



# **BARREN** → **BOUNTIFUL**

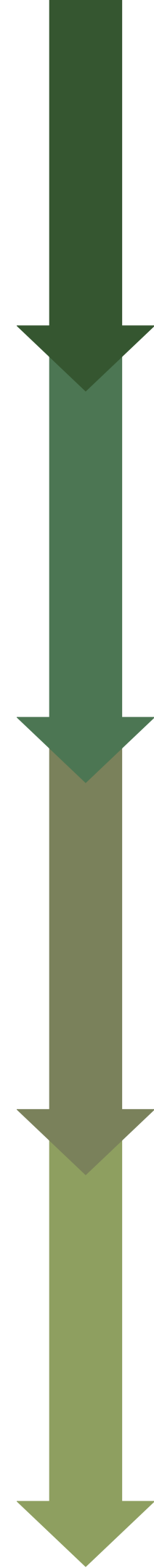
**OVERCOMING QATAR'S  
LACK OF ARABLE LAND**

**Team 5**

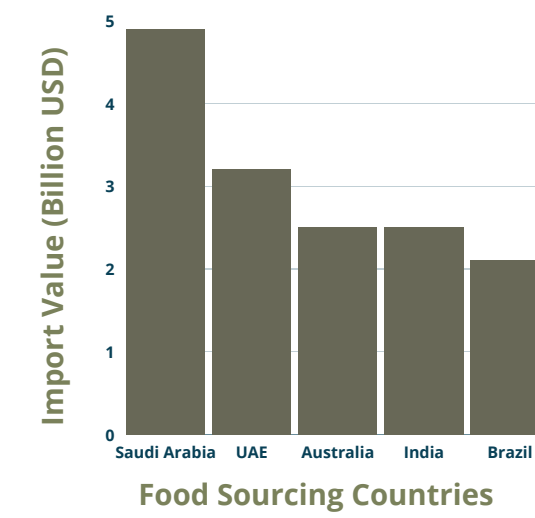
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Meera Jarrar        Racha Qaddura



# PROBLEM

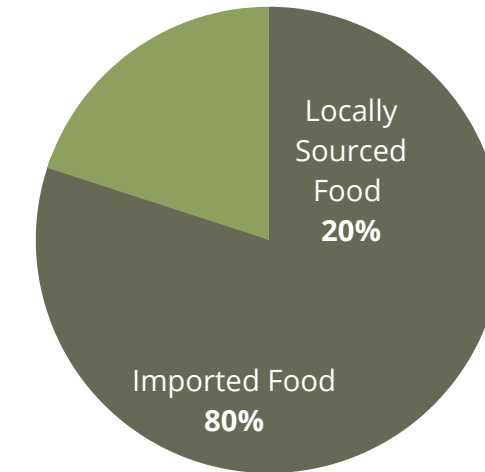


**Heavy Reliance on Imports**



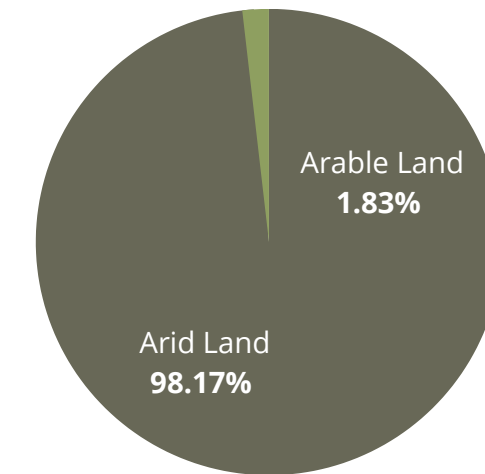
*Fig.1 - Qatar's largest food importers prior to the blockade<sup>1</sup>*

**Insufficient Local Crop-Raising**



*Fig.2 - Breakdown of Qatar's food sources (2015)<sup>2</sup>*

**Limited Area of Fertile Soil**



*Fig.3 - Amount of fertile agricultural land available in Qatar (2020)<sup>3</sup>*

**Fragile Economy & Food Insecurity**


**\$43 Billion**

*Fig.4 - The financial losses incurred by Qatar as a result of the blockade<sup>4</sup>*



# OBJECTIVE

To promote the development of agricultural practices that increase local sustainable agricultural production in Qatar

