The Waree Pond Initiative: Water Quality Assessment

Feasibility Analysis for Freshwater Aquaculture at Somdetpittayakom School

Research conducted by the
Junior High Science Team
(W. Ratchamontian et al.)

The Research Team

Student Researchers

Mr. Watanachai Ratchamontian, Miss Chanapat Choopan, Miss Jariya Nasathit, Miss Warisara Lmpool, Mr. Kritiwit Ritchai, Mr. Natthaphong Kaewmuang, Miss Nathaporn Wutti, Mr. Prakasit Jaboon, Miss Kanyanut Sapa, Miss Chananya Kinaseeta, Miss Siwaporn Kaewsangsee.

Advisors Extra Bold

Miss Prakaikham Thesarin & Miss Sasikarn Phannorach.

Somdetpittayakom School, Kalasin Province, Thailand.

Verdict: Highly Suitable for Aquaculture

A comprehensive 6-week analysis confirms Waree Pond meets or exceeds all chemical and physical standards required for freshwater fish breeding. The ecosystem demonstrates stability and safety for agricultural expansion.

Water Quality Scorecard

Transparency (Pass)	✓
Temperature (Pass)	✓
Dissolved Oxygen (Pass)	✓
pH Level (Pass)	✓
Alkalinity (Pass)	✓
Nitrate Content (Pass)	✓
Electrical Conductivity (Pass)	✓
Salinity (Pass)	✓

Pivoting from Rice Fields to Fish Breeding

The Challenge (2022)

Waree Pond used for demonstration rice fields. Yields significantly under-projected (144 kg actual vs 250 kg projected).

The Asset

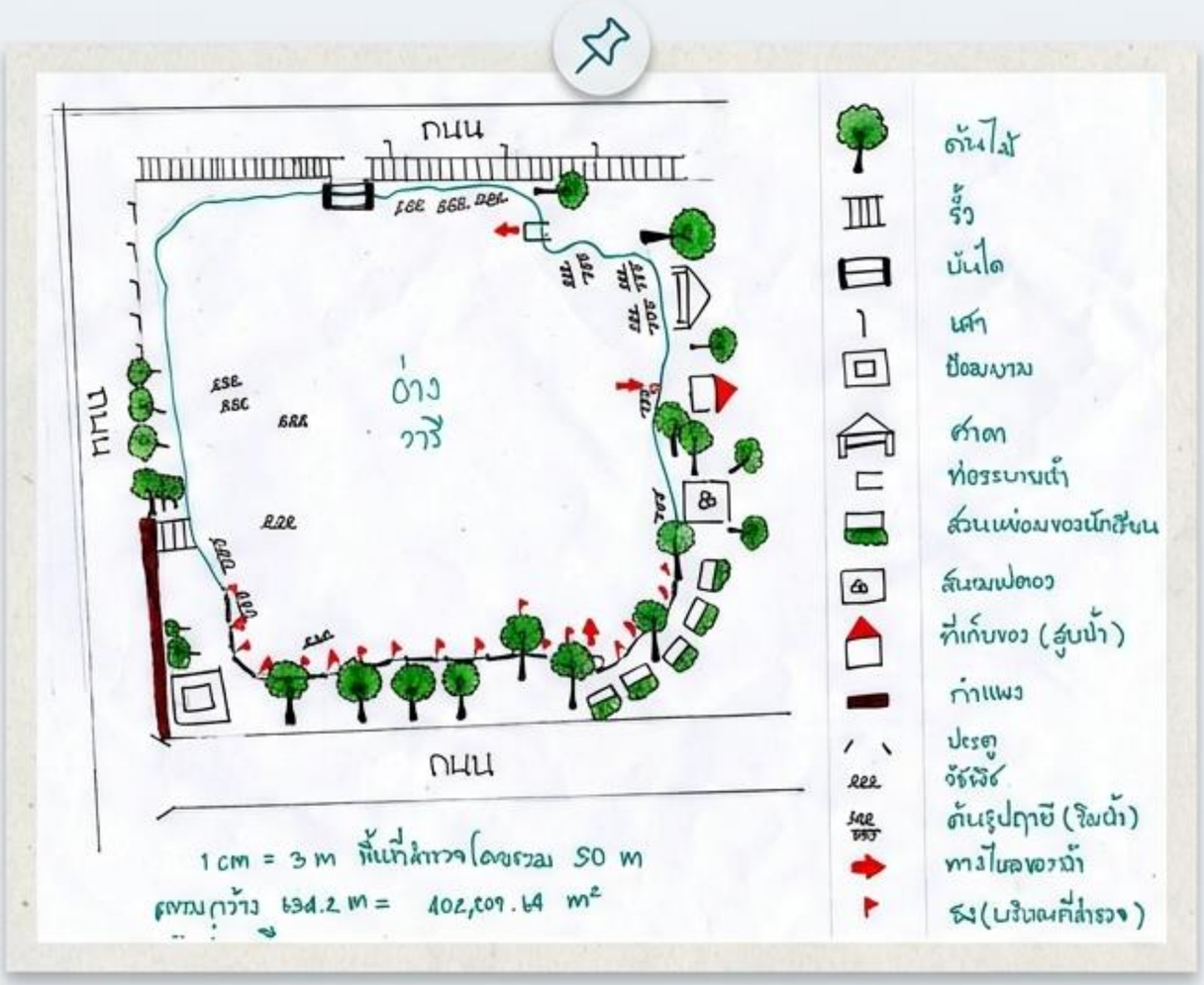
14 Rai Surface Area.
40,000 m^3 Capacity.
Natural waterway dredged in 2021.

