"Toilet to Crop" for Pakistan
William Arthur (ME), Igor De Moraes (ME), Genavieve Lombara (ME)
Advisors: Derren Rosbach (CEE, SSPS) and Elisabeth Stoddard (SSPS)

Pakistan Water Crisis
By 2025, Pakistan could run dry due to over-consumption of water.

Causes
- Intensive Water Use
- Agriculture
- Economy
- Climate Change

Impacts
- Intensive Water Use
- Agriculture
- Economy
- Lower class farmers and families.

NO WATER

Families in Pakistan are forced to drink unclean water due to the lack of fresh water available.

Project Goals
1. System to help Pakistan reuse its wastewater for agriculture
2. Campaign to highlight the benefits of using recycled wastewater

Community
Small scale cotton farmers in the Sindh province of Pakistan

Solution
Membrane Bio-reactor (MBR)

Wastewater is collected from local farm and municipal sources.

A MBR passes wastewater through multiple different filters, removing the bad chemical, nutrients, and bacteria. It is capable of secondary filtration, so it is safe for agriculture, but not human consumption.

Implementation
For Membrane Bio-Reactors:
1: Contact the Water and Sanitation Agency (WASA). They are responsible for the infrastructure of the sewage lines in Pakistan.
2: Contact The Pakistan Environmental Protection Agency (PAK-EPA).
3: They are responsible for infrastructure of the sewage lines in Pakistan.
4: They are responsible for funding and the set-up the MBRs in the existing wastewater recycling plants.

Outcomes & Assessment
Increase percentage of wastewater recycled from 8%
Eliminate stigma against wastewater reuse
Reduce stress on aquifers
Provide farmers with new source for irrigation