AQUAPONICS - DESIGN

Aquaponics is an innovative agricultural system that combines aquaculture (raising fish) with hydroponics (cultivating plants in water). In this symbiotic environment, fish waste provides organic nutrients for the plants, while the plants help to purify the water for the fish. This closed-loop system promotes sustainability by significantly reducing water usage compared to traditional farming, eliminating the need for chemical fertilizers, and minimizing environmental impact through reduced runoff. Additionally, aquaponics can be implemented in various settings, including urban areas, making it a versatile solution for sustainable food production.

The tool box:

Strategies we've tried?

I believe Stanford is trying to build a solar powered aquaponics system at Stanford Community Farm. However, aside from a brief mention of George Korir's biography in the Stanford Woods Institute for the Environment, there is no research or publicity around it. Furthermore, Stanford has several resources, including articles written by students and professors, surrounding the topics.

Strategies others have tried?

System Design Innovations:

- Vertical Aquaponics: Maximizes space efficiency by stacking grow beds vertically.
- Raft Systems: Plants are grown on floating rafts, ideal for large-scale, commercial operations.
- Media Bed Systems: Uses gravel or clay pebbles as a growing medium for plants and a filtration system.
- Nutrient Film Technique: Plants are grown in a shallow stream of nutrient-rich water, often in channels or pipes.
- Integrated Systems: Combining aquaponics with other sustainable technologies like biogas digesters or renewable energy sources.

Social Innovations:

- Community-Based Projects: Developing urban aquaponics projects to promote local food production and education.
- *DIY and Home Systems:** Simplified and affordable kits for home users to set up their own aquaponic systems.

Strategies nobody has tried?

- Aquaponics dining experience: custojers catch and pick their own fish and vegetables when they get to the restaurant.
- Aquaponics system at Stanford dininghall
- Aquaponics system people can put in their kitchen

Design Thinking Case Study - gardyn:
Gardyn offers an advanced indoor hydroponic gardening system designed to grow a variety of plants, including vegetables, herbs, and flowers, in a compact space. Their systems use **patented** Hybriponics technology, which combines high plant density with **automated** water and light management. The **AI assistant**, Kelby, provides personalized care recommendations using built-in sensors and cameras. Gardyn systems are sustainable, using 95% less water than traditional gardening and incorporating eco-friendly materials. They are **easy to use**, requiring no prior gardening experience.

Who are the people?
This product seems to be made for families looking for a way to seamlessly incorporate a sustainable living practice (eating organic food from their garden) into their life. These families enjoy plants, but are not necessarily knowledgeable about gardening and do not have the space for a messy garden.

What was their need?
These families need an easy to use hydroponic system that fits inside of a home seamlessly and aesthetically. They need a garden that is easy to use and maintain but achieves a sustainable practice.

What was the underlying strategy that was used to change people's behavior?

- **Innovation:** Gardyn uses several impressive innovations to make their product as easy to use as possible and adaptable to any room in the house. They incorporate LED lights, AI service, camaras that monitor the health of a system, and a water recirculation system.
- **Step-By-Step Guide:** Gardyn created a step by step guide that teaches users how to take care of their system, removing stress and making the gardening experience even more enjoyable.
- **Selection:** Gardyn gives 100+non-GMO varieties of plants for nutrition, taste, or beauty.
- **User interactions:** Through social media and blogs, Gardyn keeps customers engaged and involved.
- **Aesthetics:** Gardyn offers a variety of garden designs with different shapes and sizes to fit the desired asthetic of the customer.
- **Other:** a great website, warranties, payment options, ambassadors, etc.

What other strategies could have been used?
Gardyn does not leave much to be desired because they meet almost all of their customers' needs. I would suggest a Gardyn specific cookbook that can be sold at stores or in the business that showcase Gardyn gardens as part of the ambassador program.

What three aspects of these strategies worked successfully?

- **Maximizing** - Gardyn allows you to grow 30 large plants in just 2 square feet.

What three things do these strategies need to improve?

- **Innovation -** Gardyn has won several prestigious awards including TIME's Best Invention of the Year, 2024 Big Innovation Awards, FastCompany's 2023 World Changing Idea, etc.
- **User interactions:** Gardyn has over 216,000 followers on Instagram.

What strategies could be imroived? (hard to think of improvements!)

- **Aesthetics:** Gardyn could offer more colors and "themes" for their gardens. At the moment, they are very modern-looking and might not fit into the "feel" of every home.
- **Technology:** Gardyn could explore an Aquaponics garden.
- **Location:** Gardyn could make Gardyns for patios and outdoor spaces.

Imagine a new strategy:
(ideas/MVP's)

AQUAPONICS: A product similar to Gardyn (slick and compact) that includes fish.


OUTDOOR/URBAN DECORATIONS: Hydroponic or aquaponic systems in urban areas that serve as both decorations and sources of sustainable food. I imagine vertical gardens and organic looking sculptures.


STORES: Instead of buying prepackaged vegetables and fruits , customers can hand pick/catch their food.