

Environmental Issues of Tilapia Aquaculture: A Governmental Perspective

Tilapia Dialogue – First Annual Meeting

World Wildlife Fund - WWF , Washington, DC

August 27-28, 2005

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- ***Social x Environmental Responsibility***
- ***Production Systems and Social
Insertion***
- ***Best Management Practices– BMPs***
- ***A Governmental Perspective: Research
Priorities***

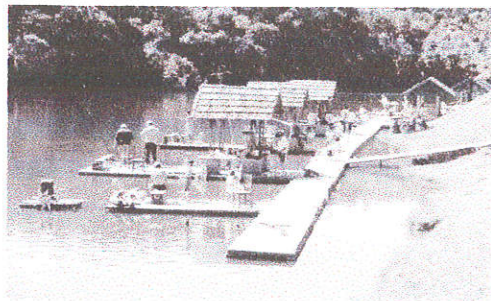
Embrapa's Social Responsibility

*To stimulate ethic concerns aiming at the
construction of a responsible attitude in face of
communities' social needs with the objective
of consolidating Embrapa's image through:*

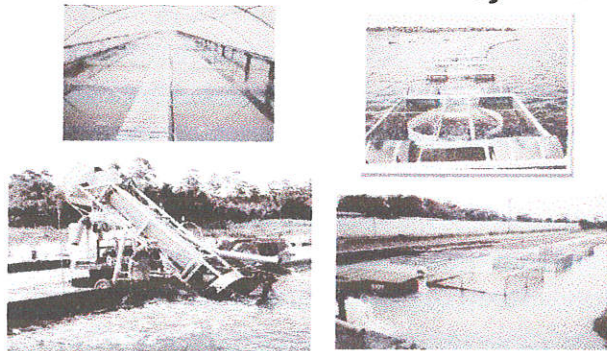
- ***Capacitating socially disfavored groups,***
- ***Providing income opportunities,***
- ***Enabling voluntary participation on social
actions and environmental education***

Tilapia Production Systems and Social Insertion

Producers Registration and Environmental Licensing




Strain Selection X Production Systems




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Water and Soil Management Technologies




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Characterization and Monitoring of Productive Unities

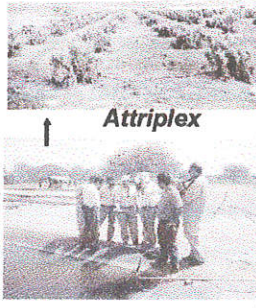


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Desalting x Environmental Conservation



Source: Everaldo Rocha Porto – Embrapa Semi-Árido



Attriplex

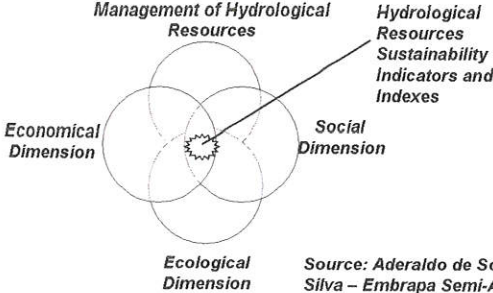
Fish Culture

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Examples of Environmental Assessment Systems and Community Participation

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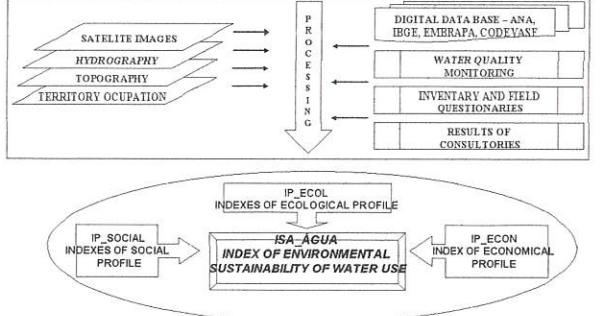
ISA-ÁGUA

