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RESEARCH REPORTS

SUSTAINABLE AQUACULTURE FOR A SECURE FUTURE

Title: Chemical and physical properties of shrimp pond bottom soils in Ecuador

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Abstract: Chemical and physical analyses were conducted on bottom soil samples from 74 brackish-water ponds representing 40 shrimp farms in Ecuador. Most ponds had soils with pH > 6 and total carbon concentrations < 2.5%. Carbon was mostly in organic form, for the average concentration of carbonate carbon was 0.06%. The C : N ratio was 8 to 10 in soils with < 2.5% carbon. In ponds built in former mangrove areas, soil carbon was > 2.5% and C : N ratios were 25 to 30. Ponds soils in former mangrove areas also tended to be high in total sulfur and low in pH. Lack of correlation between carbon and sulfur in mangrove soils suggested that most of the sulfur was inorganic and presumably in sulfides. Soils containing above 0.4% free carbonate (as equivalent CaCO₃) had pH values > 7. Although carbonate concentration was a major factor controlling soil pH, calcium hardness of pond waters was strongly influenced by salinity (and calcium) in the water supply. Total phosphorus concentrations averaged 898 mg/kg, and dilute acid extractable phosphorus usually accounted for 25–35% of the total. Concentrations of major cations and minor elements varied greatly in soils and exhibited ranges of up to three orders of magnitude. Contrary to opinions of shrimp producers, many pond soils in Ecuador are not acidic and few soils have a high organic matter content. Proper use of soil and water testing could greatly improve the efficiency of liming and other soil management practices.

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