AQUAMIMICRY

Aquamimicry®

Organic Shrimp Farming Manual

Fermented rice bran brings the pond to life, building a natural food web that helps feed the shrimp.

KEY PRINCIPLE : We do not raise shrimp with pellet feed.
We nurture the ecosystem with fermented rice bran, then let the natural food web help feed the shrimp.

Manual Scope	Current Operating Principles
Aquatic Species	Pacific white shrimp (Litopenaeus vannamei) Black tiger shrimp (Penaeus monodon) Giant freshwater prawn (Macrobrachium rosenbergii)
Stocking Density	10–30 postlarvae/m², depending on natural-food production and pond carrying capacity
Area Conversion	1 rai = 1,600 m²
System Focus	Produce enough natural food, maintain stable water conditions, and use no pellet feed.
Pond Preparation	Determine the **Aquamimicry® Red Cap** rate from actual pond-bottom soil pH measurements.
Main Ecosystem Inputs	Start building natural food 5–7 consecutive days before stocking by applying liquid fermented rice bran daily. Fine-filter or finely grind the mixture before use to support natural-food development and establish the pond's natural food web. From stocking through DOC 30, continue using fine-filtered or finely ground liquid fermented rice bran. After DOC 30, use both liquid fermented rice bran and moist fermented rice bran prepared with **Aquamimicry® Red Cap** microbial starter. Adjust daily use according to water quality, transparency, natural-food abundance, and pond carrying capacity. Reduce or pause when pond conditions are unsuitable.
Input-Use Concept	**Aquamimicry® Green Cap** microbial starter **Green Cap** 10 g/rai/application together with $CaCO_3$ 10 kg/rai/application, only on fullmoon days. Apply according to pond condition, not simply by calendar. Before every application or adjustment, inspect the pond and decide whether to increase, maintain, reduce, or stop.
Pellet Feed	**Not used from stocking through harvest.**

Operating Manual • Edition 2026.09
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1 Objectives and Operating Principles

This manual provides guidelines for shrimp farming with the **Aquamimicry®** system. Fermented rice bran is used as the main input to nurture the pond ecosystem and build a natural food web. Shrimp continuously search for and graze on natural food produced in the pond throughout the crop, with no pellet feed used.

How the Aquamimicry® System Works

NATURAL FOOD WEB DEVELOPMENT
Fermented rice bran → Microorganisms & biocolloids → Microbiome → Microbial biomass → Necromass (dead biomass) → Zooplankton & benthic organisms → Shrimp & other aquatic animals

5 Principles That Change the Way the Whole Pond Is Managed

Aquamimicry® does not begin with the question, "What should we add to the pond today?"
It begins with a different question:
"How can we help nature produce food and work inside the pond again?"

1. **Nurture the ecosystem first, then let the ecosystem help feed the shrimp.**
   No pellet feed is used throughout the crop. Fermented rice bran is used to stimulate biological activity and support the natural food web, allowing shrimp to search for and graze on food produced inside the pond.
2. **Measure before adjusting - do not guess what the pond needs.**
   Measure pond-bottom soil pH to determine the rate of **Red Cap** microbial starter during pond preparation. Any increase, decrease, or pause in fermented rice bran should be based on actual water conditions and animal response.
3. **Do not destroy the ecosystem you are building.**
   Avoid routine disinfection, algaecides, broad-spectrum toxic chemicals, and unnecessary water exchange. Every time pond life is destroyed, the ecosystem may have to be rebuilt from the beginning.
4. **Use inputs according to the protocol and actual pond conditions.**
   Use **Green Cap** only on fullmoon days at 10 g/rai/application together with $CaCO_3$ at 10 kg/rai/application. Fermented rice bran and other inputs should be increased, maintained, reduced, or stopped only after checking the pond and test results.
5. **Nature can do the work, but every pond has a carrying limit.**
   This system does not use paddlewheel aerators or routine aeration. Stocking density must therefore match the pond's carrying capacity, considering biomass, natural food production, and dissolved oxygen, especially before dawn. Do not stock more shrimp than the pond's natural food and oxygen can support.

