

NOTICE OF PUBLICATION

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RESEARCH REPORTS

Sustainable Aquaculture for a Secure future

Title: Spreadsheet Tools for Developing Surface Water Supplies for Freshwater Fish Production in Developing Countries

Author(s): E. William Tollner and Brahm Verma
Department of Biological and Agricultural Engineering
University of Georgia
Driftmier Engineering Center
Athens, Georgia 30602-4435, USA

Dan Meyer, Suyapa Triminio de Meyer, and George Pilz
Escuela Agrícola Panamericana
Zamorano P.O. Box 93
Tegucigalpa FM, Honduras

Joseph Molnar
Department of Agricultural Economics and Rural Sociology
Auburn University
301 Comer Hall
Auburn, Alabama 36849-5406

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Abstract: Variable rainfall distribution and terrain make surface water harvesting and storage a challenge in many developing countries. The overall goal of this study is to collect and develop information required to equip extension, non-governmental organization (NGO) agents, contractors and engineers for surface water development and aquaculture enterprise development in Honduras and Latin America. A pond water balance for the levee production pond enabling determination of water flow required to balance seepage, evaporation and direct rainfall was developed in English and Spanish on the Microsoft Excel® platform. The pump-in flow rate can also be determined for reaching a volume change per month target. A second model was formulated for evaluating surface water capture by watershed and/or hillside ponds for meeting the levee pond demand. Using hillside ponds that fill by impounding a fraction of total runoff (e.g., diverting water upstream) from streams appears to have promise for meeting water needs. A systematic approach using both models to reach a sustainable water supply target emerged from this work. Both the levee pond model and the water harvest model are based on

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balancing inputs and outputs given monthly rainfall patterns. A simple approach to mechanical spillways preliminary design was developed. The models are adaptable to any location if key input data is available, particularly average monthly rainfall and storm frequency–duration data. The models do not address water quality issues. The software is intended for watershed sizes not larger than 500ha and storage ponds of less than 5ha surface area—4m depth due to relationship limitations and safety concerns. Coupling with other cooperative development concerns such as marketing association provides a platform for helping groups of people in a watershed to realize further the potential of enlightened self-interest in developing common solutions to water problems.

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