



# Algae Reconstruction

RECONSTRUCTING SELF-SUSTAINING POND ECOSYSTEMS

INDIVIDUAL WORK  
2022/08 - 2022/10

Using modular rearing units for easy and scientific sustainable pond fish farming.

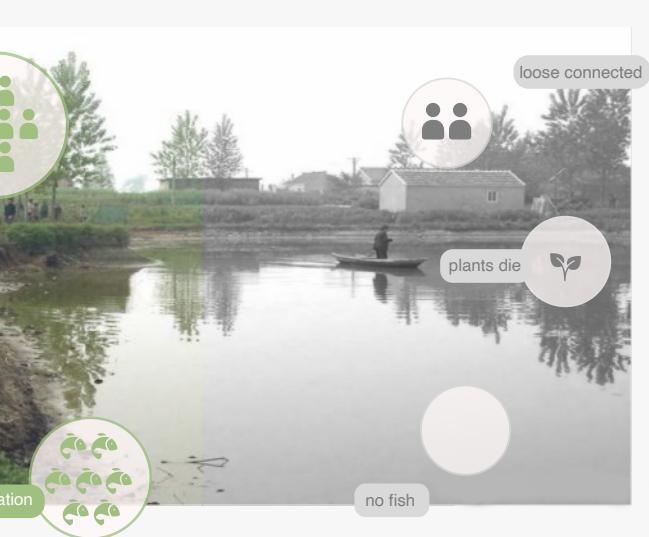
## BACKGROUND

As one of the birthplaces of the world's agricultural civilization, the Chinese people's longing for land and nature is a humanistic sentiment that has lasted for thousands of years.



## INSPIRATION

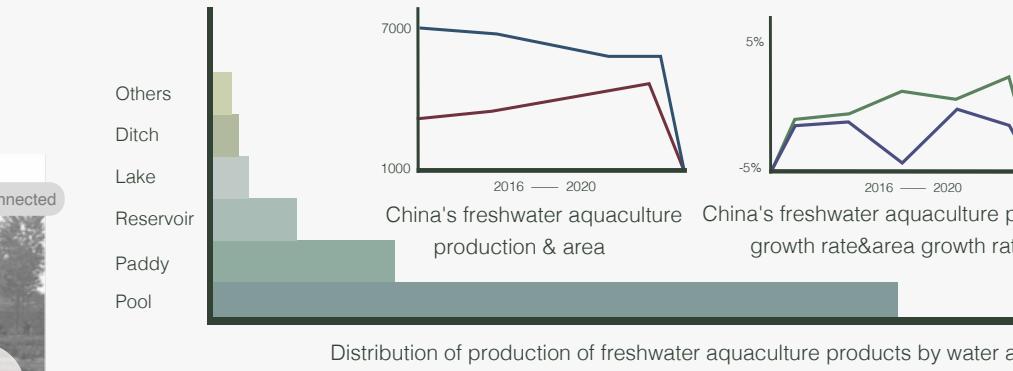
My grandfather's fish pond, which carries the fond my memories of childhood, has long been abandoned. The communication network system that once relied on fish ponds gradually disintegrated.



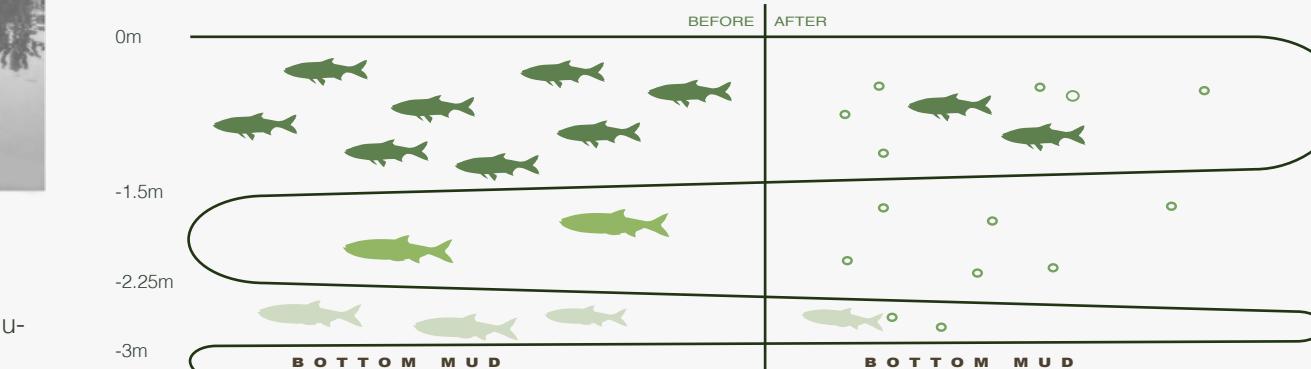
## SUMMARY

Can I return to the natural health of the ecological environment and human beings by building a self-sufficient fish pond ecosystem.