The heart of **Aquamimicry®** is not adding as much as possible. It is understanding the pond well enough to know when to help and when to stop, giving nature the opportunity to work on its own.

IMPORTANT: Aquamimicry® is ecosystem management. It does not guarantee that one fixed formula will produce the same result in every pond. Water source, soil, salinity, climate, cultured species, and biomass can all change how a pond responds.

8-Step Operating Sequence

1. **Inspect the pond bottom**
   Check pond-bottom condition and measure soil pH to determine the **Red Cap** application rate before starting.
2. **Fill the pond through filtration**
   Filter incoming water to keep out fish eggs, fish larvae, unwanted fish, and potential carrier organisms until the target water depth is reached.
3. **Restore the pond bottom with Red Cap and chain dragging**
   After filling to the target depth, apply **Red Cap** at the rate determined from soil pH. Use a boat to drag a chain over the bottom, opening the surface layer and lifting organic sediment and necromass (dead biomass) into contact with water and oxygen. This supports decomposition and nutrient recycling back into the natural food web.

4. **Check water readiness**
   Monitor pH, alkalinity, and dissolved oxygen until they are within a suitable range and show a stable trend.

5. **Build natural food before stocking**
   Prepare and apply fermented rice bran to activate the ecosystem and establish the natural food web before shrimp are stocked.

6. **Confirm readiness and stock shrimp**
   Stock only when water quality and natural food in the pond meet the readiness criteria.

7. **Adjust fermented rice bran to pond conditions**
   Increase, maintain, reduce, or stop according to water transparency and animal response. Do not follow a fixed schedule without checking the pond.

8. **Monitor and act from the first warning sign**
   Continuously record trends in oxygen, transparency, plankton, pond-bottom condition, and shrimp health. Act early when abnormalities appear.

Inspect pond → Fill water → Apply Red Cap → Chain-drag to restore pond bottom → Check water → Build natural food → Stock shrimp → Monitor and adjust to actual pond conditions

Same sequence, but every pond is different.
The steps above are an operating framework, not a fixed recipe with the same dosage for every pond. **Aquamimicry®** is ecosystem management. Water source, soil, salinity, climate, cultured species, and biomass make every pond respond differently. Farmers must measure, observe, and adjust to actual pond conditions.

Follow the same principles, but learn the language of each pond.

2 Pond Assessment and Pond Preparation with Red Cap Based on Soil pH

2.1 Soil Sampling Method

- **Inspect the pond bottom before sampling**
  Drain the pond until the bottom is visible. Note black, soft, foul-smelling areas or places with heavy sediment accumulation.

- **Collect soil samples across the whole pond**
  Collect surface soil from at least 4–5 points per rai, such as pond corners, the center, water inlet/outlet areas, and places where feed or sediment previously accumulated.

- **Measure pH at several points**
  Use the same instrument and method each time. Record pH at every point and calculate the pond average.

- **Treat strongly acidic areas locally**
  If pH differs greatly between areas, apply **Red Cap** according to the pH of each affected area.

- **Retest before every new crop**
  After pond preparation, measure soil pH again. Do not rely on results from the previous crop when deciding whether the pond is ready for stocking.

2.2 Red Cap Application Rate Table

Use the measured pond-bottom soil pH to select the **Red Cap** rate from the table. Calculate the amount according to pond area in rai.

Important: These are starting rates. If the pond bottom has thick black sludge, soft soil, a foul smell, suspected acid sulfate soil, or hydrogen sulfide odor, further inspection and corrective action are required. Do not simply increase **Red Cap** based on pH alone.

