

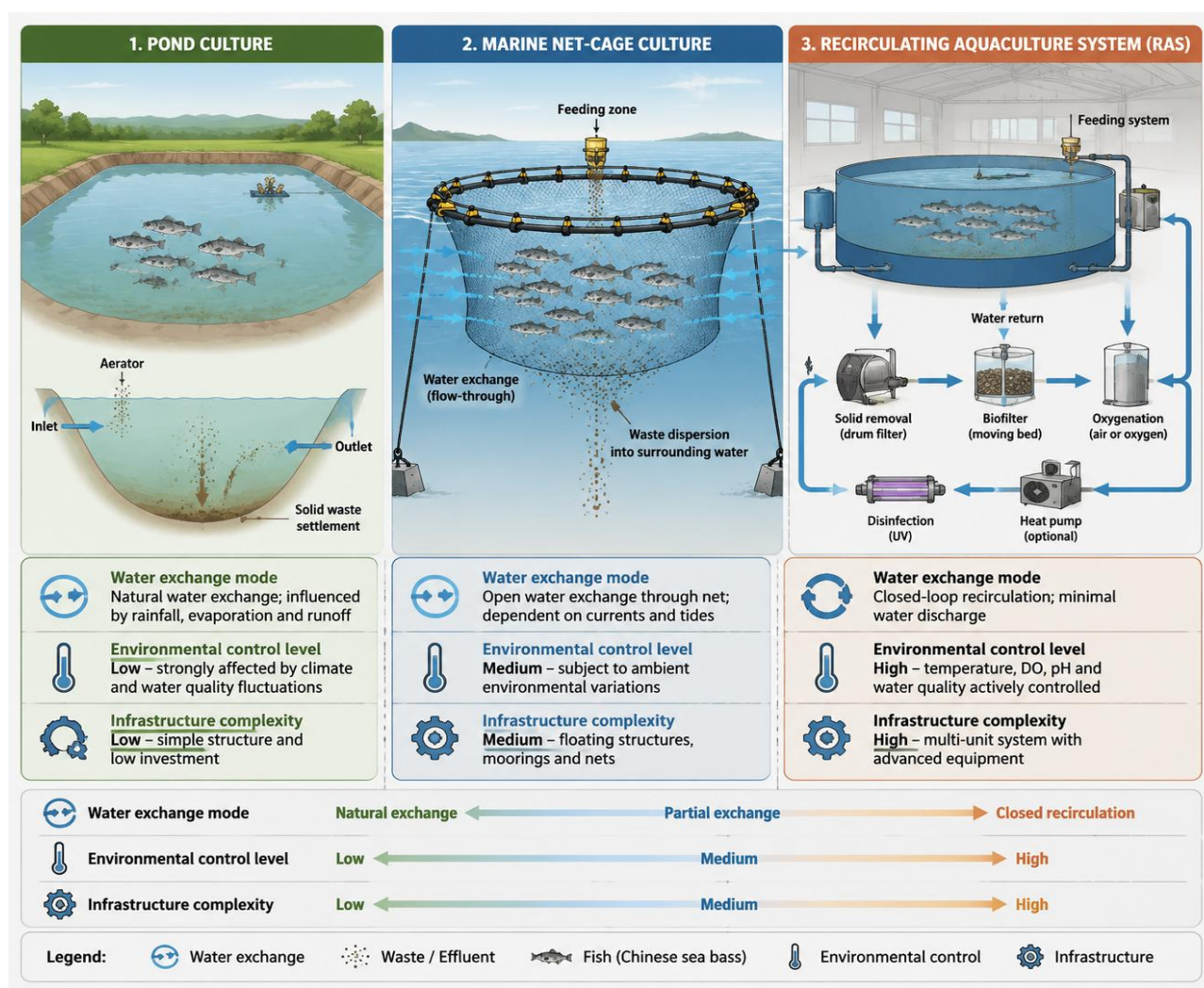


Figure 2 Comparative schematic of pond, cage, and recirculating aquaculture system (RAS) used for Chinese sea bass production, highlighting differences in water exchange mechanisms and environmental control levels

8.2 Integrated comparison of growth, survival, and FCR outcomes

Across systems, production outcomes track environmental control more closely than system label alone. In recirculating production, fish performance changed with water-quality gradients within the system, and final weight, survival rate, specific growth rate, and yield all responded to those differences. In cage production, larger rearing units produced better overall performance than the smallest cages, with higher growth rate, better FCR, and higher survival in European sea bass, which supports the view that well-scaled open-water systems can outperform undersized or stressed units. For Chinese sea bass, recent review evidence also notes that desalinated pond-reared fish can grow about one-third faster than fish reared in seawater, although this advantage is offset when high-density freshwater ponds degrade product quality (Huang et al., 2025).

A comparative case-study interpretation therefore suggests a three-way pattern. Pond systems can deliver strong growth under favorable local conditions and low capital cost, but their biological outcomes are more exposed to water-quality instability and disease-associated community shifts (Deng et al., 2021). Cage systems can support high production and good feed efficiency when cage size and site conditions are appropriate, but they remain vulnerable to environmental exposure and stress, including the typhoon risk explicitly noted for Chinese sea bass cage farming (Huang et al., 2025). RAS appears most consistent for stabilizing survival and feed use because it provides better year-round environmental conditions for water-quality-sensitive fish, and analogous bass evidence shows higher body weight in funnel-shaped recirculating systems than in traditional ponds (Xu et al., 2025).