TRA VINH UNIVERSITY

Bringing quality learning opportunities to the community

STARS WATER CENTER

STARS WATER

BLUE LOOP – INTEGRATED HOUSEHOLD WATER MANAGEMENT SYSTEM

Problem Statement

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11/29/2024 11:43 GMT+7

Nearly 74,000 households in the Mekong Delta lack domestic water due to saltwater intrusion

LE DAN

Tuổi Trẻ trên Google News

Drought and saltwater intrusion in the Mekong Delta in 2023-2024 caused 1,189 hectares of rice to have reduced productivity, 43 hectares of rice to be completely lost, and nearly 74,000 households to lack domestic water.

TN
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Weather

From February to April 2025, saline intrusion in the Mekong Delta is likely to be higher than the average of many years.

01/24/2025 11:25'

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Mekong Delta faces increased saltwater intrusion in 2024-25 dry season

December 13, 2024 - 09:49

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The Cửu Long (Mekong) Delta is expected to experience unusually high saltwater intrusion during the upcoming dry season, albeit less severe than in 2023-24, 2015-16 and 2019-20.

Idea & Objectives

Our Idea

A decentralized model integrating aquaponics, ecological wetlands, and rainwater harvesting and solar energy systems

Builds a closed-loop water cycle within a household.

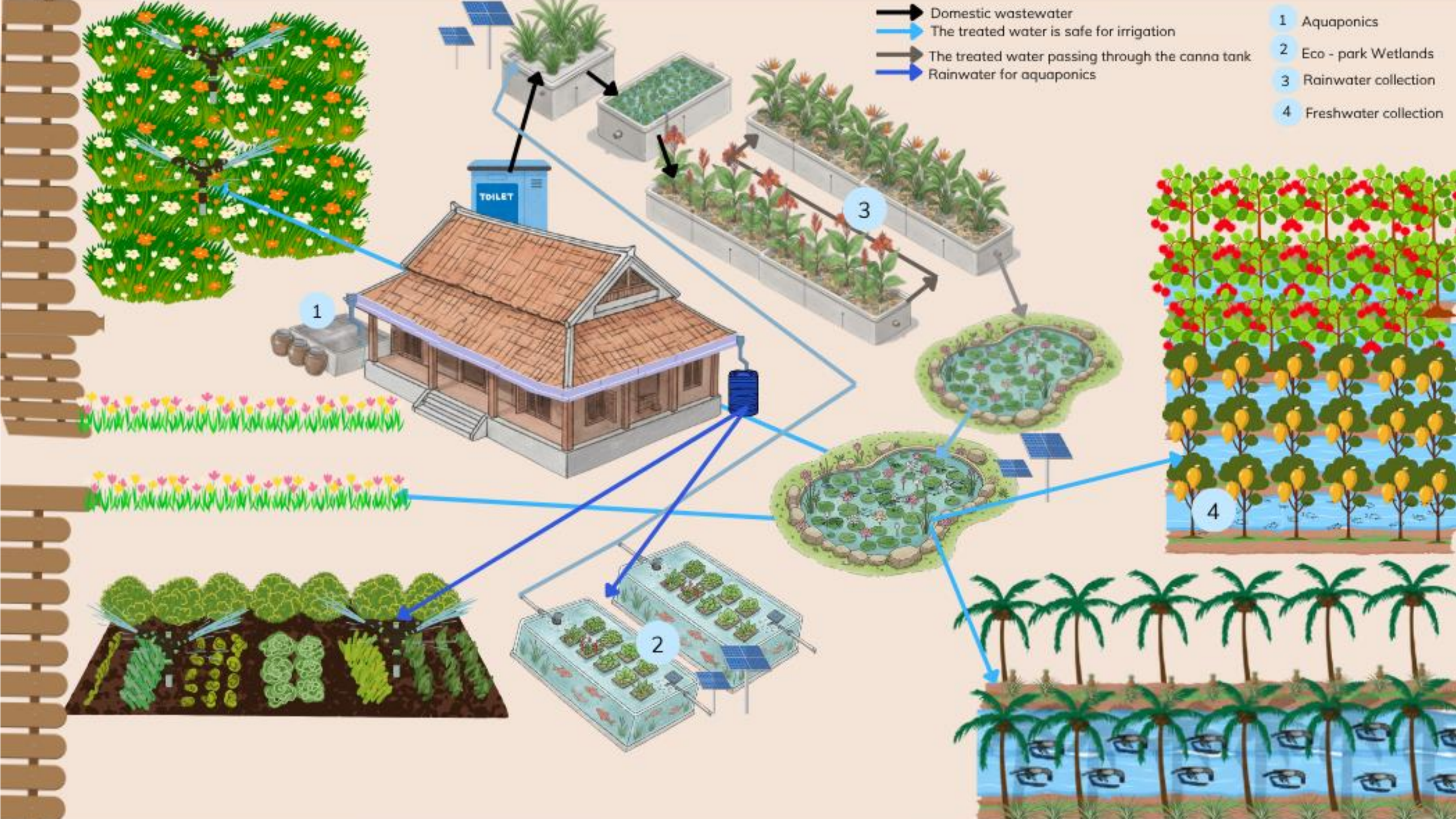
Combines modern sustainability concepts with local knowledge (traditional house–pond–garden system (VAC)).