Measured pond-bottom soil pH	Red Cap rate	Action
6.0 to < 7.0	1 bottle/can/rai	Standard starting rate for mildly acidic soil
5.0 to < 6.0	2 bottles/cans/rai	Increase the rate and focus on areas with low pH
4.0 to < 5.0	3 bottles/cans/rai	Strongly acidic soil: restore and monitor the pond closely
3.0 to < 4.0	4 bottles/cans/rai	Severely acidic soil: allow time for recovery and confirm readiness before stocking
< 3.0	**DO NOT STOCK SHRIMP**	Stop the process. Check for acid sulfate soil and restore the affected area first.

Rate definition: "bottle/can" means the commercial **Red Cap** pack size used in this manual: 500 mL per bottle or 500 g per can. If pack size changes, calculate and use an equivalent amount of product.

How to Apply Red Cap in a Pond That Already Contains Water

Calculate the amount from the soil-pH table and pond area.
Mix 1 bottle/can of **Red Cap** with 20 L of clean water and stir well. If using several bottles/cans, increase the water proportionally.

Begin broadcasting while chain dragging. Apply gradually and evenly over the area being restored, and drag the chain across all areas that require treatment.

After treatment, monitor soil pH and water quality until the pond is ready before stocking shrimp.

Example: At 2 bottles/cans/rai, mix with 40 L of water and broadcast evenly over 1 rai.

Use this procedure only during pond preparation before shrimp are present. After stocking, do not chain-drag or disturb the pond bottom at any time during the crop.

2.3 Pond-Bottom Preparation Practices

- **Do not routinely disinfect the pond.**
  Aquamimicry® does not use chlorine, routine disinfectants, algaecides, or toxic chemicals as standard pond-preparation steps.
- **Control unwanted fish before the crop starts.**
  Use pond drying, fine filter bags/screens, filtered incoming water, and physical fish removal as appropriate. If tea seed cake is necessary, use it before natural-food development or shrimp stocking.
- **Do not use other toxic fish-killing chemicals.**
- **Do not add materials outside the protocol.**
  Do not add vermicompost, seaweed, fertilizer, molasses, high-protein grains, or green-water boosters.
- **Use calcium carbonate ($CaCO_3$) only when needed.**
  Apply only when soil or water tests show a need, to help stabilize pH. Do not apply without supporting measurements.
- **Plough or chain-drag to restore the pond bottom.**
  Do this only during pond preparation before shrimp are present. Plough a dry pond, or use chain dragging when water is present, to open accumulated sludge, support organic-matter decomposition, and recycle nutrients. Treat the required area according to bottom condition, then confirm acceptable water quality before stocking.
- **System requirement**
  After shrimp are stocked, never chain-drag or disturb the pond bottom during the crop.

3 Water Filling and Natural Food Development

3.1 Fill Water and Check Pond Readiness

- **Filter water before it enters the pond.**
  Use approximately 100–200 micron screening or a suitable multi-stage filtration system to reduce unwanted organisms and debris entering the pond.
- **Start at 80–100 cm water depth.**
  Before increasing depth, consider water temperature, dissolved oxygen, and the number and size of aquatic animals already in the pond.
- **Do not exchange water routinely.**
  Exchange or add water only when needed for animal safety or during an emergency, and record the reason each time.
- **Check that the water is suitable for postlarvae.**
  Measure pH, alkalinity, temperature, salinity, and mineral/ionic balance to ensure suitability for the shrimp to be stocked.
- **No routine aeration, but oxygen must be monitored.**
  Check dissolved oxygen regularly, especially before dawn. If water quality does not meet the criteria, do not stock shrimp.

3.2 Build Natural Food Before Stocking

Begin only after the pond water passes the readiness checks in **Section 3.1.** Use liquid fermented rice bran to establish the natural-food base for shrimp.

1. Select suitable rice bran
Use fresh, fine rice bran from a reliable mill. It should have a uniform fine texture, little husk, few broken rice grains, no musty or rancid smell, no mold, and no moisture clumps. Store it dry and protected from rain and humidity.

Simple glass test: Fill a clear glass with clean water and sprinkle a thin layer of rice bran on the surface. Observe for about 1 minute: how it wets, sinks, and how much coarse material or husk remains floating. Use this only to compare sources together with texture and smell; do not judge quality from floating or sinking alone.