The Opportunity (2024)

Repurposing reservoir for upper secondary agricultural fish breeding.

Requirement: Establish chemical baseline for aquatic life.

Site Survey: Ang Waree Reservoir



Location: Somdetpittayakom School, Kalasin Province.

Dimensions: 14 Rai surface area.

Capacity: 40,000 cubic meters.

Surroundings: Educational plots, community zones, and natural vegetation.

Survey Method: 50-muter straight line transect with reference flags every 3 muters.

Methodology Adhering to International GLOBE Protocols

Data collection occurred every Saturday for six consecutive weeks.

Transparency

Secchi Disk lowered until invisible, raised until visible.

Temperature

Bulb thermometer at 10 cm depth, 3-5 minute hold.

Chemistry

DO Test Kit (<2 hrs), Conductivity Meter, pH paper, Nitrate Test Kit.

Verification

All data recorded in the GLOBE Data Entry system.

Scientific Editorial

Physical Properties: Temperature & Clarity

Water Temperature

25.5°C

Supports optimal metabolic rates for tropical aquatic life.

Transparency (at depth)

34 cm

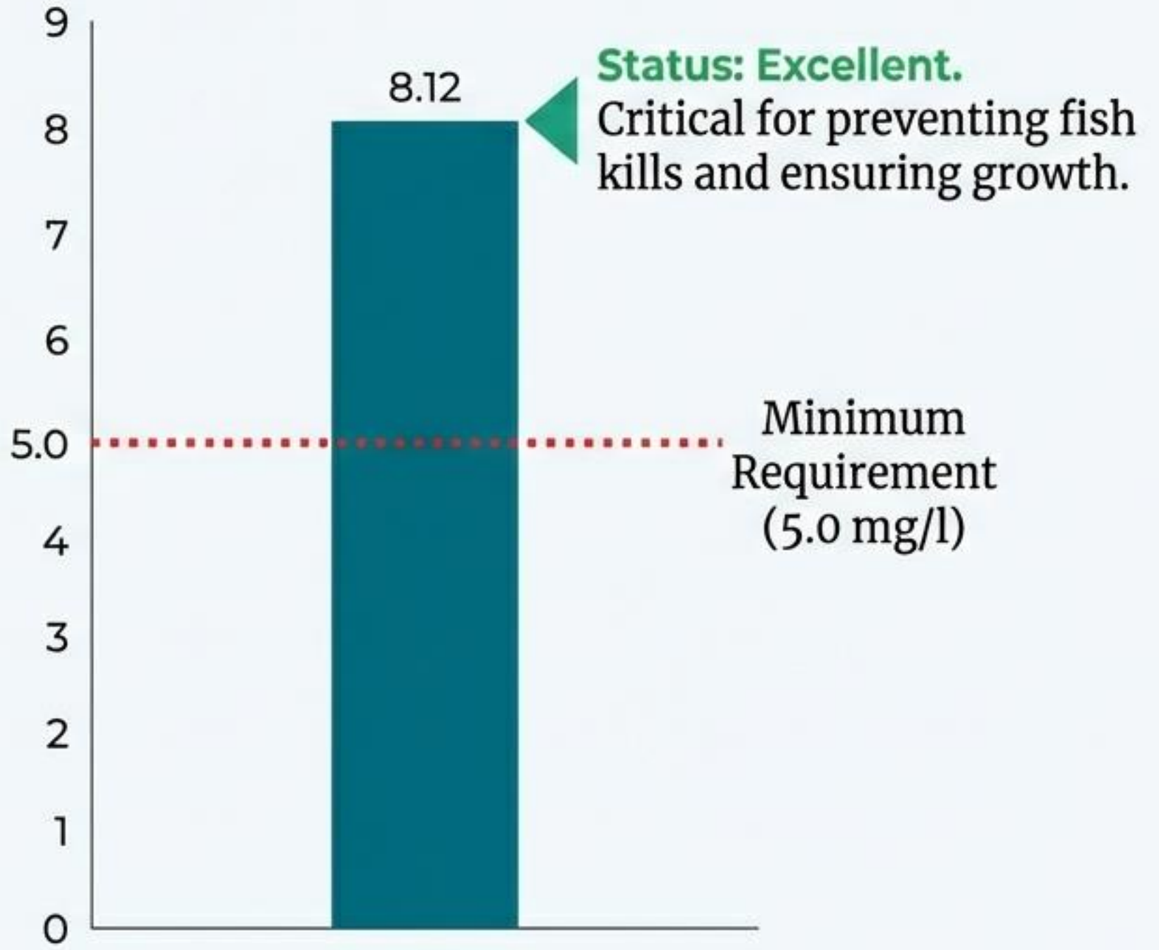
Indicates balanced plankton levels—sufficient food source without oxygen depletion.