## INTERVIEW



## BIOSYSTEM



The beauty that fish ponds bring to people is not only a link symbol in the biological sense, but also a symbol of a network of basic level society in rural China.

In sharp contrast to the status quo of my country's aquaculture industry, most of the small pond aquaculture is in a state of neglect.

## RESEARCH

Carbon sink fishery refers to the process and mechanism of promoting aquatic organisms to absorb carbon dioxide in water bodies through fishery production activities and removing these carbons from water bodies through harvesting, also known as "removable carbon sinks".

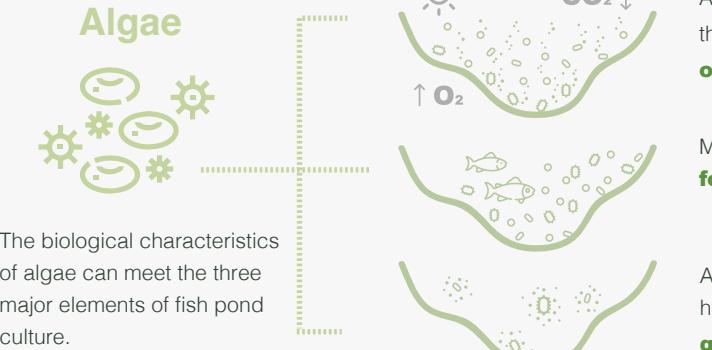


## CONCEPT

### Algae

The biological characteristics of algae can meet the three major elements of fish pond culture:

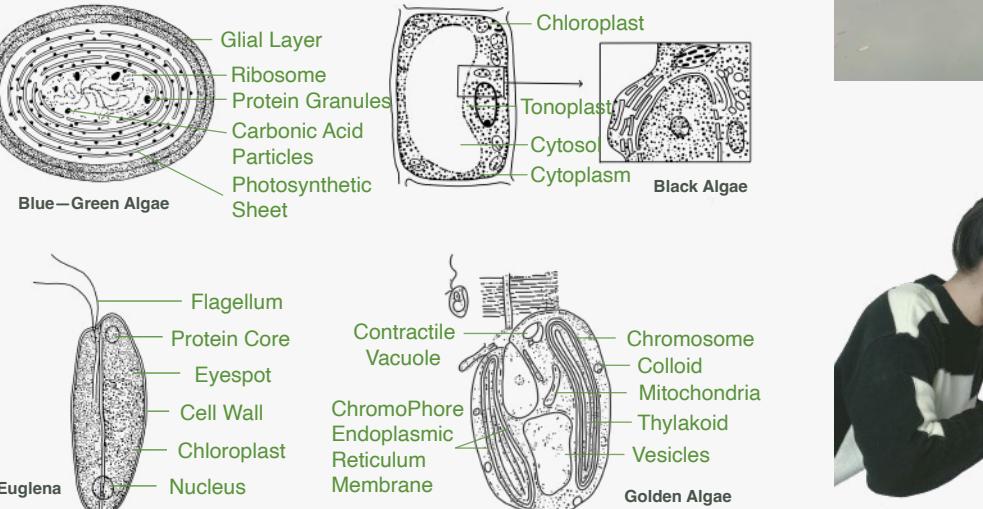
I want to introduce the concept of carbon sinks in the process of fish farming and use the biological characteristics of seaweed to create a self-sufficient ecosystem.