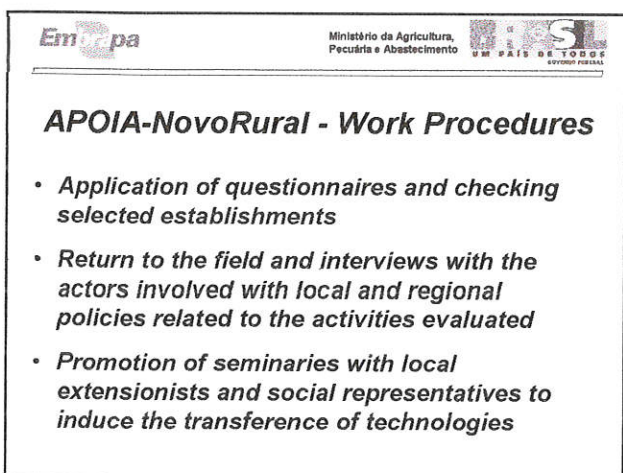
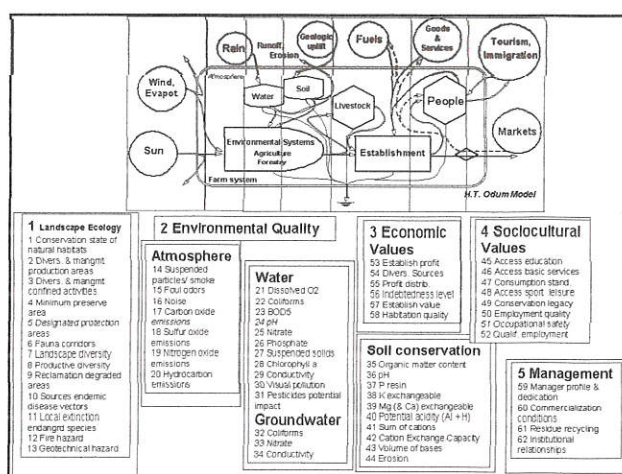
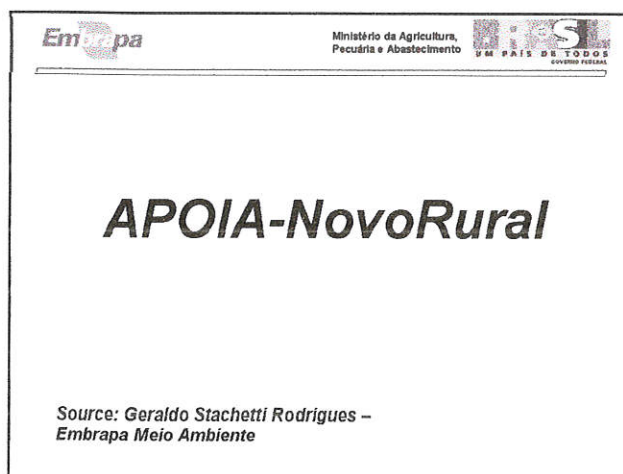
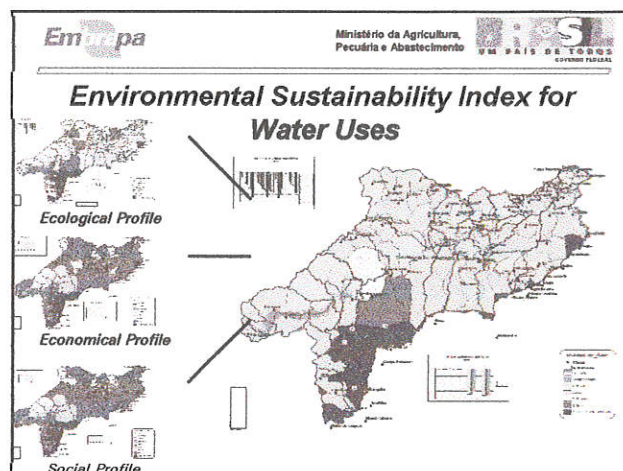
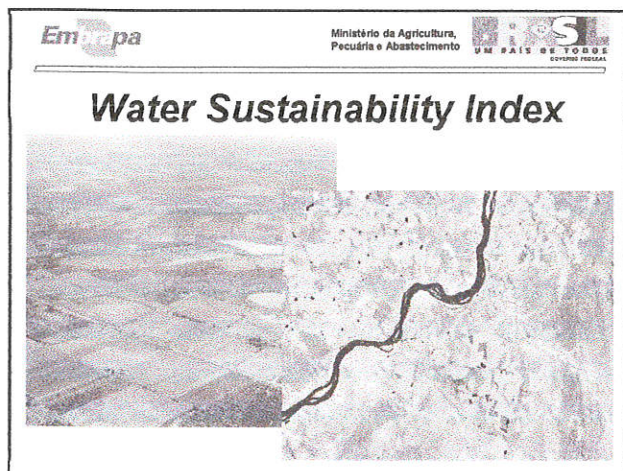


Source: Aderaldo de Souza Silva – Embrapa Semi-Árido

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Profile Construction (ISA_ÁGUA)

