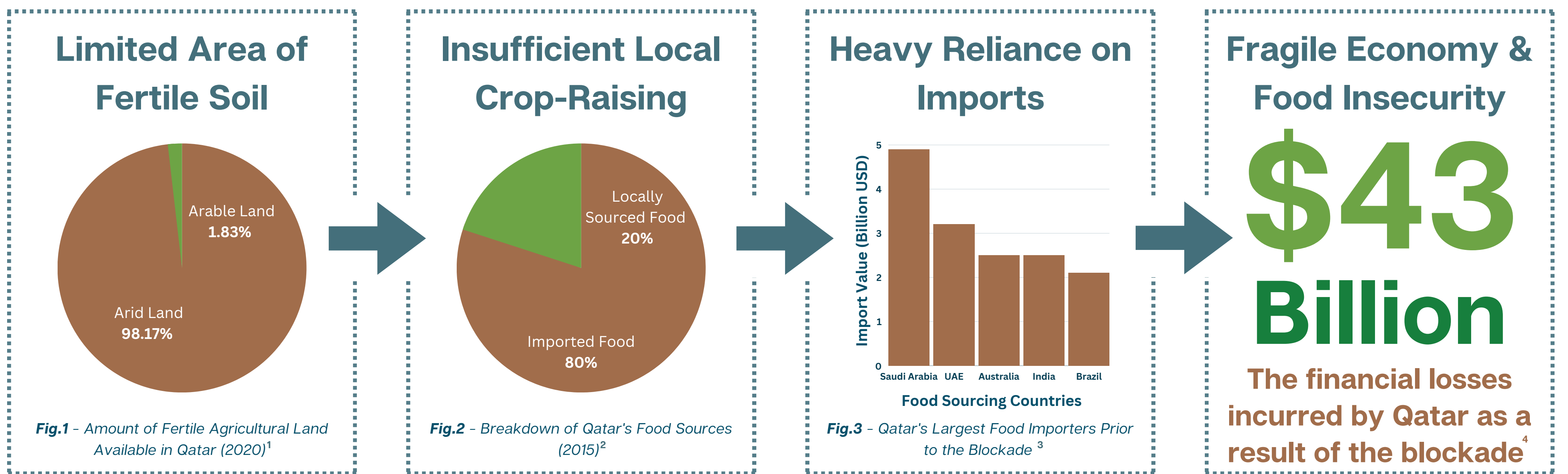


Barren → Bountiful

Overcoming Qatar's Lack of Arable Land

Abdellatif Hussine, Haya Al-Rewaily, Meera Jarrar, Racha Qaddura

Problem



Solution

Hydrogel Agriculture⁵

- Made up of 99% water, composed of insoluble gel polymers
- Eliminates water lost by evaporation
- Soil retains water and nutrients for 20x longer than normal, but expensive

Sandponics⁶

- Circular system that combines a marine ecosystem with sand for filtration
- Sand is made fertile by continuous nutrient supply from fish waste
- Low-cost, accessible, and sustainable

Eco-Friendly Desalination⁷

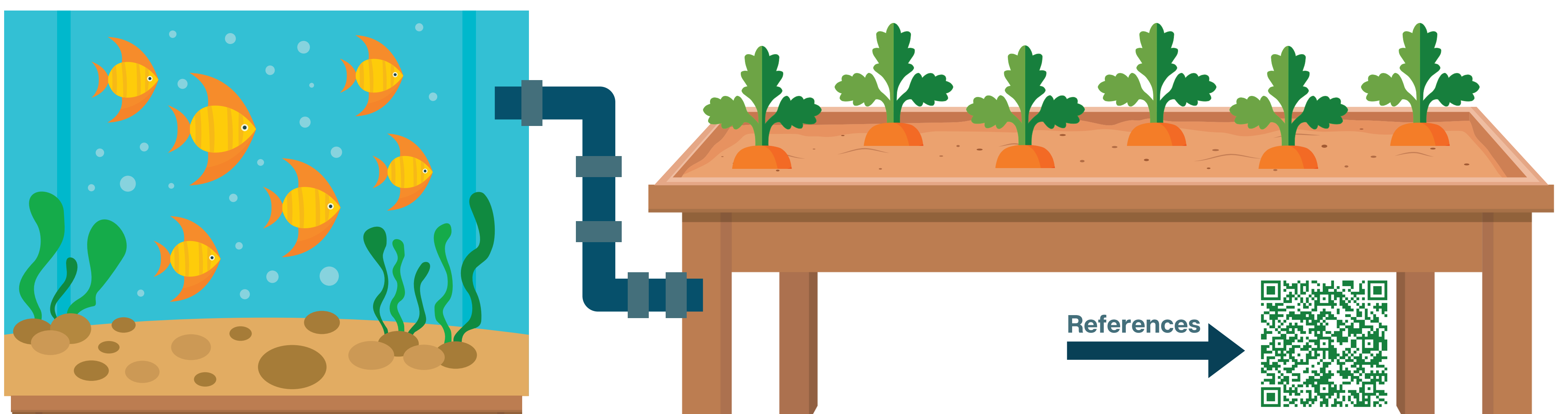
- Semipermeable membrane purifies seawater using a pressure gradient
- Continuous water source keeps dry agricultural land quenched
- Low energy cost, but toxic brine remains

How Does it Work?

- Fish produce ammonia
- Beneficial bacteria convert ammonia into nitrates
- Plants consume nitrates as nutrients
- Sand acts as a:
 - Mechanical Filter: purifies the incoming water of dirt
 - Biofilter: removes pathogens and suspended solids

Why Should You Use it?

- Low start-up, maintenance, and running costs
- Abundant building materials
- Low power usage, manual operation possible
- Flexible scalability of system
- Both root and stem crops feasible



References →