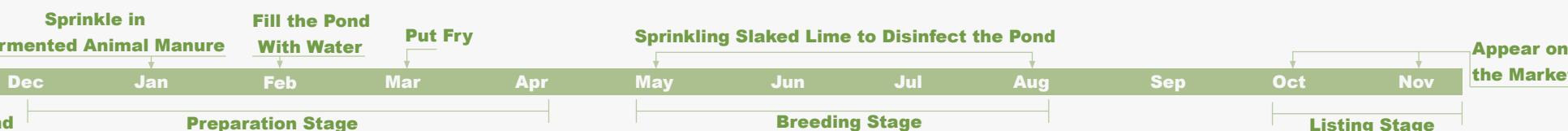
Algae absorb carbon dioxide from the water through **photosynthesis** and release **oxygen** for fish to breathe.

Many species of algae are also major **food** sources for filter-feeding fish.

Algae can absorb pollutants such as heavy metals in water and **purify water quality**.



## FARMING WORK TIMELINE



## PERSONA



Name: Norman  
Job: Fisherman  
Age: 65  
Personality: Conservative, Poor Adaptability.

### Pain point:

Physical exhaustion, lack of energy, memory loss, and a desire to spend more time with family and develop hobbies.



Name: Jason  
Job: Agricultural student  
Age: 22  
Personality: responsible, strong learning ability

### Pain point:

Graduated from agricultural college, eager to promote the development of hometown, lack of practical experience.



Name: Emily  
Job: Teacher  
Age: 26  
Personality: Knowledgeable, reasonable gentle.

### Pain point:

The fishery in her hometown is declining, and she is eager to inherit the family industry.



Name: Variegated carp  
Feeding habits: Filter feeding

### What i need?

Golden algae



Name: Silver carp  
Feeding habits: Filter feeding

### What i need?

Euglena and Black algae



Name: Grass carp  
Feeding habits: Filter feeding

### What i need?

Blue—green algae

## BIOLOGY ANALYSIS



Visual observation status of water quality samples before Algae release.



Visual observation status of water quality samples after adding algae.



**Before release**  
There are many impurities and the nutrition is not rich

**After release**  
The water quality is clear and the algae are healthy and abundant.



**Before launch**  
pond oxygen content 4.0  
**After launch**  
pond oxygen content 8.0



## MATERAIL ANALYSIS



### Before release

There are many impurities and the nutrition is not rich

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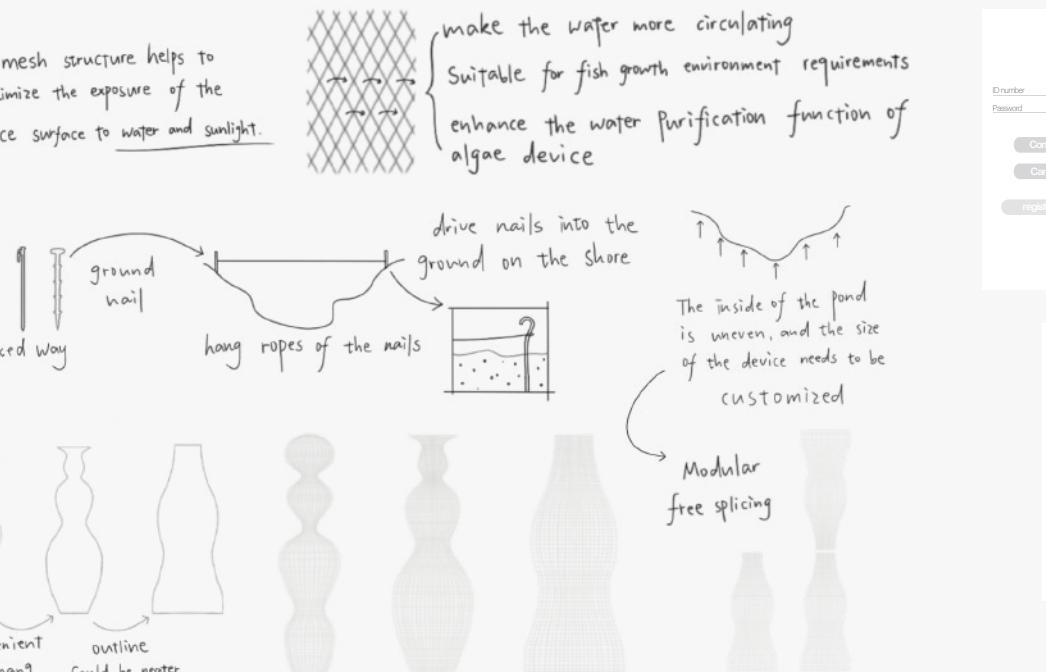
### After release

