Tropical and dense countries like the Philippines experience rain half of the year and people fall victim to floods and typhoons. “Storm is the most frequent disaster occurring (55% of the total number of disasters) in the Philippines causing 80% of total affected people, 76% of total death, and 76% of estimated cost (damage) followed by flood and earthquake” (AHA Centre 2015). Every year, many people get stranded in their homes while the floods rise to dangerous heights. People from local government units and disaster risk reduction groups conduct rescue operations but stranded victims are hard to reach while bringing rescue boats and equipment.
Value Proposition

We help rescue volunteers rescue stranded victims faster and more efficiently by placing emergency rafts closer to the victims.
Solution: **RE-LEAF**

Our design is a double-layered modular platform that can be folded into a raft, fitting up to 4 individuals. Throughout the year, the platform can be used as a park bench, a roof or even a divider that would be placed all around the city for easy access in times of need. Inspired by the Victoria water lily’s ribbed structured veins, the bottom of the raft will be patterned the same way and will immediately float once it comes into contact with water. It will be able to support the weight of the people on board as well as the currents of the flood waters. The platform can easily transform into a raft by following the creases and a rope mechanism will hold them in place.

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Victoria water lily pattern  
RE-LEAF bottom pattern

4 ft  |  4 ft  |  1.8 ft
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Front  |  Side  |  Roof configuration
How It Works

1. Lay it flat with the water lily pattern against the floor/water.
2. Pull the rope from the end of the raft until it folds and the sides are connected properly.
3. Tie the rope to the handle on the platform.
The platform’s main layer has a recycled HDPE in a sponge-like construction inspired by certain bones which has lots of pores. This helps the raft float.

The outer layer of the raft (inner when in both bench and roof configurations) is a flexible natural rubber material installed to make the folding of parts possible.

The rope mechanism is embedded in the platform and there is a latch you can pull to transform. Lay the platform flat on the ground then pull on the rope to transform it into a raft.
Biomimicry Inspiration #1:
Phasmatodea

We wanted to create a solution that is adaptable to the landscape and conditions of the community so we looked at phasmids for inspiration. The main concept of the project is its ability to transform from an object that can be found in the community into a raft that can be used during extreme floods. The inspiration came from the ability of phasmids to use camouflage (Deep Look 2020). While resting, they stay in place and blend in with their environment. When it’s time to move, they transition without difficulty.

Biomimicry Inspiration #2:
Victoria Water Lily

For the raft, we took inspiration from the Victoria water lily. The water lily can support weight due to a ribbed structural support at its underside (Ralevski 2020). The air pockets formed by the support also helps keep it afloat. This informed the design of the raft as its ability to float while holding weight is one of the top considerations of the design.
Competitors

Industry and Geography

OndoyBoat (Local Mfr.)
Urban Bulldog (Local Mfr.)
Inflatable Boats

Technology

Rescue Drones
Lifebuoys
Line Throwers
Rescue Cans

Our Advantages

Closer to the stranded victims.
Eliminates the hassle of bringing rescue boats from the storage room to the flooded areas.

Useful throughout the year.
Existing rescue rafts are only used during extreme floods. The Re-Leaf has other uses during sunny days.

Less storage space needed.
Allocation of space just for storing Re-Leaf rafts is unnecessary. They can be used as public furniture to serve the local community.
Business Approach

Users and Buyers

The *target users* are the rescue volunteers from the different organizations that conduct rescue operations. These are people from the local government units (LGU), the disaster risk reduction groups, the Philippine Coast Guard, etc.

The *buyers* are the heads of organizations. For LGUs, it is ultimately the mayor that serves as the buyer. There are mayors and org heads that are open to the idea of using innovative solutions for the problems of the community and these are the ones we will target.

Revenue Models

Product Sales- directly selling to the LGUs (through contract bidding) and other organizations.

License- partnering with local rescue boat/raft manufacturers and licensing the concept and technology to them. This model will transfer most of the responsibility of manufacturing the product to the partners.

Other Opportunities

The product aims to solve problems encountered during extreme floods but the concept provides a certain flexibility when it comes to future applications. A consumer product version for individual homes is possible in the future. Private businesses like resorts, malls, and others could also be targeted in the future.
Product Development Roadmap

- Market research
- Biomimicry research

Research

- Sketching of concepts
- Creating 3D model of initial design.

Ideation

- Rapid prototyping w/ scale models
- Rapid prototyping w/ 1:1 models.

Prototyping 1

- Adjustments w/ original concept based on prototyping results

Recalibration

- Another round of prototyping
- Production of a single unit of the product

Prototyping 2
Team Leaf Party

We are a team composed of Industrial Design and Architecture students from the Philippines. We come from different backgrounds and bring different skillsets but we all share a passion for helping our community.