen as part of Local Stakeholder Engagement.	 <p><b>10 REDUCED INEQUALITIES</b></p>	By <b>reducing poverty</b> and increasing wealth, inequalities will be reduced.	 <p><b>16 PEACE, JUSTICE AND STRONG INSTITUTIONS</b></p>	By providing access to knowledge.
 <p><b>5 GENDER EQUALITY</b></p>	Increasing education through development of region's infrastructures.	 <p><b>11 SUSTAINABLE CITIES AND COMMUNITIES</b></p>	Integrated land management plan leads to smart cities and communities.	 <p><b>17 PARTNERSHIPS FOR THE GOALS</b></p>	<b>Public &amp; Private Partnership</b> with direct and indirect returns model.
 <p><b>6 CLEAN WATER AND SANITATION</b></p>	By increasing green vegetation and restoring the hydrological cycle clean water availability and sanitation will improve. <b>10-100 Bio [m³] additional precipitation</b> in 30 yrs.	 <p><b>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</b></p>	By implementing a <b>sustainable fishing &amp; agroforestry development</b> .	 <p><b>SUSTAINABLE DEVELOPMENT GOALS</b></p>	



## 12. Summary of progress up to date and way forward

### 12.1. Summary of progress up to date



### 12.2. Way forward

