United States: Data Analysis and Synthesis

The Data Analysis and Synthesis Team (DAST) at the University of California, Davis (UCD) continued refining several pond models reported on in previous annual reports and publications. For example, a model designed to simulate temperature and dissolved oxygen concentrations in stratified ponds was modified by using stochastically generated weather parameters as inputs. The model can be executed for an 85-day simulation, and work is underway to increase the number of time-steps the model can process. Results indicate that temperature and dissolved oxygen predictions from the model match well with measured values; however, fish growth and chlorophyll-*a* concentrations are consistently overestimated.

Another study at UCD involves developing a preliminary model to investigate the effects of integrated aquaculture and agriculture on nutrient cycling and whole system productivity. The model will concurrently evaluate the impacts of various management actions for enhancement of pond sediment quality. The model consists of three modules: fishpond, crop, and terrestrial soil nitrogen. Inputs of nitrogen into the pond include feed and / or fertilizer and water. Outputs from the pond include uptake by fish, effluent water, and removal of pond sediments. The three modules are linked through the use of sediment from ponds as crop fertilizer and / or the use of wastes from crops as feed / fertilizer to aquaculture ponds. Preliminary results demonstrate that feed quality and digestibility of feed need to be considered to improve overall estimation of organic matter and nitrogen production in the fish pond, and to improve estimation of fish growth.

The Data Analysis and Synthesis Team (DAST) at Oregon State University further refined the decision support system *POND*. In a study to demonstrate that *POND* can be readily adapted to different species and / or culture conditions, OSU DAST researchers parameterized the fish bioenergetics for *Ictalurus punctatus* (channel catfish), *Colossoma macropomum* (tambaquí), and *Piaractus mitrei* (pacu). Simultaneous validation of the water temperature model for CRSP and non-CRSP locations was also completed in this study. A second study was implemented to examine the use of genetic algorithms for estimating suitable bioenergetic parameters for different pond species. The reports, *Decison Support for Pond Aquaculture: Simulation Models and Applications* and *Decision Support for Pond Aquaculture: Parameter Estimation for Simulation Models*, respectively, are contained in the Global Studies and Activities section of this pulication.