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## STORYBOARD

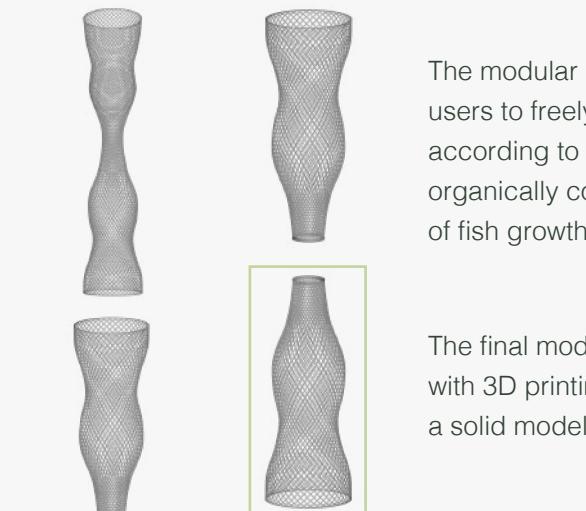


## SKETCHES



### 3D model

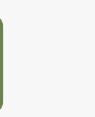
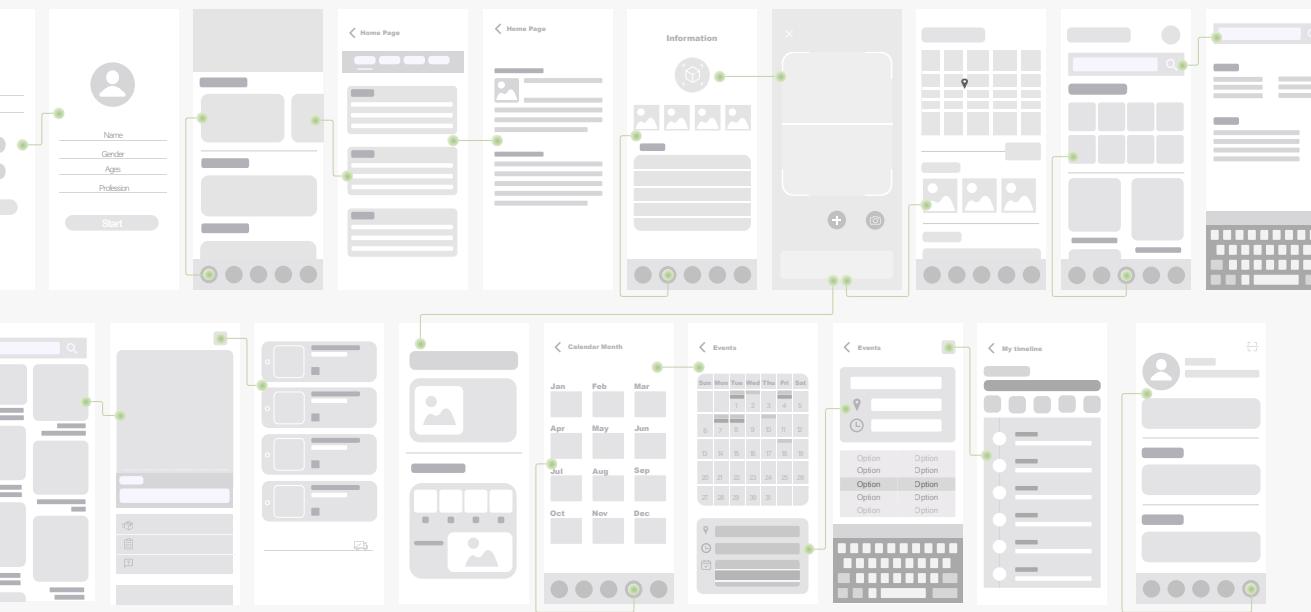
The three major elements of fish pond farming-dissolved oxygen, oxygen and food, the three elements must be in balance to ensure the health of the pond.



The modular design is convenient for users to freely combine and release according to the size of the pond, and organically control the three elements of fish growth.

The final modeling will be combined with 3D printing technology to produce a solid model.

## PORTOTYPE



### Algaenergy

A comprehensive app that assists fishermen in fish farming.

It integrates multiple functions such as obtaining fishery information, recording pond data, and purchasing fishing gear.

