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## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

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**Title:** Management of Bottom Soil condition and Pond Water and Effluent Quality

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**Abstract:** Good bottom soil condition and high-quality water are essential ingredients for successful pond aquaculture of tilapia and other species. Some problems with pond soil and water quality are related to site characteristics (Hajek and Boyd 1994). Soils may have undesirable properties such as acidity, high organic matter content, or excessive porosity. Water supplies may not be large enough or the source water naturally may be of poor quality or polluted with domestic, industrial, or agricultural wastes. Even if a good site is available, large inputs of nutrients and organic matter in feeds to enhance aquacultural production can lead to excessive phytoplankton, low dissolved oxygen concentration, high ammonia concentration, poor bottom soil condition, and other problems (Boyd and Tucker 1998).

Many soil and water quality problems can be avoided by attention to site selection, pond design, and pond construction and by the use of moderate stocking and feeding rates. Nevertheless, sites are seldom perfect, and often, site limitations are not adequately mitigated during design and construction. Pond managers also may strive for unrealistically high production. Thus, soil and water quality problems are not uncommon in pond culture of tilapia. When soil and water quality in ponds are impaired, fish suffer stress. This makes them more susceptible to disease, and they do not consume feed efficiently or grow as well as they should.

Effluents from ponds with poor-quality water may have low dissolved oxygen concentration and high concentrations of nutrients, organic matter, and suspended solids. Release of such effluents into natural waters can cause pollution that harms aquatic communities and lessens the quality of water for other beneficial uses.

The purpose of this chapter is to discuss management of soil and water in ponds and to present suggestions for reducing the volume and improving the quality of pond effluent.

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This abstract was excerpted from the original paper which was in, C. Lim and C.D. Webster (Editors). *Tilapia: Biology, Culture, and Nutrition*. Food Products Press, Binghamton, pp. 449–448.

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