

CONSTRAINTS TO AQUACULTURAL DEVELOPMENT

(from the PD/A CRSP Continuation Plan 1996)

Constraints to the orderly development of sustainable aquaculture as they have been identified in the literature (see Appendix B) have been summarized in Table 2. Among the many constraints facing aquaculture, there is no one constraint that can be singled out for its global importance. Rather, most constraints depend on scale, temporality, system, stage of development, and context. For example, in southern Africa the optimization of fish productivity through pond fertilization and natural feeds has been identified by FAO as one of the top research priorities, whereas in Latin America, a key priority is pathology and disease prevention. In a broad sense, certain general priorities appear often in the literature. Among these are:

- building National Agricultural Research Systems by conducting collaborative research,
- carrying out social sciences research especially in cases where aquaculture is being extended to new areas, and
- recognizing the importance of a systems approach, which in this context refers to the interaction of the sociosphere and the technosphere.

Major factors that limit the development of more sustainable aquacultural systems include inefficient and inconsistent aquacultural productivity, a poor understanding of socioeconomic factors, negative environmental effects resulting from aquacultural operations, insufficient human resource development, poor or outdated information management, and limited networking capacities.

- Constraints to aquacultural productivity include inefficient utilization of pond nutrient inputs; limited knowledge of pond dynamics; lack of species-specific information; limited knowledge of reproductive physiology and breeding of cultured species; limited knowledge of pathology and epidemiology of fish diseases; and fingerling production strategies that fail to incorporate improved hatchery technology.
- Constraints related to the environmental effects of aquaculture include lack of assessment and monitoring of the effects of material transport and poor understanding of effluent management and pollution control.
- Constraints within the area of socioeconomics include inadequate attention to economic analysis of production; poor understanding of investment, markets, and risk reduction; lack of attention to efficient resource utilization; barriers to assimilation of technological innovations through extension and training; gender inequities as they relate to technological change; and household food insecurity.
- Constraints in the area of human capacity include untrained or poorly trained personnel; gender inequities influencing access to education; and insufficient outreach/extension capacity.

- Constraints to information management include limited access to technical information; incomplete baseline data on aquacultural production, environment, and socioeconomics; and poor feedback mechanisms showing the linkages between program management, research, and impact on stakeholders.
- Constraints to networking include a deficiency of national/regional technical information networks and limited ability for National Agricultural Research System (NARS) members to fully participate in the international research community.
- Constraints to target economies include lack of policy formulation and strategic planning at the national level; problems of regulation and enforcement; and a weak institutional base.

CONTINUATION PLAN 1996–2001 PROGRAM FRAMEWORK

The *Continuation Plan 1996–2001* program framework, and the foundation for the current portfolio of PD/A CRSP research projects, consists of two building blocks: research in sustainable production systems and research support activities.

The sustainable production systems research framework is organized into the areas of production optimization, environmental effects, and social and economic aspects. Each area is further subdivided into specific research themes, which are the thematic areas of research needed to remove constraints to the development of more sustainable aquaculture.

Research Area: Production Optimization
 Research Themes: Pond Dynamics
 Feeds and Fertilizers
 Reproduction Control
 Aquaculture Systems Modeling
 New Aquaculture Systems/New Species

Research Area: Environmental Effects
 Research Themes: Effluents and Pollution
 Appropriate Technology
 Responsible Science Policy
 Geographic Information Systems: Planning, Policy, and Global
 Data Analysis

Research Area: Social and Economic Aspects
 Research Themes: Marketing and Economic Analysis
 Adoption/Diffusion
 Food Security
 Regional Analysis: Human-Environment Interactions
 Decision Support Systems
 Product Diversification