NextSense

Aquaculture Intelligence

Real-Time Water Quality Monitoring, Smart Feeding, and Automated Aquaculture Management

Better Water Quality. Faster Response. More Efficient Production.

SHRIMP POND | FISH POND | HATCHERY | MARINE AQUACULTURE | RECIRCULATING AQUACULTURE SYSTEM



Key Challenges in Aquaculture Operations

01

Limited Water Quality Visibility

Kondisi air berubah sepanjang hari, tetapi pemeriksaan masih dilakukan secara periodik.



02

Late Response to Critical Conditions

Penurunan dissolved oxygen atau perubahan pH terlambat diketahui.



03

Inefficient Aeration and Feeding

Aerator dan feeder dioperasikan berdasarkan jadwal tetap, bukan kondisi aktual.



04

Fragmented Operational Data

Data kualitas air, pakan, peralatan, pertumbuhan, dan mortalitas tidak terintegrasi.



Small changes in water quality can quickly become major production risks.



NextSense Aquaculture Intelligence

Field Sensors



LoRaWAN / RS485 / Cellular



Gateway & Edge Controller



NextSense Cloud



Dashboard, Analytics & Alerts



Aerator, Pump, Valve & Feeder Control



KEY OUTCOMES

- Real-time water-quality visibility
- Faster operational response
- Centralized multi-pond monitoring
- Data-driven aeration and feeding
- Historical data for production evaluation
- Optional equipment automation

NextSense connects water conditions, equipment operation, and production data within one integrated platform.

Complete Aquaculture Operational Visibility



01
Water Quality

- Dissolved oxygen
- Temperature
- pH
- Salinity
- ORP
- Turbidity



02
Water Resources

- Pond water level
- Reservoir level
- Inlet and outlet flow
- Water pressure



03
Equipment

- Aerator
- Pump
- Feeder
- Blower
- Valve



04
Production

- Feed usage
- Biomass estimation
- Growth sampling
- Mortality
- Harvest record

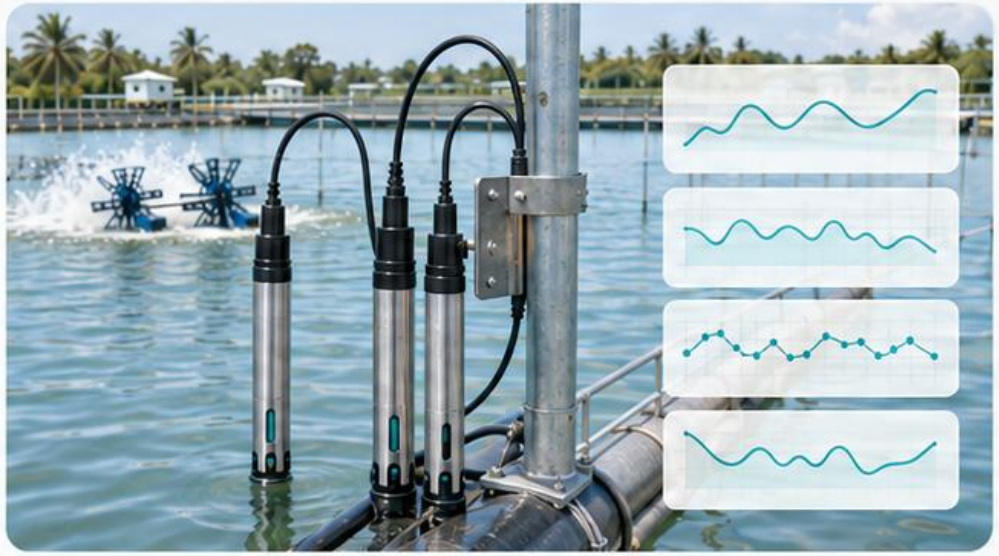


05
Environment

- Rainfall
- Air temperature
- Humidity
- Wind speed
- Solar radiation

Continuous Water Quality Monitoring

Parameter	Informasi operasional
Dissolved Oxygen	Ketersediaan oksigen bagi ikan atau udang
Water Temperature	Kondisi metabolisme dan aktivitas budidaya
pH	Stabilitas kimia air
Salinity	Kesesuaian kondisi air untuk udang atau ikan laut
ORP	Indikasi kondisi oksidasi dan kualitas lingkungan air
Turbidity	Perubahan kejernihan dan konsentrasi partikel
Water Level	Ketersediaan dan perubahan volume air



OPTIONAL ADVANCED PARAMETERS

- Ammonia
- Nitrite
- Nitrate
- Chlorophyll
- Conductivity
- Alkalinity melalui input hasil laboratorium

DO, temperature, pH, dan salinity menjadi parameter inti. Sensor ammonia dan nutrien ditempatkan sebagai opsi lanjutan setelah evaluasi kondisi air serta kebutuhan kalibrasi.