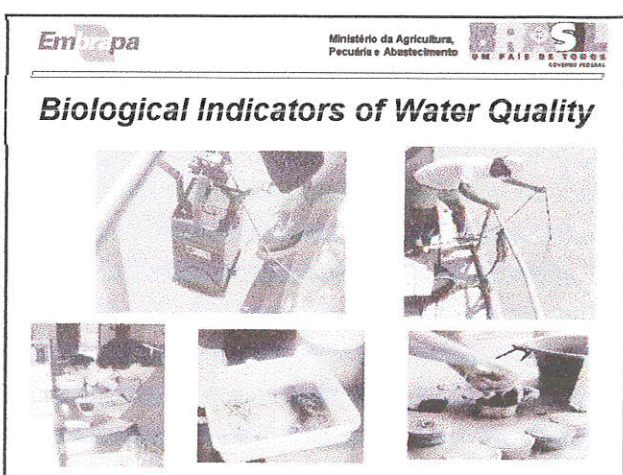
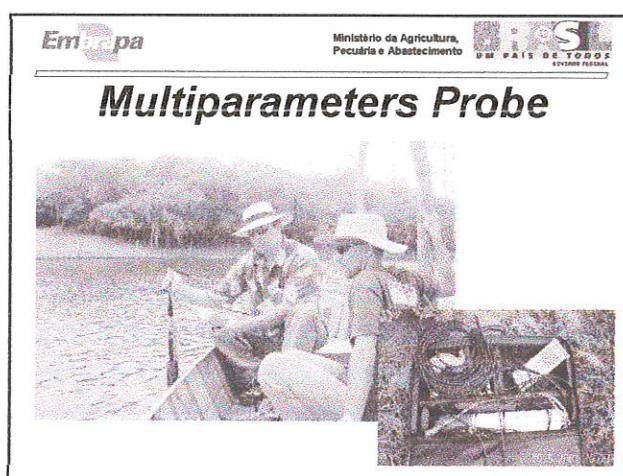
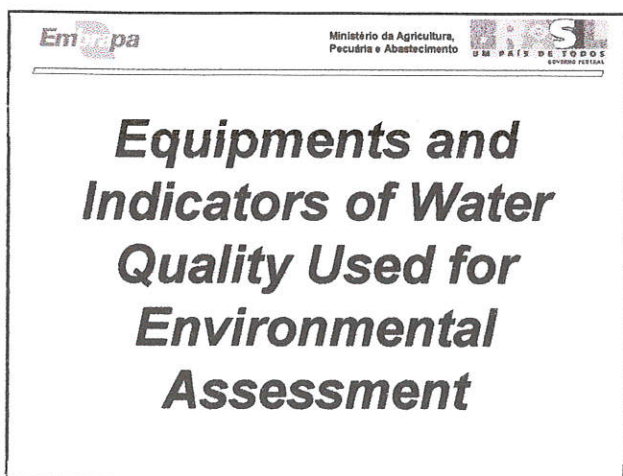
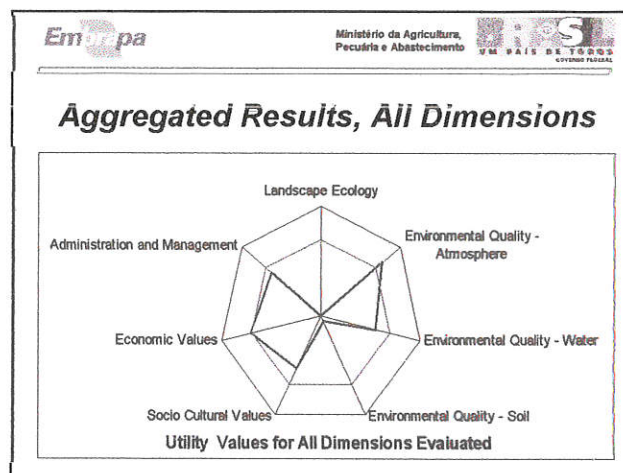
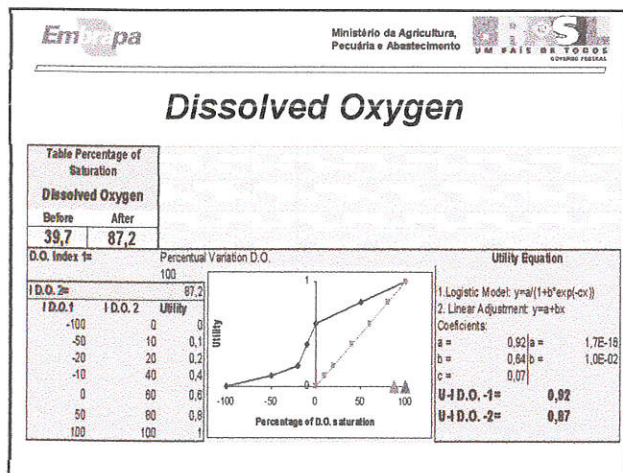




