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Sustainable Aquaculture for a Secure Future

Title: Efficiency of Mechanical Aeration

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Abstract: Paddlewheel design greatly impacts standard aeration efficiency. Although widely implemented, the long-arm paddlewheel aerators typically used in Asia do not reflect the most efficient designs. Mechanical aerators are used increasingly in aquaculture because aeration can greatly increase the amount of production possible per unit area or volume of water. These devices usually are powered by electricity, but in some locations, small diesel engines are the power source. During a recent visit to a shrimp-farming area in Thailand, the author saw ponds aerated at 24-36 hp/ha (18-27 kW/ha). These aerators often are operated about 20 hours daily over a 60- to 100-day crop period. At a farm with 24 hp/ha of aeration and a 100-day crop, about 36,000 kWhr of electricity would be used for aeration. Shrimp production for successful crops of 14- to 18-g shrimp was reported to be around 7,000-9,000 kg/ha. Electricity costs about U.S. \$0.10/kWhr in Thailand. Thus, aeration costs \$0.41 to \$0.53/kg of shrimp for electricity alone. Aeration costs for fish production usually are lower than for shrimp, but still represent a major production expense.

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