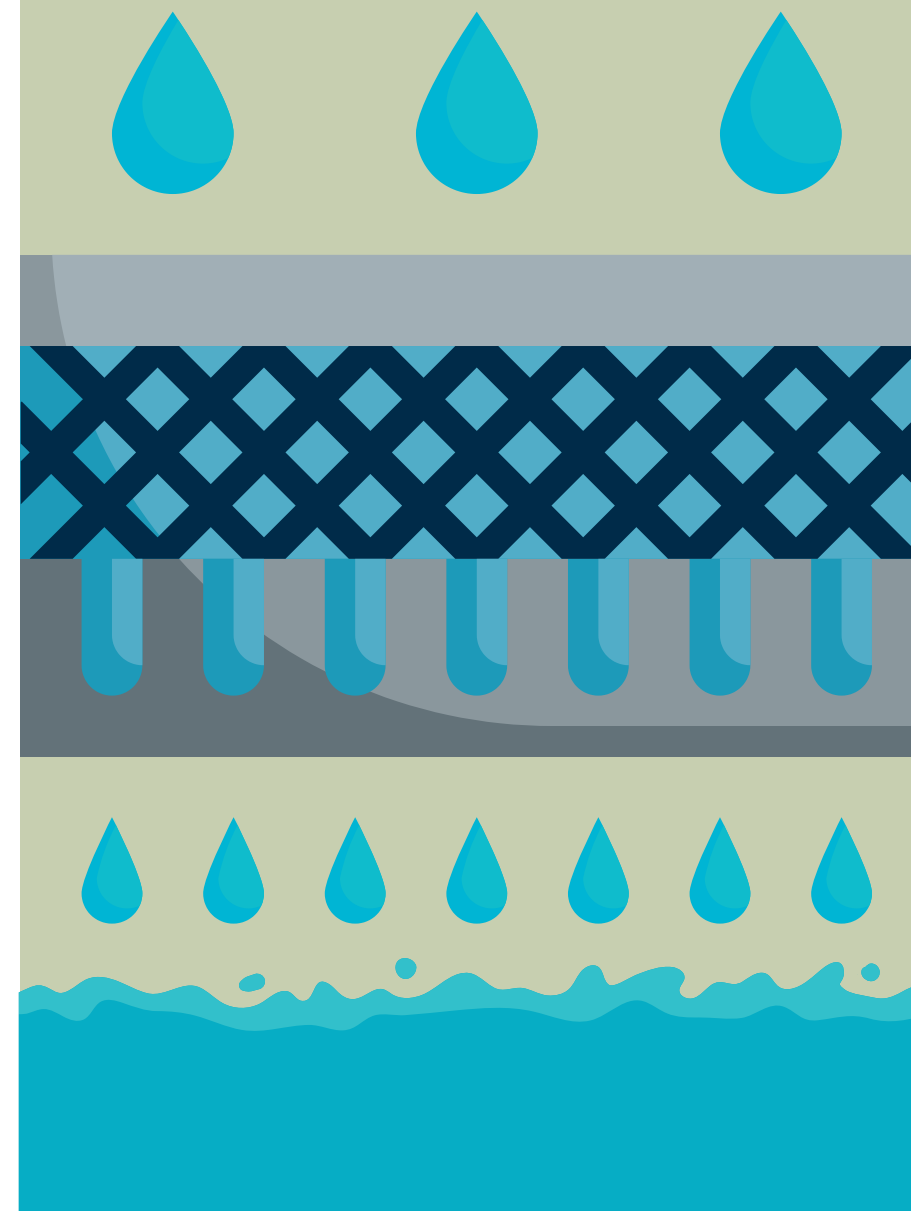


# APPROACHES

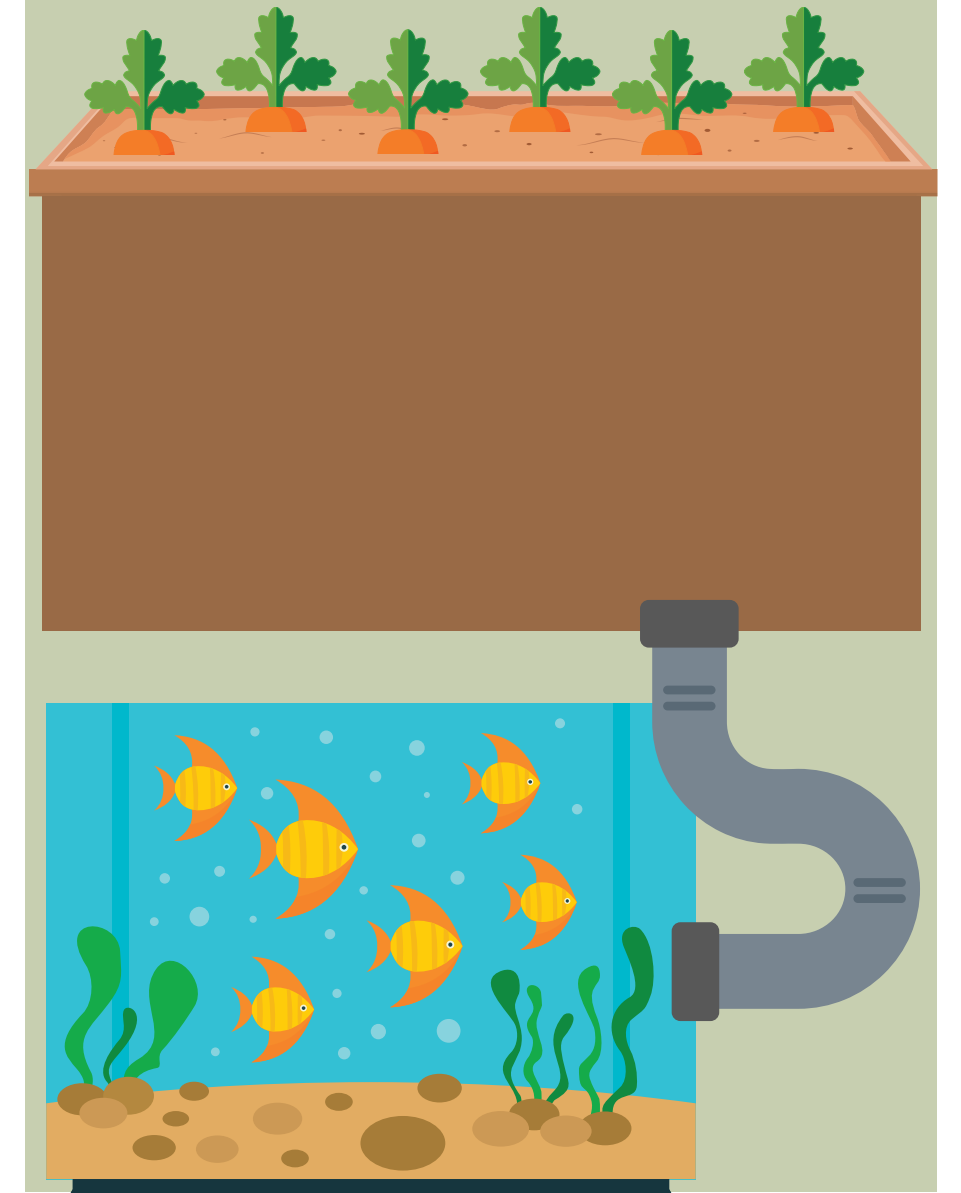
## HYDROGEL AGRICULTURE<sup>5</sup>



## ECO-FRIENDLY DESALINATION<sup>6</sup>



## SANDPONICS (iAVs)<sup>7</sup>



# CRITERIA

*Table.1 - Considerations made within each criterion in the decision matrix*

Criterion	Focus
Cost	How high are the start-up costs? What about the running costs? Is it expensive to maintain?
Design Accessibility	Is the design scalable? Are the materials easily obtainable?
Environmental Sustainability	Is there any negative impact on the environment, whether short-term or long-term?
Average	An average of the scores for each criterion

# DECISION MATRIX






**Table.2** - The decision matrix applied on the 3 potential solutions

Criterion (out of 5)	Approach		
	Hydrogel Technology	Eco-Friendly Desalination	Sandponics (iAVs)
Cost	2	3	5
Design Accessibility	2	3	4
Environmental Sustainability	2	2	5
Average	2	2.7	4.7









# SANDPONICS

## HOW

-  Fish produce ammonia
-  Bacteria convert ammonia into nitrates
-  Plants consume nitrates as nutrients
-  Sand acts as a:
  - Mechanical Filter: purifies water of dirt
  - Biofilter: removes pathogens
-  Water is drained back into fish habitat

## WHY

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

# ANY QUESTIONS?

REFERENCES

