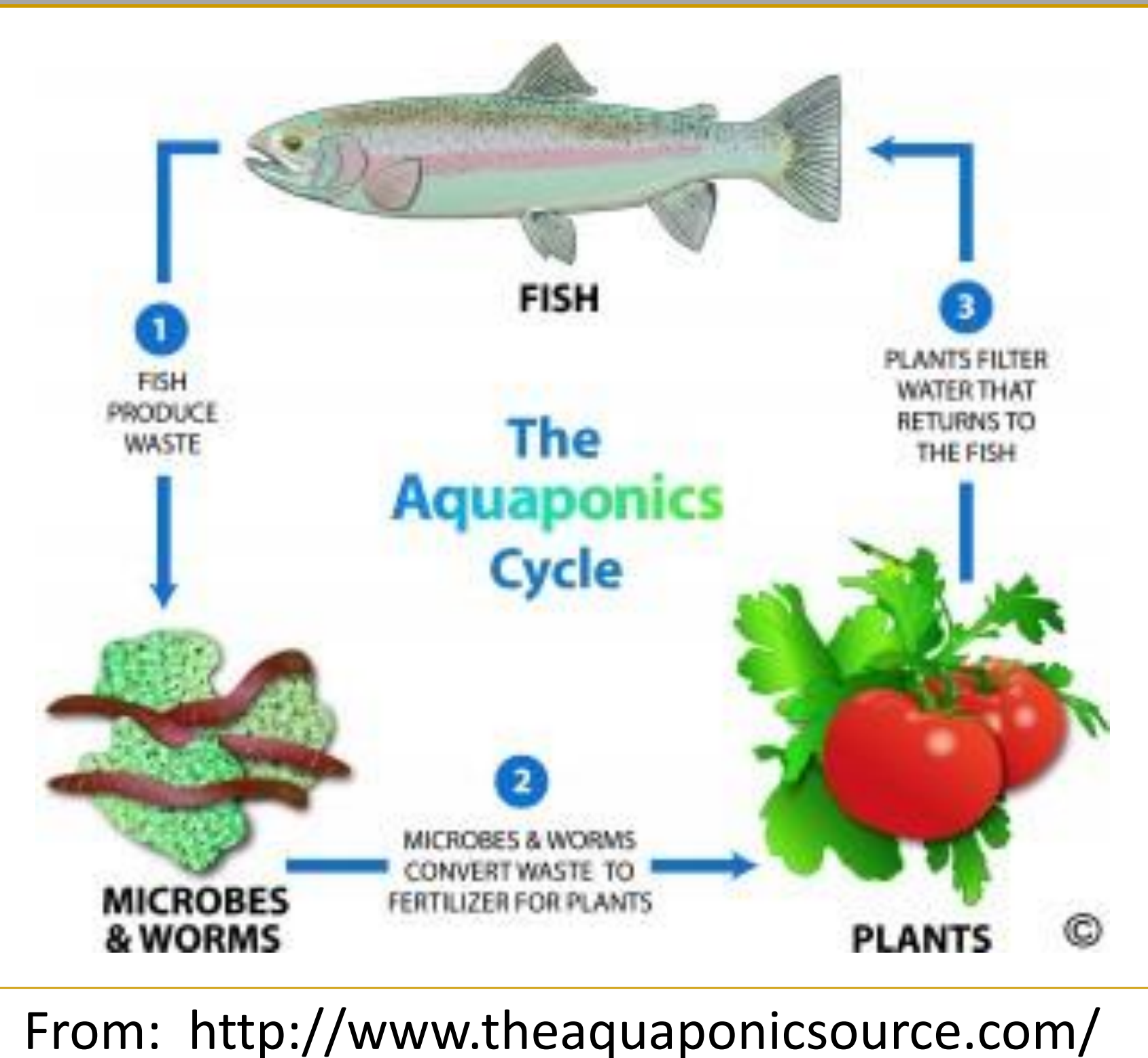


Background

According to the Alternative Farming Systems Information Center, USDA:
Aquaponics is "a combination of fish and plant production using aquaculture and hydroponics systems"
 Aquaculture is "The farming of finfish, shellfish and other aquatic animals"
 Hydroponics is "Growing plants in a nutrient solution root medium"