Objectives

Reuse 70–80% of household wastewater.

Reduce 50% of freshwater demand.

Support food production and income generation.


Domestic wastewater
The treated water is safe for irrigation
The treated water passing through the canna tank
Rainwater for aquaponics
1 Aquaponics
2 Eco - park Wetlands
3 Rainwater collection
4 Freshwater collection
TOILET
1
2
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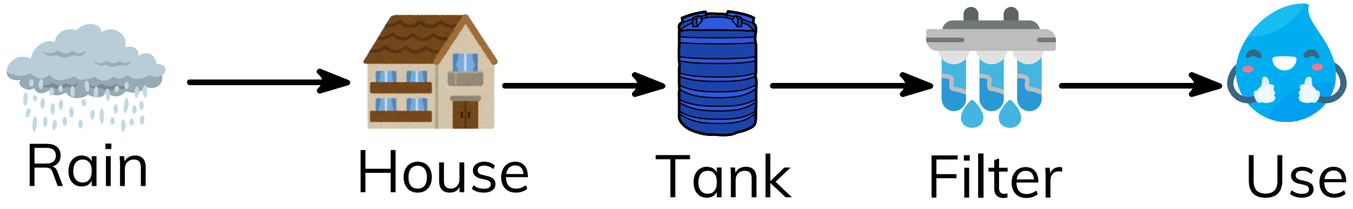
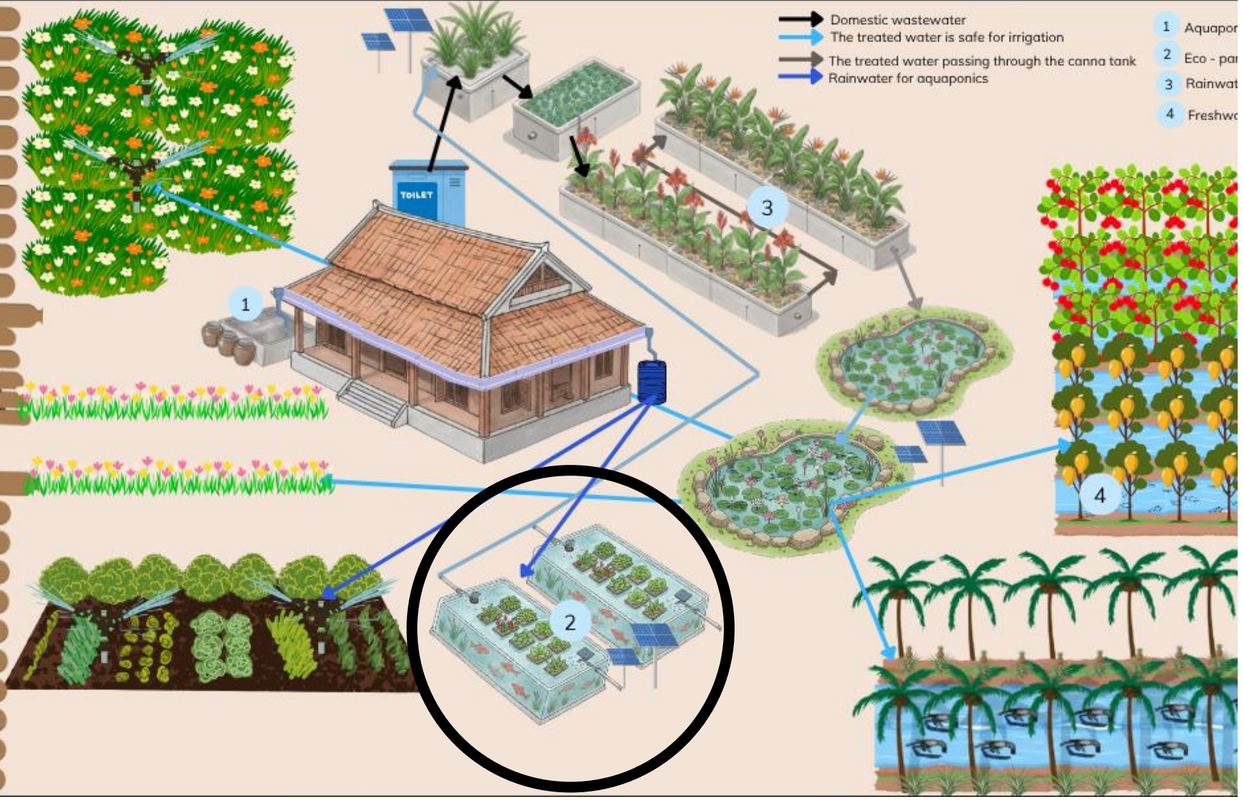
RAINWATER COLLECTION & DRINKING WATER TREATMENT