2. Prepare liquid fermented rice bran
Ingredients per batch:

Ingredient	Amount
Fine rice bran	1 kg
Baking soda	200 g
Red Cap	10 g
Clean water	4 L

Mix baking soda with clean water in a clean container. Add **Red Cap** and fine rice bran, then stir until all bran is evenly wet. Cover to keep insects out but do not seal airtight. Keep in the shade and ferment for 24 hours.

After 24 hours, prepare the fermented liquid by either: (1) filtering through a fine filter bag and using the filtered liquid in the pond, with solids separated for use on plants; or (2) grinding the entire mixture very finely with a soybean-milk grinder before broadcasting evenly over the pond. Do not use any batch with mold or an abnormal rotten smell.

3. Start liquid fermented rice bran before stocking

Start about 5–7 days before the planned stocking date.
Starting rate: 3 kg dry rice bran/rai/day.
Ferment according to the formula for 24 hours, filter out the solids, and broadcast all filtered fermented liquid evenly over the pond.

Example: For a 2-rai pond, use 6 kg dry rice bran per day and double all other ingredients. Broadcast all filtered fermented liquid over the pond. Additional clean water may be added for dilution to improve distribution.

Adjust the amount according to water transparency:

Transparency	Adjustment
• < 15 cm	Reduce liquid fermented rice bran
• 15–30 cm	Maintain current amount
• > 30 cm	Gradually increase liquid fermented rice bran

Use transparency together with dissolved oxygen, smell, and overall water condition. If the water is abnormal or turbid because of suspended soil, identify the cause before adjusting the amount.

4. Check readiness every day

Observe water color, transparency, foam, odor, and pH changes, and measure dissolved oxygen especially before dawn. Use a plankton net for sampling small organisms and a microscope when needed. A change in water color or suspended particles alone does not confirm that enough natural food is present.

5. Stock shrimp only when the pond is ready

The 5–7 day period is a planning guide, not a deadline. Delay stocking if pre-dawn oxygen is low, water quality or plankton is unstable, there is a rotten smell, black anaerobic sludge is present, or natural food is still insufficient.

4 Preparation and Quality Control of Fermented Rice Bran

4.1 Fermented Rice Bran Forms by Day of Culture (DOC)

Culture Period (DOC)	Form Used	Preparation and Use
Before stocking through DOC 30	Liquid fermented rice bran only	Fine-filter through a filter bag or grind the mixture finely with a soybean-milk grinder before broadcasting evenly over the pond.
After DOC 30	Liquid + moist fermented rice bran	Use liquid fermented rice bran to support the natural food web, and place moist fermented rice bran in feeding trays raised above the pond bottom for shrimp and fish to graze.

4.2 Moist Fermented Rice Bran Formula (Start After DOC 30)

Ingredient	Amount per Batch	Function / Requirement
Fresh fine rice bran, free of husk	1 kg	Main ecosystem substrate; must be fresh, not rancid, and mold-free
Clean water	1 L	Use chlorine-free water. Moisten the bran so it is damp, not wet, with no standing water.
Baking soda (sodium bicarbonate)	100 g	Buffering aid in the fermentation process
Red Cap	1 mL/g	Microbial starter for fermented rice bran
Fermentation time	At least 24 hours	Ferment in a warm, shaded place and check every batch before use.

4.3 How to Prepare Moist Fermented Rice Bran

Clean and wash the fermentation container. Do not use containers contaminated with disinfectants, pesticides, fuel, or rancid materials.

Mix baking soda and **Red Cap** into part of the clean water at the specified rate. Gradually sprinkle the liquid over the fine rice bran and mix until evenly moist - damp, not wet, with no dry lumps. Cover to prevent contamination while allowing gas to escape safely. Never seal the fermentation container tightly enough to build pressure. Keep the batch in a warm, shaded area and mix again after about 12 hours.