Problem Summary

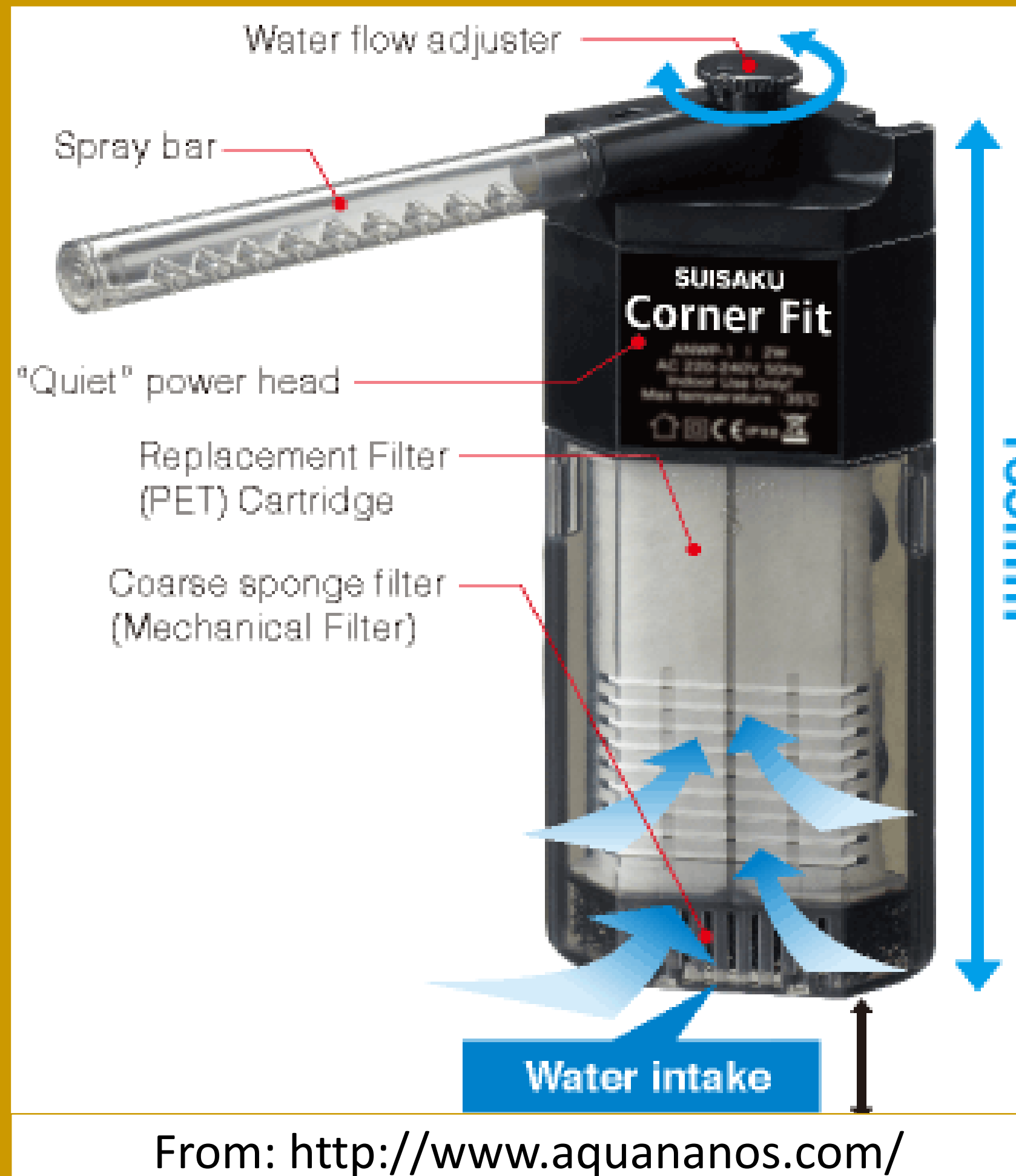
- Aquaponic system not converting larger solids into useful nutrients
- Current filters undersized
- Pre-filter now prevents clogging but removes potential nutrients
- Fecal matter and feed floating throughout fish tank result in low water quality