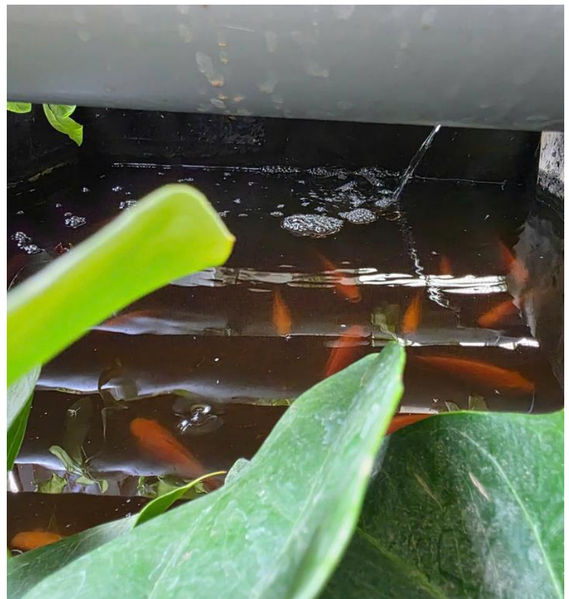
Benefits

- Reduces reliance on groundwater and bottled water.
- Uses natural rainfall — a free and renewable water source.
- Encourages community-level water resilience in rural areas.
- Simple to install, maintain, and replicate across households.