Ferment for at least 24 hours, check quality, and begin using only after DOC 30. Divide the moist fermented rice bran among feeding trays raised above the pond bottom. Never dump it in piles or place trays directly on the bottom.

4.4 Batch Acceptance and Rejection Criteria

Check Item	Accept	Reject / Corrective Action
Odor	Mild fermented grain/rice-bran smell	Sharp sour, rotten, sewage, rancid, or chemical smell: reject the batch.
Appearance	Uniform brown, evenly moist, not wet	Darkening, mold, abnormal growth, rancid smell, or separated standing liquid: reject.
Acidity	Near neutral and consistent with an approved standard batch	Rapid increase in acidity or abnormal reading: do not guess a correction. Reject and investigate the cause.
Raw-material quality	Fresh fine rice bran; clean water and container	Moldy/rancid bran or contaminated water/container: dispose of safely.
Small postlarvae stage	Use fine particles or filtration as needed	If large particles settle on the bottom, filter or reduce particle load.

FORMULA CONTROL Use only the specified fermented-rice-bran formulas. Do not modify them by adding protein mixes, seaweed, fertilizer, animal manure, or unapproved grains. Any experimental formula must be separated into a controlled R&D project.

5 Using Fermented Rice Bran: Build the Natural Food Web and Adjust to Pond Response

The rates below are starting guidelines for moist fermented rice bran. Start low and adjust according to dissolved oxygen, pH changes, transparency, natural food, pond-bottom condition, shrimp condition, and biomass. The goal is to maintain natural-food balance in the system. Total use must not exceed 3 kg/rai.

5.1 Reference Starting Rates

Culture Period (DOC)	Reference Starting Rate	How to Use
5–7 days before stocking	Liquid fermented rice bran	Start low. Use only when DO and water conditions are stable, and confirm natural food before stocking.
Stocking through DOC 30	Liquid fermented rice bran only	Fine-filter or finely grind before use. Broadcast evenly and evaluate the response for at least 24 hours before increasing.
After DOC 30	Liquid + moist fermented rice bran	Continue liquid fermented rice bran according to pond conditions and place moist fermented rice bran in trays raised above the pond bottom.
Maximum limit	Total ≤ 3 kg/rai	This is a ceiling, not a target rate. Reduce or stop immediately when warning signs appear.

5.2 Application Method

- Broadcast evenly after sunrise when DO begins to recover. Avoid application at night.
- Moist Solid State Fermented rice bran:

  Start after DOC 30. Divide it among feeding trays raised above the pond bottom so shrimp and fish can graze and feeding behavior can be observed. Never dump it in piles, place trays directly on the bottom, or position them over areas with accumulated sludge.
- Liquid fermented rice bran supports natural-food production and continuity of the natural food web. Moist fermented rice bran provides material that shrimp and fish can graze on directly. Both forms must be adjusted to pond response and carrying capacity.
- Use Secchi-disk transparency as a trend indicator, generally around 15–30 cm. If the water becomes too turbid or dark, reduce fermented rice bran or pause until the system returns to balance. Never make decisions from transparency alone.
- After every increase, keep the new rate for at least 24 hours. Check pre-dawn DO and the next day's water response before increasing again.

5.3 Increase • Maintain • Reduce • Stop

Evidence from the Pond	Fermented Rice Bran Decision
Water becomes clearer, natural food decreases, shrimp remain active, and pre-dawn DO is safe.	Increase cautiously by about 10–20%, then reassess within 24–48 hours.
Water and natural-food trends are stable; shrimp gut condition and activity are acceptable.	Maintain the current rate.
Water is too turbid/dark, transparency is below the normal range, water becomes darker, foam/odor increases, or organic matter is accumulating.	Reduce fermented rice bran or pause temporarily to protect natural-food balance. Check DO, pH, nitrogen compounds, and pond-bottom condition.
Pre-dawn DO < 2.5 mg/L, mortality increases, the pond water crashes, or anaerobic black-bottom conditions develop.	Stop fermented rice bran immediately and begin corrective action.