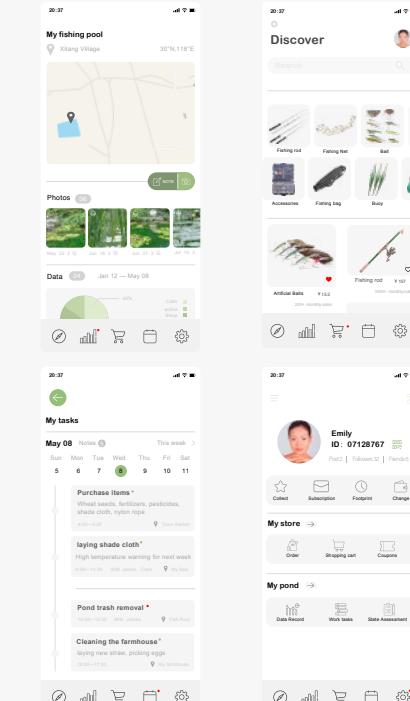
#### Color matching



#### Icons



Whether you are a novice farmer or an experienced pond owner, you can find help here.



## FINISHED PRODUCT DISPLAY

Create a self-sufficient pond ecosystem with a modular algae installation.



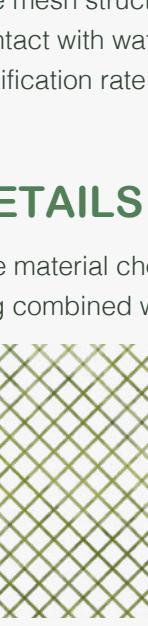
## MODULE DISPLAY

The modular grid device woven by linear algae can be freely and flexibly combined according to the depth of different positions in the pond.

### Single



### Combination



The mesh structure can increase the exposed area of the device, increase the area in contact with water and the area irradiated by sunlight. Enhance the circulation, purification rate and algae reproduction rate of the pond.

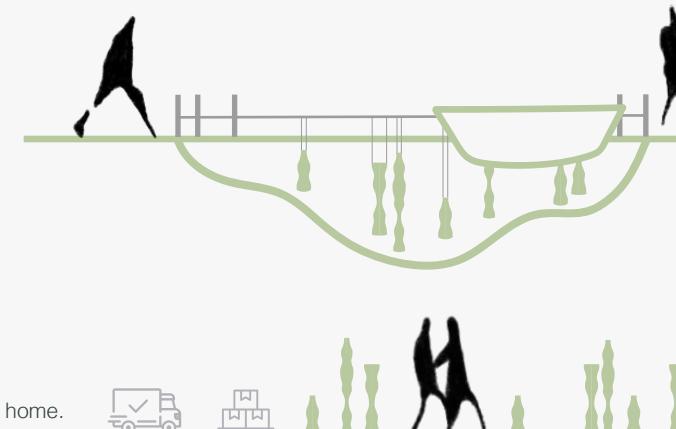
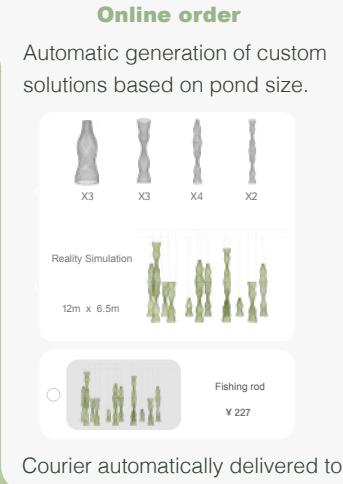
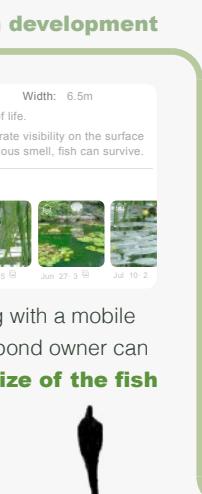
## DETAILS DISPLAY

The material chosen for the device is a biogel of seaweed mixed with agar, created by modeling combined with 3D printing technology.