Monitor the Complete Water Flow



SENSOR & DATA

Reservoir water level	Inlet water flow	Outlet water flow
Pump status	Pipe pressure	Valve position
Pond water level	Filter differential pressure	Recirculation flow

OPERATIONAL VALUE

- Mengetahui ketersediaan air.
- Mendeteksi pompa hidup tetapi tidak ada aliran.
- Mendeteksi kebocoran atau penyumbatan.
- Membandingkan suplai air antar-kolam.
- Mencatat pergantian air secara otomatis.

Smart Aerator and Equipment Monitoring



INTEGRATED EQUIPMENT

- Paddle wheel aerator
- Blower
- Water pump
- Circulation pump
- Automatic feeder
- Inlet and outlet valve
- Generator
- Electrical panel

MONITORING PARAMETERS

- ON/OFF status
- Running hours
- Current consumption
- Voltage
- Power consumption
- Equipment fault
- Overload indication
- Communication status

EXAMPLES OF DETECTION

- Aerator diperintahkan ON, tetapi tidak ada arus.
- Motor mengalami peningkatan arus abnormal.
- Pompa berjalan, tetapi flow tidak terdeteksi.
- Peralatan terlalu sering start-stop.
- Peralatan membutuhkan preventive maintenance.

Dissolved Oxygen-Based Aeration Control

01
DO sensor membaca kondisi air



02
Sistem membandingkan dengan threshold

03
Alarm atau rekomendasi dibuat

04
Aerator dinyalakan bertahap



05
DO terus dimonitor



06
Aerator dihentikan setelah kondisi stabil



07
Aktivitas tercatat pada dashboard



OPERATING MODES

- Manual control
- Scheduled operation
- Sensor-based recommendation
- Semi-automatic control
- Fully automatic control

SAFETY CONTROL

- Manual override
- Minimum running time
- Start-stop delay
- Hysteresis threshold
- Maximum operating limit
- Communication-failure fallback

Automation dilakukan secara bertahap setelah data baseline dan pola operasional tervalidasi.

Improve Feeding Visibility and Control



MANAGED DATA

- Feeding schedule
- Feed type
- Feed quantity
- Feeder operating duration
- Feed stock
- Pond biomass
- Sampling weight
- Feeding response
- Daily feed consumption

ANALYSIS & INSIGHTS

- Perbandingan rencana dan aktual pemberian pakan.
- Estimasi konsumsi pakan per kolam.
- Tren pakan terhadap pertumbuhan.
- Indikasi overfeeding atau underfeeding.
- Estimasi feed inventory.
- Perhitungan FCR jika data biomass dan feed tersedia serta tervalidasi.