NATURAL-FOOD PRODUCTION CAPACITY. If natural-food production cannot keep up with biomass, reduce density, partially harvest, or otherwise reduce biomass. Do not compensate with pellet feed.

6 Shrimp Stocking and Early-Crop Management

6.1 Selecting Postlarvae

- Use strong, active PL12–PL15, or the stage specified by the hatchery/farm biosecurity plan.
- Verify pathogen screening, hatchery history, and antibiotic-use records.
- Acclimate PL to farm salinity and ionic conditions. Low-salinity/rainwater systems require specific acclimation and ionic-balance checks.
- Reject weak, uneven, deformed, or poorly responsive PL.

6.2 Postlarvae Acclimation

- Measure temperature, salinity, and pH in transport and pond water.
- Adjust temperature first, then salinity and pH gradually within hatchery/farm limits.
- Maintain oxygen; avoid crowding, heat, and prolonged direct sunlight.
- After confirming pond readiness, stock at a safe time and record the actual number.

6.3 Early Culture Period: DOC 1–30

- Check postlarvae activity and gut condition.
- Use only fine-filtered or finely ground liquid fermented rice bran. Start low and adjust carefully; avoid heavy coarse-particle loads on small PL.
- Do not chain-drag through the pond or disturb accumulated sediment after stocking.
- Check pre-dawn DO, especially after cloud, rain, higher bran use, or plankton changes.

EARLY-CROP PRIORITY: From pre-stocking through DOC 30, use liquid fermented rice bran only. After DOC 30, add moist fermented rice bran in trays raised above the bottom. Adjust both forms to pond condition and stay within the stated maximum.

6.4 Using Solar Lights

- Use solar lights to attract insects and small organisms to the water surface, adding natural food and drawing shrimp into the lit area for easier night observation.
- Use no more than 2 light sets/rai, about 50 cm above the water. Spread the light; avoid concentrating it in one spot.
- Green light is recommended when available. Use rainproof outdoor fixtures.

7 Daily Monitoring and Control Limits

Trend data are more useful than a single reading. Measure at consistent locations and times, especially before dawn and in the late afternoon.

Indicator	Operating Guideline	Action Trigger
Dissolved oxygen	Pre-dawn ≥ 3.0 mg/L; preferably ≥ 5.0 mg/L	< 2.5 mg/L: stop fermented rice bran and investigate immediately
pH	Stable and suitable for the site; generally about 7.3–8.3	Morning-to-afternoon swing > 0.3 or a sudden trend change
Alkalinity	General guide: 80–150 mg/L as $CaCO_3$	Falling alkalinity with unstable pH: calculate a split-dose $CaCO_3$ adjustment
Transparency	Use the pond's stable trend; generally 15–30 cm	Rapid drop in transparency, rapid darkening, or rapid clearing
Temperature	Stable and suitable for the cultured animals	Sudden change, heat stress, or severe water-column stratification
NH_4-N / ammonia and nitrite	No harmful level or increasing trend	Continuous increase together with stress, low DO, or pH-related risk
Shrimp condition	Active, with a continuous, full gut and growth on target	Empty or interrupted gut, cramping, abnormal swimming, disease signs, or mortality
Pond bottom / odor	No expanding black anaerobic areas or rotten odor	Black bottom, gas, moving sediment, or strong odor

Minimum Monitoring Schedule

Time	Minimum Checks
Before dawn	DO, temperature, shrimp along pond edges, surface behavior, shrimp health, and odor
Morning	pH, water appearance, transparency trend, tray/gut observations, and fermented-rice-bran decision
Afternoon	DO, pH, temperature, plankton density, and signs of oxygen supersaturation or stress
Weekly	Alkalinity, nitrogen trend, estimated biomass, and pond-bottom check. Repeat after heavy rain, prolonged cloud cover, or sudden water changes.