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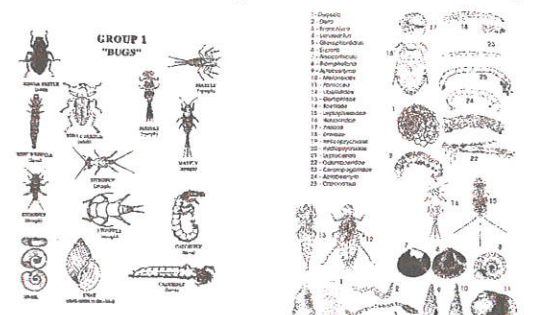
Environmental Quality

Water Quality	Variable Units
Dissolved O ₂	• Percent O ₂ saturation
Coliforms	• Number of colonies /100 ml
BOD ₅	• Milligram/liter de O ₂
pH	• pH
Nitrate	• Milligram NO ₃ /liter
Phosphate	• Milligram P ₂ O ₅ /liter
Suspended solids	• Milligram suspended solids/liter
Chlorophyll a	• Microgram chlorophyll/liter
Conductivity	• Micro ohm/cm
Visual pollution	• Percent of time with occurrence
Pesticides potential impact	• Percent of treated area



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Water Quality and Biodiversity



GROUP 1 "BUGS"

1. Daphnia
2. Daphnia
3. Daphnia
4. Daphnia
5. Daphnia
6. Daphnia
7. Daphnia
8. Daphnia
9. Daphnia
10. Daphnia
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21. Daphnia
22. Daphnia
23. Daphnia

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Best Management Practices (BMPs)

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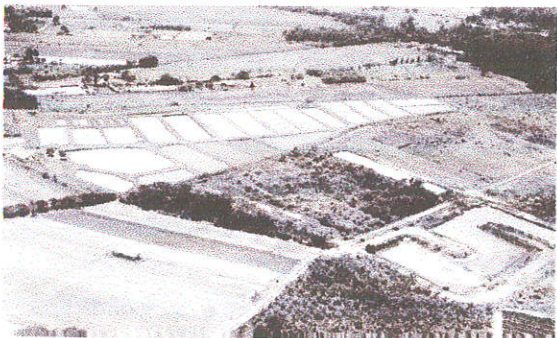
BMPs consist in a selection of effective and objective actions, which are specific to local conditions and have the ultimate purpose of enhancing and assuring the **COMPETITIVENESS and the **SUSTAINABILITY** of a particular production system**

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Examples of BMPs

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BMP - Site Selection




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BMP - Preparation and Maintenance of Ponds




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BMP – Run-off Reduction




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BMP - Indicators of Sustainability



Social / Economical

Environmental Quality



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CONCLUSIONS & RECOMENDATIONS

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*There are several technologies to enhance people's quality of life. What is necessary to do is to find out how to put them in practice. Therefore, such technologies should invariably consider **INSTITUTIONAL** and **EDUCATIONAL** approaches, and mostly with **COMMUNITIES' PARTICIPATION** and **PEOPLE'S EMPOWERMENT***

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Strategies for Aquaculture Sustainable Development

*Adoption of a mutual commitment among the different actors that constitute the aquaculture productive chain, and also with the representatives of environmental institutions, aiming at the achievement of an equilibrium between aquaculture production and environmental protection based on the **BMPs***

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- Adopt BMPs according to local conditions, specific situations and also to the different production systems
- Consider obligatory BMPs the practices that can be adopted in large scale to promote the responsible management of the aquacultural systems
- Validate the adoption of obligatory BMPs based on standards with the objective of confirming that these BMPs are contributing to reduce negative environmental impacts



A Governmental Perspective: Research Priorities

Nutrition and Feeding

- *Nutritional requirements of regional species, feeding behavior studies, feed formulation with alternative regional products, nutritional management of fingerlings, juveniles, adults and termination*

Genetic Improvement

- *Germoplasm active stock of species with socio economical importance, precocities studies, tolerance to low temperatures and diseases, alternative methods to produce monosex stocks, and strain selection for different aquacultural production systems*