OPTIONAL INTEGRATION



Automatic feeder



Feeder load cell



Feed silo level



Camera-assisted feeding observation

Centralized Aquaculture Dashboard

Total ponds

Active sensors

Critical water-quality alerts

Aerators running

Pumps running

Daily feed usage

Average dissolved oxygen

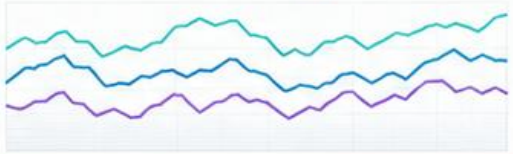
Equipment offline

Pond map

Water-quality status by pond



Live sensor readings





Equipment status



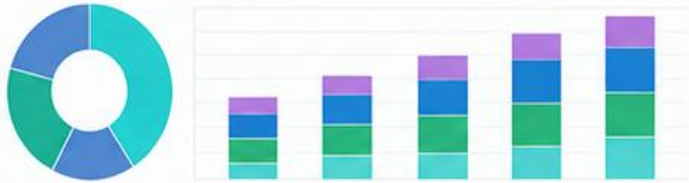
Alert priority



Historical trends



Production summary



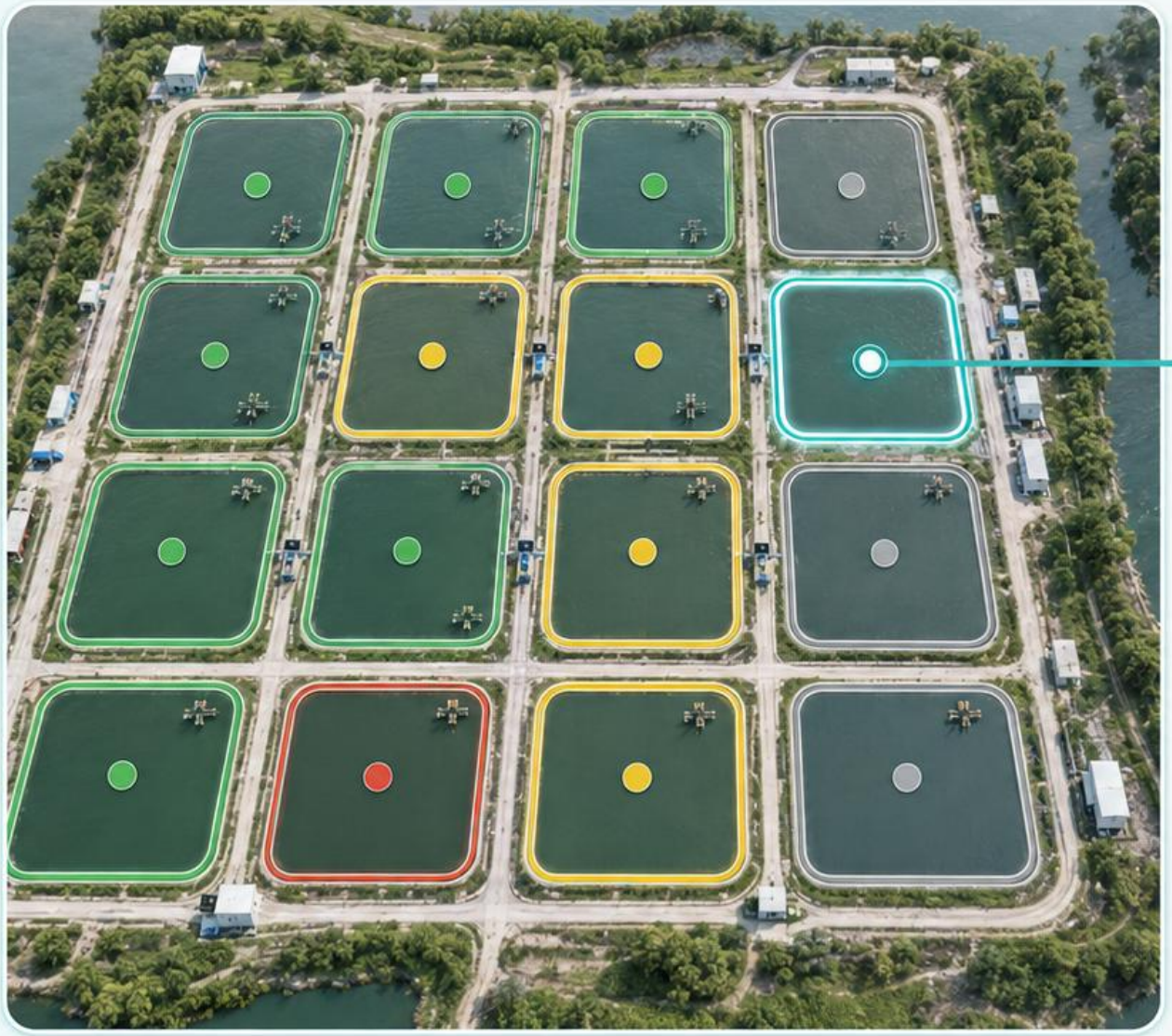
Green — Normal

Yellow — Attention

Red — Critical

Grey — Offline or no data

Monitor Every Pond from One Screen



- Pond name and location —
- Species and cultivation cycle —
- Stocking date —
- Pond area and depth —
- Estimated population —
- Average body weight —
- Biomass estimation —
- DO, temperature, pH, and salinity —
- Aerator and pump status —
- Daily feed usage —
- Latest sampling result —
- Active alerts —
- Sensor health —