Using Green Cap and $CaCO_3$ During the Crop

- **Green Cap:** Apply only on fullmoon days at 10 g/rai/application, following the **Aquamimicry®** protocol to support water-quality control and decomposition of shed shrimp shells after molting.
- **Example:**
  For a 2-rai pond, use 20 g **Green Cap** per application together with 20 kg $CaCO_3$ on fullmoon Days.
- **$CaCO_3$ use:** Apply together with **Green Cap** at the specified ratio to support alkalinity and pH stability. Dissolved calcium in the water is a mineral source shrimp use to build and harden the new shell.
- **$CaCO_3$ rate:** Use a ratio of 1 g **Green Cap** to 1 kg $CaCO_3$. Therefore, 10 g **Green Cap**/rai/application is used with 10 kg $CaCO_3$/rai/application. Check water quality before application and monitor the response afterward.
- **Monitoring:** Check DO and pH before use. Follow alkalinity and shell condition, and record the amount applied and pond response. If oxygen is low or shrimp are abnormal, correct the cause before application. Alkalinity and dissolved calcium are different measurements and should not be used interchangeably.

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7.1 Monitoring Natural Food and Suspended Particles with an Imhoff Cone

- This wording is used instead of "measuring the amount of natural food" because it is scientifically more accurate. An Imhoff cone does not measure all plankton or living food. It measures the volume of settleable particles and solids, which can be used with Secchi transparency and shrimp observations to follow system trends.

8 Corrective Action Table

Condition	Immediate Action	Restart / Follow-up
Low pre-dawn DO or shrimp surfacing	Stop fermented rice bran; check plankton, organic load, temperature, and mortality.	Restart at 25–50% only after pre-dawn DO is stable.
High afternoon DO / large pH swing	Suspect photosynthesis-related instability. Do not increase automatically; check morning DO and water trend.	Reduce organic inputs if nighttime oxygen risk rises. Stabilize before returning to the previous rate.
Water too clear and natural food declining	If DO, pH, and bottom are stable, increase cautiously by 10–20%.	Review in 24–48 h; reverse if transparency or oxygen worsens.
Dark water, foam, or abnormal odor	Pause fermented rice bran; check ammonia/nitrite, DO profile, and bottom.	Restart only after the cause is controlled and trends normalize.
Black bottom or gas	Do not chain-drag. Stop loading that area, aerate, and remove accumulated organic matter when possible.	Recheck bottom and water before restarting. Never guess pond-preparation pH rates during the crop.
Alkalinity falling / pH unstable	Confirm results; calculate a small split-dose $CaCO_3$ adjustment.	Retest after each dose. Do not use CaO or mixed minerals.
Disease signs or increasing mortality	Stop unnecessary inputs, sample, and seek aquatic-animal health diagnosis.	Follow biosecurity and veterinary /authority guidance. Never claim fermented rice bran treats disease.

Criteria for Restarting After a Pause

1. Identify and correct the cause first. Do not restart simply because a calendar date has arrived.
2. Confirm that pre-dawn DO is safe, pH variation is stable, and shrimp behavior is normal.
3. Restart fermented rice bran at 25–50% of the previous rate.
4. Hold that rate for 24–48 hours, monitor through the full daily cycle, and increase only if the pond remains stable.

SAFETY Although this system uses no pellet feed, emergency aeration and aquatic-animal health always take priority over energy-saving goals or avoiding water exchange.

9 Records, Checklists, and Manual Control Points

9.1 Records to Keep

Continuous recordkeeping is an important part of **Aquamimicry®** management because decisions should be based on system trends rather than a single measurement.

At minimum, record the following:

1. **1. Water-quality data**
   - Pre-dawn and afternoon DO
   - Morning and afternoon pH
   - Water temperature
   - Alkalinity
   - Secchi-disk transparency (cm)
   - NH_4-N/ammonia and nitrite as needed

2. **2. Natural-food monitoring**
   - Imhoff cone after 30 minutes settling (mL/L)
   - Water color and appearance
   - Type and amount of visible particles in the water
   - Presence of zooplankton or small organisms from spot sampling
   - Natural-food trend: Increasing / Stable / Decreasing
   - Use the Imhoff value as supporting information for trends in particles and settleable solids.
   - Do not use the Imhoff cone value alone to decide whether the pond has enough natural food.