AQUAPONICS

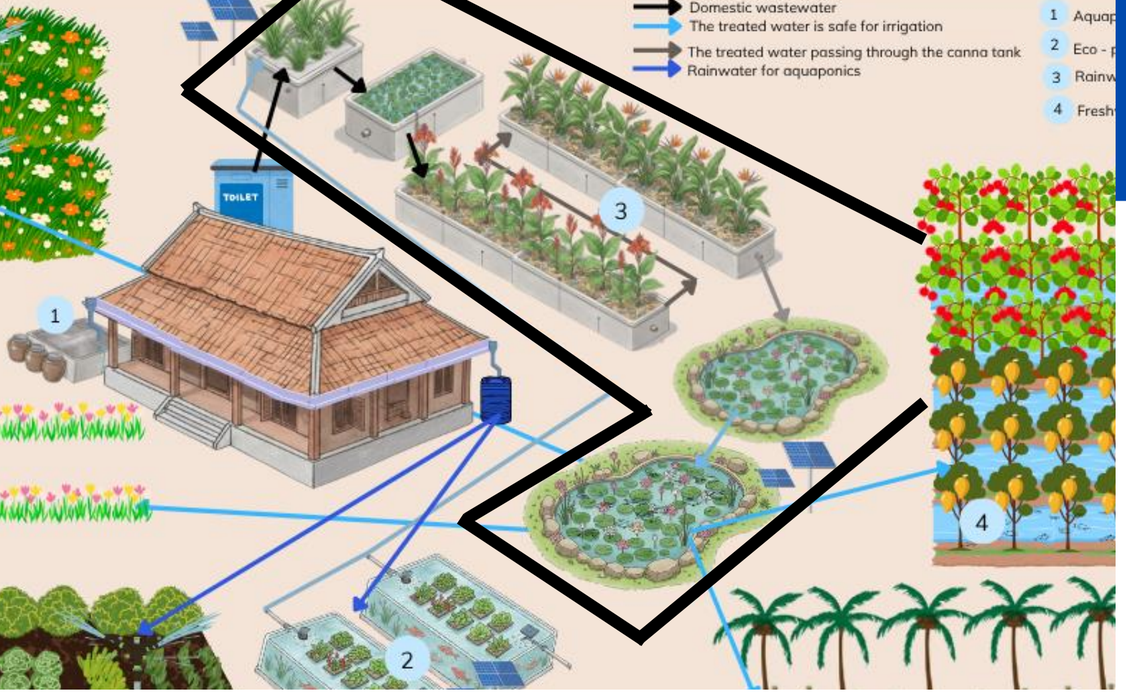
It is a closed-loop system in which fish waste is biologically converted into essential nutrients for plants. The plants then clean the water before it is returned to the fish tank.



Benefits

- ✅ Zero chemical fertilizers
- ✅ Water saving compared to traditional farming.
- ✅ Dual income source: vegetables + fish harvest.
- ✅ Operates with clean solar energy — reduces electricity costs and carbon footprint.
- ✅ Climate-resilient — functions year-round, even during power outages or saline intrusion.

Eco - Park Wetlands



The system operates on natural biological treatment principles with five connected filtration tanks.

- Household wastewater passes through five natural treatment stages.
- Each stage uses local plants with specific purification functions.
- Solar-powered pumps deliver treated water to fruit and coconut gardens.
- Treated water is reused for irrigation and stored in ponds for the dry season.

Environmental - Social - Economic Impact

Environmental

- Reduce Water Pollution
- Reuse over 70% domestic & rainwater
- Increase biodiversity
- Promote sustainable land use

Social

- Improve hygiene and reduce health risks
- Enhance community awareness
- Build resilience (droughts/saline intrusion)
- Empower farmers to adopt eco-friendly practices

Economic

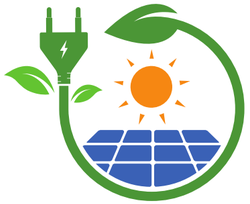
- Reduce household water costs
- Generate extra income
- Lower fertilizer and energy expenses
- Encourage green business opportunities

WHAT MAKES OUR INNOVATIVE

Based on Nature-Based Solutions →

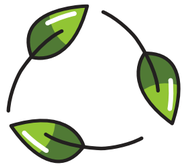
Uses constructed wetlands, aquaponics, and rainwater harvesting as living systems

Uses Renewable Energy (Solar Power) →



Solar panels run pumps and aerators.
Reduces carbon footprint and operation costs.

Fully Circular Water Cycle at Household Level →



Rainwater → Storage → Aquaponics → Wetlands → Irrigation → Reuse

Scalable to Other Rural Communities in the Mekong Delta →

Uses local materials, native plants, and farmer knowledge.

Conclusion

- Practical & Sustainable Model: Perfectly suited for the Mekong Delta's natural conditions.
- Multifunctional Integration: Combines water harvesting, natural wastewater treatment, renewable energy, and food production.
- Miniature Home Ecosystem: Recycles water, saves energy, and provides fresh daily food supply.
- Sustainable Rural Living: Simple, affordable, and easily implemented for families.

Together, we can build a greener, cleaner, and more sustainable rural community for the future.

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THANK YOU FOR YOUR ATTENTION