Health and Disease

- *Inflow and pond water quality and effluents studies, development of technologies for diagnosis and prophylactic treatments of parasites and diseases, effects of nutritional composition and stress over organic defense mechanisms*

Production Systems

- *Management techniques to improve the relationship between costs and benefits of fish culture in ponds and cages, environmental assessment and monitoring of different production systems, economical and ecological zoning of the areas used for intensive fish production*

Reproduction and Hatchery

- *Physiology, reproductive cycle of regional species, new techniques for larval culture, formation and maintenance of broodstock and development and improvement of reproductive and behavioral techniques for fish culture*

Environmental Issues

- *Definition of policies for environmental management and area zoning viewing its use for fish culture*
- *Water grant, as set in the Hydric Resources National Policy*

Environmental Issues

- *Policies and procedures for the introduction, re-introduction and transfer of aquatic species*
- *Refinement of policies for the utilization of government public waters for fish culture in cages*

Other Areas

- *Capacitating of people involve with fish production, and transference of technology for fish processing, sanity and certification, competitively and actions focused to marketing and market studies, post-harvest and development of alternative products from different fish species*

Tilapia Aquaculture Dialogue

Purpose: 2-day meeting bringing together individuals with different perspectives tilapia aquaculture to discuss the environmental impacts of the industry and ways to reduce them
Attendees: About 30 people divided equally between scientists and key individuals
Date: August 27-28, 2005
Convenors: WWF-US
Location: Washington, DC

Tilapia aquaculture is a rapidly growing food production system. They are hardy, fast-growing fish that have been and are still a staple source of protein in many developing countries. Moreover, a recent surge in consumer demand has shifted many tilapia producers from subsistence growers to large, export-driven producers. In just a few decades, the industry has come to produce product year round, while significantly reducing the price of tilapia globally. Today, tilapia, once a staple for the poor, is found on the menus of even the most expensive restaurants.

Such rapid expansion of the tilapia aquaculture industry, however, has not come without environmental impacts--both real and perceived. Although tilapia aquaculture has been promoted as a low-impact form of production, there are better and worse practices used throughout the industry. Moreover, impacts occur both at the level of individual tilapia farms as well as cumulatively on much larger areas.

The list of key impacts for discussion is still in draft and therefore subject to change. The issues that have been identified thus far include:

- Siting/effluents
- Increased pressure on wild fisheries (e.g. feed, harvest, markets, etc.)
- Escapes/non-natives
- Predator control
- Sex reversal
- Mortality disposal

It is clear, however, that there is a great deal of variability between the overall efficiency of better producers and worse ones. Several questions arise:

- Are there better practices for tilapia aquaculture production that reduce the most significant social and environmental impacts?
- What are the barriers to the more widespread adoption of such better practices?
- Can better practices alone reduce cumulative impacts, or are other actions required? If so, what would they be?
- Which better practices can be best implemented through market-based incentives and which through government regulations?
- What impacts are not currently being addressed either by industry or government?

The goal of the proposed dialogue is to generate informed discussion around the key, generally recognized impacts of tilapia aquaculture as well as the questions listed above. The idea is to identify issues around which there is general agreement, issues about which there is disagreement and issues for which there is insufficient data to come to informed decisions about the overall impact of the industry.

Some 30 people will be invited. About half will be scientists whose research is/has been to address the issues and questions relevant to the environmental impacts of tilapia aquaculture. The other half of attendees will be individuals who are influential within different pivotal stakeholder groups (e.g. producers, buyers, retailers, investors, NGOs, donors, and government officials) and who are important in shaping the overall debate on tilapia aquaculture.

- The dialogue will last two days and all discussion will be off the record. On the first day, the dialogue will consist of researchers and producers discussing the current state of the issues listed below. There will be some time for clarification and discussion to follow.

On the second day, participants will discuss specific issues and develop a proposal for how to arrive at a common ground regarding key issues and questions related to the overall impact of the tilapia aquaculture industry or cost effective ways to reduce it. In some cases, the proposal might be to study existing systems or prototypes that reduce the overall impacts in key areas but that are not well understood by others. Recommendations might also be forthcoming to undertake research on a key area where there is simply not enough information available to understand the overall impact of the industry. In yet other instances, research may be proposed to determine if a particular question or issue about which there is little data is in fact something to be concerned about.

Any thoughts about the issues identified above, the overall approach, or key individuals who should be invited would be appreciated. Please send all queries and comments to Dr. Aaron McNevin, WWF-US, 1250 24th Street NW, Washington DC 20037, USA at aaron.mcnevin@wwfus.org.