3. **3. Shrimp response**
   - Activity and swimming behavior
   - Gut continuity and fullness
   - Molting and shell condition
   - Abnormal shrimp or mortality
   - Average weight and shrimp/kg from sampling
   - Estimated biomass and survival based on available data

4. **4. Inputs added to the pond**
   - Record the type, amount, date, time, and reason for every application of fermented rice bran, microbial products, $CaCO_3$, or other inputs, together with the pond response after use.

5. **5. Important pond events**
   - Record heavy rain, prolonged cloudy weather, sudden temperature changes, DO drops, water-color changes, abnormal odor, heavy molting, or any other event that may affect the system.

Reading the Pond the Aquamimicry® Way

Do not look at any single number in isolation. Consider the relationship among:

Secchi + Imhoff + DO + pH + Natural food + Shrimp gut + Growth

When these data are recorded continuously, they show whether natural food is increasing, stable, or decreasing; whether the system can support the shrimp biomass; and whether fermented rice bran should be increased, maintained, reduced, or stopped before problems become serious.

Key principle: Never judge a pond from one number alone. Read the trend and the response of the whole system together.

9.2 Checklist Before Approving Shrimp Stocking

- Soil-pH mapping completed and **Red Cap** applied according to the pH range.
- No untreated areas of severely acidic soil or black bottom remain.
- Incoming water has been filtered and predators controlled by physical methods.
- Water level and source-water condition have been recorded.
- Pre-dawn DO and daily pH variation are within acceptable limits.
- Natural food has been confirmed by observation, not by water color alone.
- Postlarvae quality, pathogen documents, and acclimation plan have been approved.

9.3 Control Points in the Current Manual

Control Point	Current Aquamimicry® Guideline
Role of fermented rice bran	Before stocking through DOC 30, use fine-filtered or finely ground liquid fermented rice bran. After DOC 30, use liquid fermented rice bran to support the natural food web plus moist fermented rice bran in trays raised above the bottom for shrimp and fish to graze.
Red Cap for pond preparation (rejuvenation)	Set the rate according to measured soil-pH range and affected areas.
Products added during the crop	**Green Cap** 10 g/rai/application together with $CaCO_3$ 10 kg / rai / application only on fullmoon days. Use other inputs according to pond condition and test results, and monitor the response.
Pond preparation	Prefer physical control, filtration, and ecosystem-based preparation over toxic chemicals.
Water management	Make decisions using DO, pH, transparency, natural food, pond-bottom condition, and shrimp observations together.
Carrying capacity	Review biomass together with natural-food production capacity. Stocking density alone is not the control point.
Pellet feed	Not used throughout the crop.
Fermented-rice-bran ceiling	Start low and adjust to the pond. Rates may increase as shrimp grow, but total use must not exceed 3 kg/rai. Reduce or pause when water becomes too turbid or dark.

10 Pre-Harvest Assessment and Crop Summary

- At minimum record: Day of Culture (DOC), average weight, shrimp/kg, estimated biomass, estimated survival, total production, kg/rai, total rice bran used during the crop, major costs, pre-harvest water quality, and observations from the crop.
- This section is essential because **Aquamimicry®** should not end with only "the shrimp grew." It should end with "system results that can be measured and traced back."

Limitations of Use

This manual is an operating guideline for the **Aquamimicry®** system and must be adapted to each farm's water, soil, climate, shrimp health, legal requirements, and infrastructure. It does not replace hatchery biosecurity, aquatic-animal health diagnosis, emergency oxygen management, or legal requirements.

Aquamimicry®

Feed the ecosystem and let nature raise your shrimp