Design Constraints

- No use of powered components
- Must be able to be cleaned without replacing parts
- Decomposes waste faster than it builds up

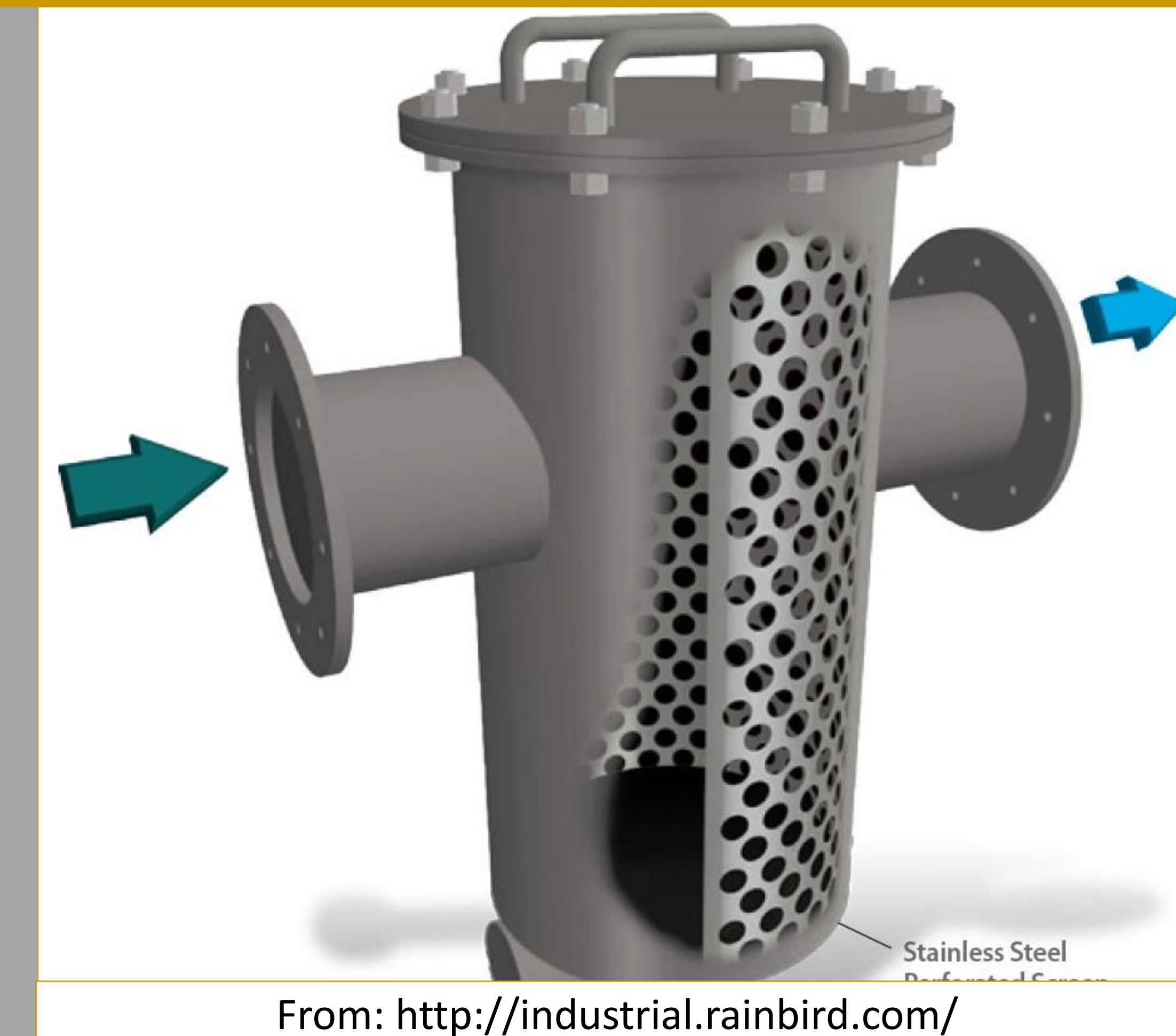
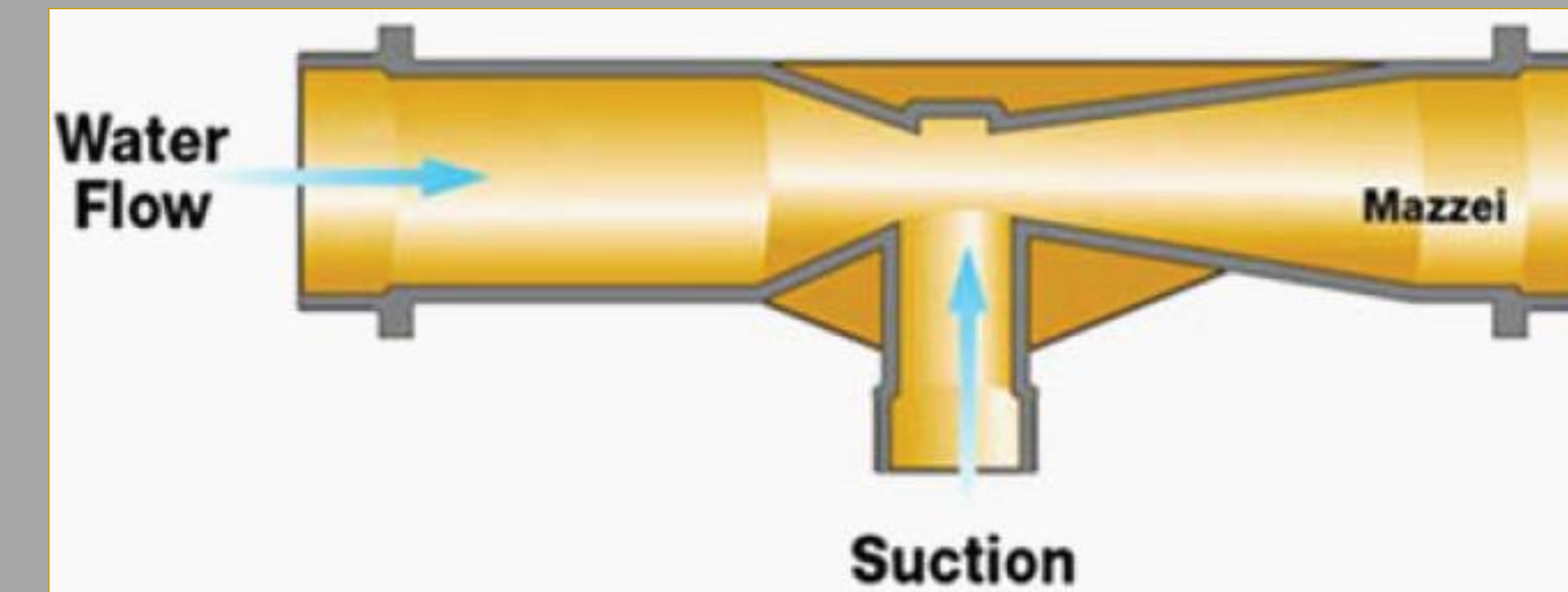
Potential Impact

- Lower inputs and less space while having higher food production
- Lower carbon footprint than other methods of agriculture



Alternative Designs

The designs were combined to make a comprehensive hybrid that uses all their best features to create a better final design.



Corner Filters: Bio-filter using air through bio-media to lift and aerate water and breakdown of ammonia in fish tanks.

Venturi Injector: Sucks fertilizer or air into moving water stream due to pressure difference.

Screen Filter: Particle filtration method where screen catches particles and either blocks ones that are oversized or resizes them as they shear through the screen.

| Economics | |
|-----------------------|------------------------|
| Item | Cost Estimate (Retail) |
| PVC Pipe | \$ 30.00 |
| PVC Fittings and Glue | \$ 175.00 |
| Welding Supplies | \$ 20.00 |
| Perforated Aluminum | \$ 70.00 |
| Tanks | \$ 250.00 |
| Total | \$ 545.00 |

Final Design

Features:

- Air injection venture for maximizing dissolved oxygen in water pre-filtration
- Screens placed inside ball valves and outside inlets for sizing soft particles
- Biomeida tank with reservoir for decomposition of fish waste
- Welded perforated barriers between inlets and fish (not shown)