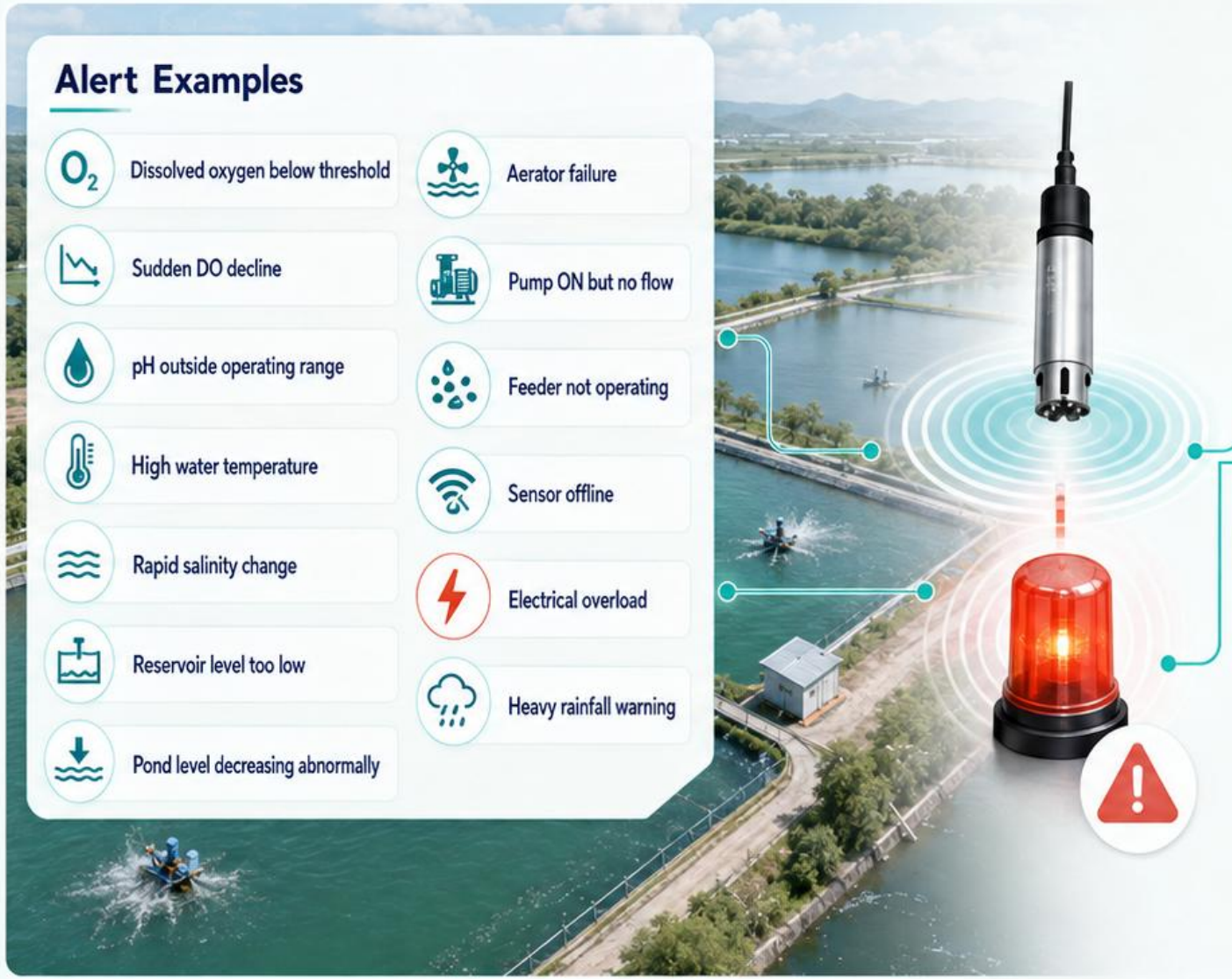




Early Warning and Operational Notifications

Alert Examples

- Dissolved oxygen below threshold
- Sudden DO decline
- pH outside operating range
- High water temperature
- Rapid salinity change
- Reservoir level too low
- Pond level decreasing abnormally
- Aerator failure
- Pump ON but no flow
- Feeder not operating
- Sensor offline
- Electrical overload
- Heavy rainfall warning



Notification Channels

- WhatsApp
- Telegram
- Email
- Mobile notification
- Dashboard
- Control-room display

Alert Information

Waktu kejadian	—
Lokasi atau kolam	—
Nilai aktual	—
Threshold	—
Tingkat prioritas	—
Recommended action	—
Status penyelesaian	—

From Data to Operational Intelligence

Analytics Capabilities

- Water-quality trend analysis
- Feed consumption trends
- Daily and nighttime DO profile
- Water-exchange analysis
- Correlation between temperature and DO
- Equipment anomaly detection
- Aerator runtime analysis
- Sensor-data completeness
- Energy consumption by pond
- Cross-pond performance comparison

AI-Assisted Recommendations

- DO pada Pond B menurun lebih cepat dibandingkan pola normal.
- Aktifkan satu tambahan aerator untuk mencegah kondisi kritis.
- Konsumsi energi meningkat tanpa peningkatan kestabilan DO.
- Periksa pompa inlet karena terdapat perintah ON tanpa aliran.
- Evaluasi jadwal feeding karena pakan meningkat sementara pertumbuhan melambat.

