CONTENTS

I. PRODUCTION OPTIMIZATION

Pond Dynamics Research
Pond Soil Characteristics and Dynamics of Soil Organic Matter and Nutrients (9PDR2) ........................................................... 1

Feeds and Fertilizers Research
Growth Performance and Economic Benefits of Oreochromis niloticus/Clarias gariepinus Polyculture Fed on Three Supplementary Feeds in Fertilized Tropical Ponds (9FFR2) ..................................................................................... 11
Fish Yields and Economic Benefits of Tilapia/Clarias Polyculture in Fertilized Ponds Receiving Commercial Feeds or Pelleted Agricultural By-Products (9FFR2A) .................................................................................................................................................................... 17
Reduction of Feed Rations below Satiation Levels in Tilapia Pond Production (9FFR3) .......................................................... 21
Educational Development Activities in Support of Tilapia Aquaculture in the Philippines (9FFR5) ..................................... 25
Development of Training Modules for Aquaculture Extension Workers and University Students in Kenya (9FFR6) ........ 27

Reproduction Control Research
Masculinization of Tilapia by Immersion in Trenbolone Acetate: Detection of Trenbolone Acetate in Water after Treatment (9RCR5C) ........................................................................................................................................................... 31
Masculinization of Nile Tilapia Fry by Immersion in Trenbolone Acetate: Reuse of Hormone Solution and Effects of Temperature (9RCR5D) .............................................................................................................................................................. 35
Monosex Tilapia Production through Androgenesis: Selection of Individuals for Sex Inheritance Characteristics for Use in Monosex Production (9RCR6A) ..................................................................................................................................................... 39
Monosex Tilapia Production through Androgenesis (9RCR7) ....................................................................................................... 45
The Application of Ultrasound to Produce All-Male Tilapia Using Immersion Protocol (9RCR8) ............................................ 53

New Aquaculture Systems/New Species Research
Lotus-Fish Culture in Ponds: Recycling of Pond Mud Nutrients (9NS1) ........................................................................................ 59
Culture of Mixed-Sex Nile Tilapia with Predatory Snakehead (9NS2) ....................................................................................... 67
Development of Sustainable Pond Aquaculture Practices for Colossoma macropomum and Piaractus brachyomus in the Peruvian Amazon (9NS3 and 6) .............................................................. 75
Spawning and Grow-Out of Colossoma macropomum and/or Piaractus brachyomus (9NS3A) ................................................. 85
Semi-Intensive Culture of Red Tilapia in Brackishwater Ponds (9NS4) ............................................................... 89
Supplemental Feeding for Semi-Intensive Culture of Red Tilapia in Brackishwater Ponds (9NS5) ........................................ 97

II. ENVIRONMENTAL EFFECTS

Effluents and Pollution Research
Fate of Methyltestosterone in the Pond Environment: Use of MT in Earthen Ponds with No Record of Hormone Usage (9ER2D) ............................................................................................................................................... 103
Effects of Water Recycling on Water Quality and Bottom Soils in Shrimp Ponds (9ER4) ................................................................................................. 107

Appropriate Technology Research
On-Farm Trials: Evaluation of Alternative Aquaculture Technologies by Local Farmers in Kenya (9ATR1) ...................... 121
Linkages of Aquaculture within Watersheds and Concurrent Design of Hillside Ponds (9ATR2) ........................................ 131
III. SOCIAL AND ECONOMIC ASPECTS

Marketing and Economic Analysis Research

- Development of Central American Markets for Tilapia Produced in the Region (9MEAR3) ............................................................. 135
- Economic and Social Returns to Technology and Investment in Thailand (9MEAR4) ............................................................................. 141
- Rapid Economic Evaluation Tools (9MEAR5) ......................................................... 149

Adoption/Diffusion Research

- Aquaculture Training for Kenyan Fisheries Officers and University Students (9ADR3) ............................................................ 155
- Establishment of Companion Sites in the Africa Region (9ADR4) ............................................................... 159
- Effect of Stocking Size and Nutrient Inputs on Productivity of Oreochromis shiranus in Ponds (9ADR4A) .............................. 161
- Studies on Potential Use of Salinity to Increase Growth of Tilapia in Aquaculture in Malawi (9ADR4B) .............................. 167
- Regional Outreach in Africa (9ADR5) ......................................................................................... 175
- Production of Improved Extension Materials (9ADR6B) ................................................................................................................ 177
- Decision Support for Policy Development: Planning Conferences for Collaborating Researchers, Public Agencies, and Nongovernmental Organizations Working in Aquaculture (9ADR7) .................................................... 179
- Production Strategies Characterizing Small- and Medium-Scale Tilapia Farms (9ADR8) .......................................................... 183
- Technical Assistance for Fingerling Production Serving Small- and Medium-Scale Tilapia Producers & Training and Technical Assistance for Honduras Institutions Working with Small- and Medium-Scale Tilapia Producers (9ADR9 and 10) .................................................. 189
- A Manual of Fertilization and Supplemental Feeding Strategies for Small-Scale Nile Tilapia Culture in Ponds (9ADR11) ................................................................................................................................. 193

Regional Analysis: Human-Environment Interactions Research

- Establishment of New Collaboration in Bangladesh (9RA1) ............................................................................................................. 195

Decision Support Systems Research

- Decision Support Systems for Fish Population Management and Scheduling in Commercial Pond Aquaculture Operations (9DSSR2) ................................................................................................................................. 199
- Enhancing the POND Decision Support System for Economics, Education, and Extension (9DSSR3) .................. 203

PD/A CRSP annual technical reports are the compiled reports of annual technical progress by PD/A CRSP researchers in addressing the objectives for which the various experiments, studies, and activities were funded. These technical reports address program accomplishments during the period 1 August 2000 to 31 July 2001.

The corresponding work plans for reports included appear in the CRSP's Ninth Work Plan and addenda. Work plans are available at the CRSP website (<pdacrsp.orst.edu>), by email request (claird@ucs.orst.edu), or by regular mail request by writing to Pond Dynamics/Aquaculture Collaborative Research Support Program, 418 Snell Hall, Oregon State University, Corvallis, OR 97331-1643, USA.

With a few exceptions, reports in this publication have been edited for clarity and consistency by the PD/A CRSP Information Management and Networking Component. Reports received after the submission deadline have not been edited and appear with the words “Printed as Submitted” on the first page.

The contents of this document do not necessarily represent an official position or policy of the United States Agency for International Development (USAID) or the PD/A CRSP. Likewise, mention of trade names or commercial products in this report does not constitute endorsement or recommendation for use on the part of USAID or the PD/A CRSP. The accuracy, reliability, and originality of work presented in this report are the responsibility of the individual authors.

Program activities are funded by USAID under Grant No. LAG-G-00-96-90015-00 and by participating US and host country institutions.