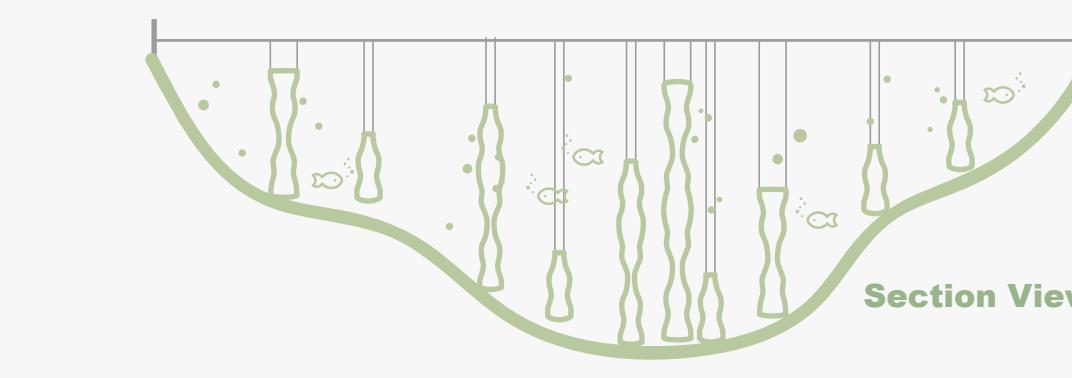


The mesh structure is made from a mixture of gelatin and algae powder. Algae uses photosynthesis to grow continuously, maintain the ecological balance of the pond, and feed fish.

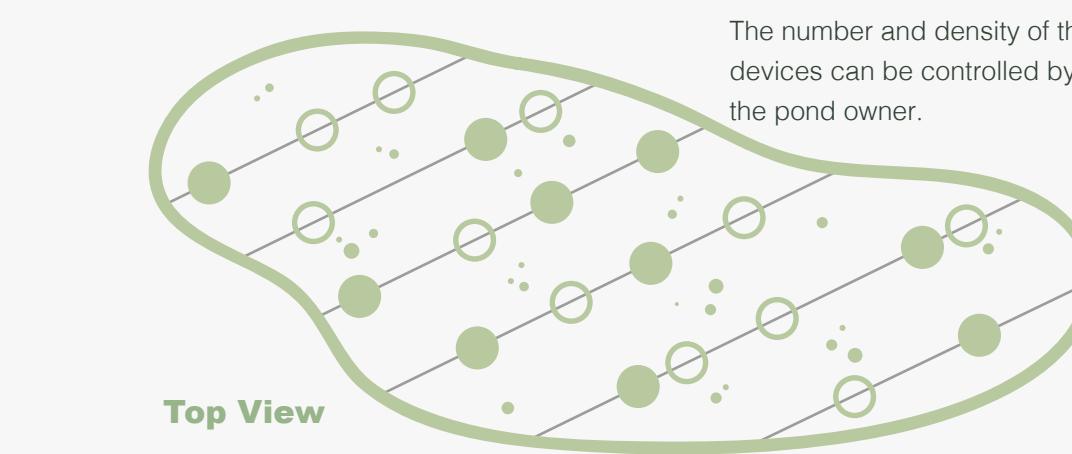
## MANUAL



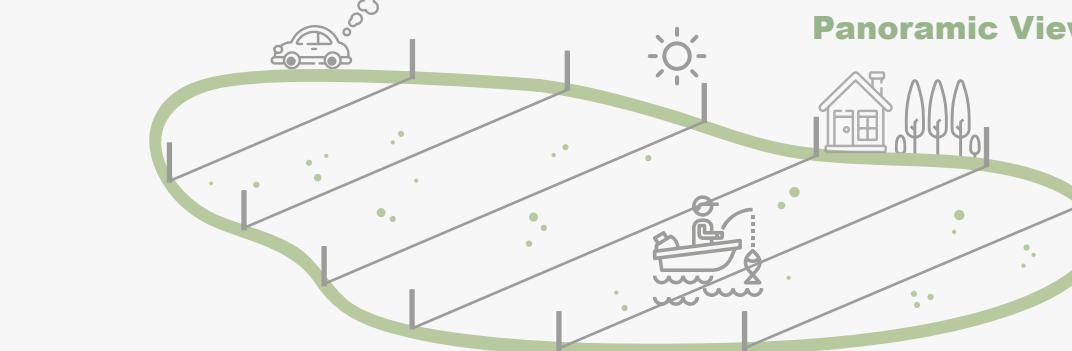
## USE SCENE DISPLAY



A modular grid installation woven from thread-like algae, which can be freely combined according to the size of the pond.



The number and density of the devices can be controlled by the pond owner.



## EFFECT DISPLAY