Scientific Editorial

Dissolved Oxygen: The Breath of the Ecosystem

8.12 mg/l

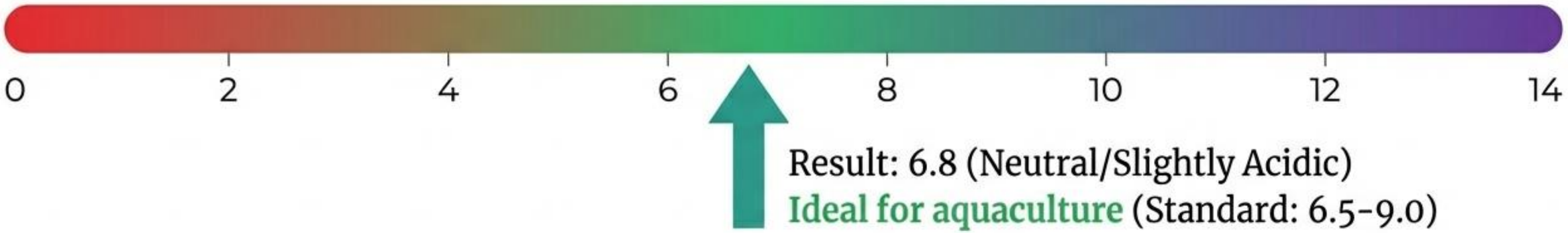
Average Dissolved Oxygen



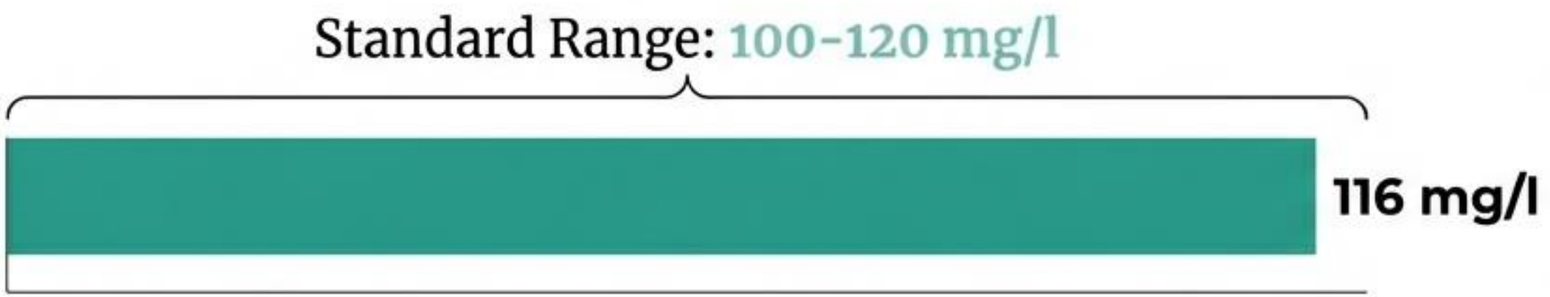
Scientific Editorial

Chemical Stability and pH Balance

pH Scale (0-14)



Alkalinity



Result: 116 mg/l. **Perfect alignment** indicates stable buffering capacity against pH swings.

Scientific Editorial

Contamination Analysis: Purity & Safety

Nitrate

0.02 ppm

Threshold: < 0.5 ppm

Significantly below danger limits. No wastewater contamination.

Salinity

0.5 ppt

Standard: 0 - 0.5 ppt

Standard for freshwater environments.

Conductivity (EC)

272 µS/cm

Standard: 100–2,000 µS/cm

Well within normal freshwater range.

Comprehensive Data Dashboard (6-Week Average)