AI-assisted decision support

Rekomendasi membantu tim farm mengambil keputusan. Keputusan operasional tetap dapat dikonfirmasi oleh tim farm.



Business and Operational Benefits

Faster Response

Tim mengetahui perubahan kondisi air lebih cepat.

Reduced Production Risk

Kondisi kritis dapat dideteksi sebelum berkembang menjadi insiden besar.

Optimized Aerator Operation

Operasi aerator dapat disesuaikan dengan kebutuhan aktual.

Improved Feeding Visibility

Penggunaan pakan tercatat dan dapat dibandingkan dengan pertumbuhan.

Lower Manual Inspection Dependency

Pemeriksaan lapangan menjadi lebih terarah.

Better Management Decisions

Manajemen memiliki data historis untuk membandingkan kolam dan siklus produksi.

IMPORTANT NOTE

Benefit finansial akan dihitung setelah baseline konsumsi energi, pakan, mortalitas, dan hasil panen tersedia.



Recommended Aquaculture Intelligence Pilot

PILOT SCOPE

- 2–4 kolam representatif
- DO and temperature sensor
- pH sensor
- Salinity sensor untuk tambak udang atau air payau
- Pond and reservoir water-level monitoring
- Aerator status and electrical-current monitoring
- Pump status and flow monitoring
- LoRaWAN or cellular gateway
- NextSense dashboard
- WhatsApp alert
- Historical trends and reports
- User training and evaluation

OPTIONAL PILOT ADDITIONS

- Weather station
- Automatic feeder integration
- Energy meter
- ORP and turbidity
- Remote aerator control

PILOT KPI

- Data availability
- Sensor stability
- Alert delivery time
- Operator response time
- DO stability
- Aerator runtime visibility
- Energy baseline
- Feed recording completeness
- User adoption



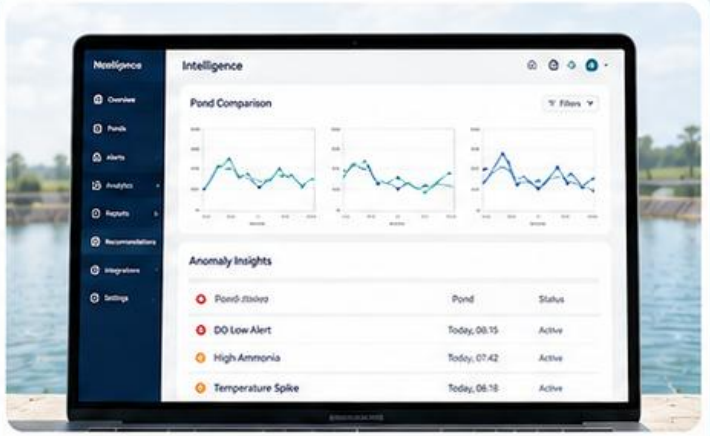
Flexible and Scalable Implementation



PHASE 1 — MONITORING

- Water-quality monitoring
- Equipment-status monitoring
- Dashboard
- Historical trends
- Basic notifications

Aquaculture Monitoring



PHASE 2 — INTELLIGENCE

- Advanced alerts
- Cross-pond comparison
- Anomaly detection
- Energy and feeding analytics
- Operational recommendations
- Production-report integration

Aquaculture Intelligence



PHASE 3 — AUTOMATION

- DO-based aerator control
- Pump and valve control
- Automatic feeder integration
- Water-exchange automation
- ERP or farm-management integration

Aquaculture Automation

Why NextSense



End-to-End Integration

Sensor, connectivity, gateway, dashboard, alerts, and automation.



Flexible Sensor Compatibility

Supports various sensors and industrial protocols.



Customizable Dashboard

Dashboard tailored to the customer's cultivation process.



Local Engineering and Support

Survey, installation, commissioning, training, and after-sales support.



Scalable Implementation

Start with a pilot and expand across the entire farm.

CALL TO ACTION

1. Identify the operational challenge.
2. Conduct a field and engineering survey.
3. Define the pilot scope.
4. Deploy and validate the solution.
5. Evaluate results and scale.

Schedule a Technical Discussion and Live Dashboard Demonstration

NextSense delivers an aquaculture solution designed around the customer's cultivation process—not only a collection of water-quality sensors.