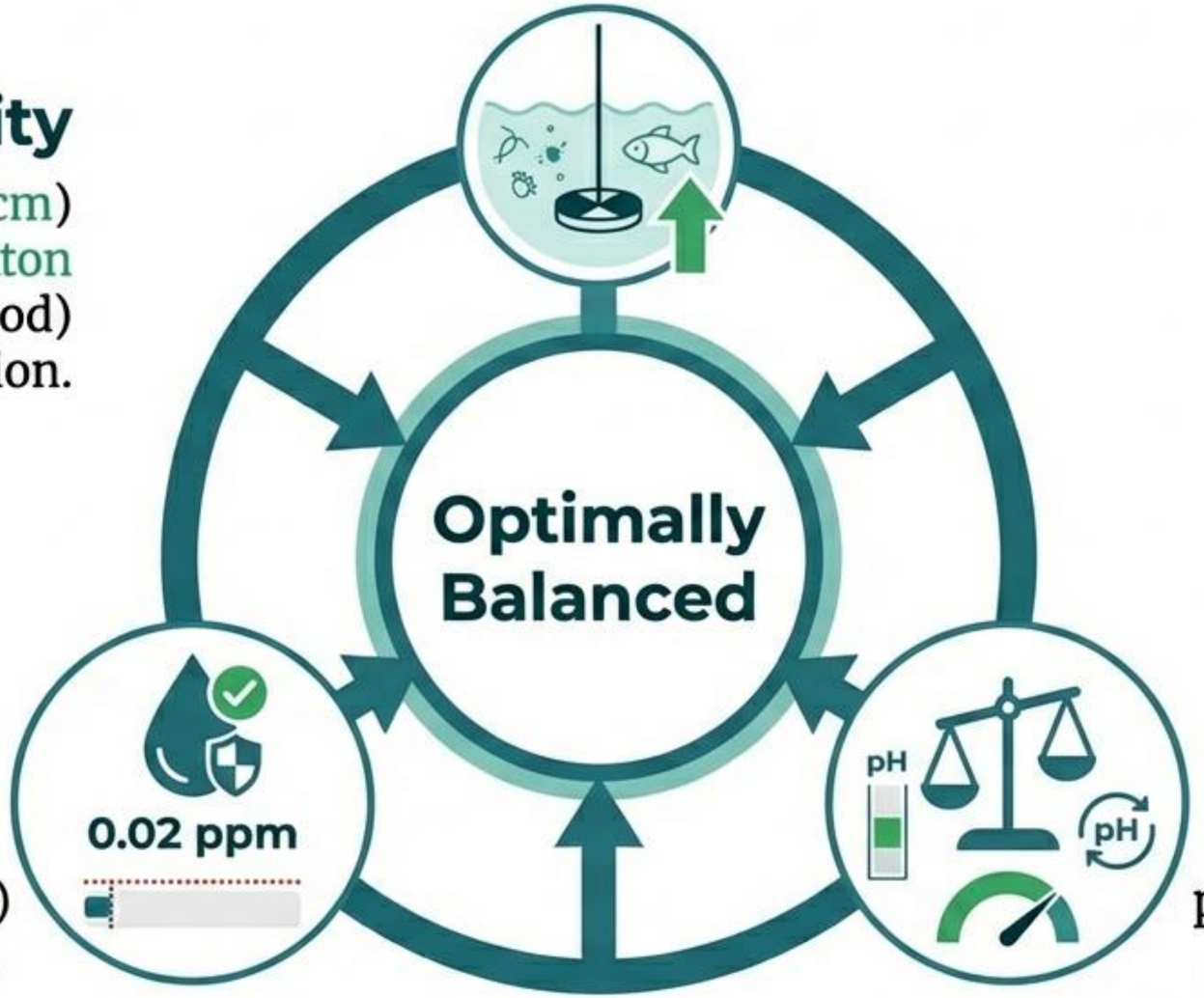
Parameter	Our Result	Standard Criteria
Transparency	**34 cm**	30-60 cm
Temperature	**25.5 °C**	25-32 °C
Conductivity (EC)	**272 µS/cm**	100-2,000 µS/cm
Salinity	**0.5 ppt**	0-0.5 ppt
pH	**6.8**	6.5-9.0
Alkalinity	**116 mg/l**	100-120 mg/l
Nitrate	**0.02 ppm**	< 0.5 mg/l
Dissolved Oxygen	**8.12 mg/l**	> 5 mg/l

Scientific Editorial

Interpreting the Ecosystem

Productivity

Transparency (34cm) indicates healthy plankton levels (natural fish food) without eutrophication.



Safety

Low Nitrates (0.02 ppm) confirm isolation from sewage or toxic runoff.

Stability

pH (6.8) + Alkalinity (116 mg/l) creates a shock-resistant environment.

Assessment Conclusion: Project Go

Hypothesis Confirmed: The water in Waree Pond possesses physical and chemical properties highly suitable for fish breeding.

Also cleared for general agricultural use within the school.

Educational & Community Impact

Curriculum

Resource for upper secondary agricultural courses (2024 Academic Year).

Living Lab

Real-world environment for students to study environmental chemistry and biology.

Sustainability

Model for sustainable water resource management in the Somdet District community.

Acknowledgments & References

Acknowledgments

Special thanks to School Director Mr. Phumsak Saenkanya for support.
Gratitude to IPST and GLOBE Thailand for the environmental science platform.

References

Duangsawat, M. (1983). Water Properties and Fish Farming.

Duangsawat, M. & Somsiri, C. (1985). Water Properties and Analysis Methods.

Tanthulawes, M. (1996). Water Quality Management.