Warm Water Fish Production as a Niche Market and Diversification Strategy for UK Farmers

Project Web page

http://www.aqua.stir.ac.uk/Systems/tilapiaProject.htm

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The Project

- Novel aquaculture approach: sustainable and environmentally friendly production method for farmed fish
- Integration of tilapia into UK farming and rural economies as a diversification strategy
- Benefits to small scale producers whilst stimulating growing niche markets for fresh fish in the UK

Why Tilapia?

- The “fish of miracles”
  - Highly suitable for low cost aquaculture
  - Omnivorous: can be fed a herbivorous diet (no need for processed fish or meat meals)
  - Hardy, adaptable, fast growing but in warm water... (23-28^{o}C)
- Potentially a sustainable source of quality food with fewer environmental impacts

Research

- Technical Trials
  - Thailand
  - Institute of Aquaculture (IoA)
  - Commercial partners
- Marketing
  - Focus Groups
  - Consumer surveys
  - Product placement
  - Entrepreneurship/Rural Diversification

Health and Sustainability Impact Assessments

Health

- Sustainability and health implications throughout the whole process: farm to fork
- Explore impacts through inter-linking marketing activities and technical trials
- The direct and indirect impacts of tilapia culture using an AST system in the UK
  - collect and analyse data from literature, stakeholders and key informants

Health Impacts Pre Tilapia Production

Inputs
- Raw materials
- Equipment
- Feed source

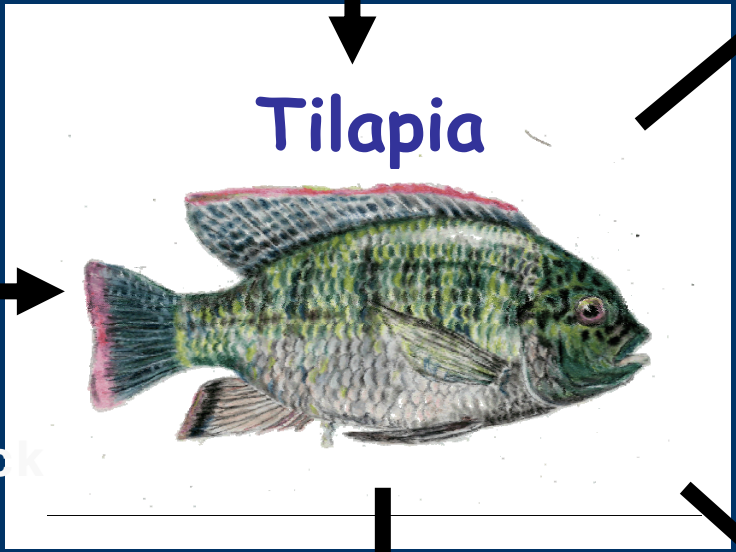
Infrastructure
- Maintaining & running

Transport
- Feed
- Supplies
- Fry
- Fish and feedstock miles

Energy usage
- Water source and use
- Global Warming
- Pollution: air, water, soil

Health Impacts Tilapia Production

Occupational health
- Hazards of farming
- Hazards of maintenance



- Waste disposal
- Job creation
- Varied occupations
- Environmental impacts linked to health

Health Impacts Post Tilapia Production

Public health benefits
- nutrients, wellness

Negative Health Impacts
- alternative fish consumption?

Processing and Distribution
- Transport to retailers, live / dead.
- Storage
- Packing
- Presentation
- Fish miles

Trials

- Conventionally waste feed removed by a filter and fish raised in clean water (RAS)
- Can waste be retained in the system and used as a further source of feed? (AST)
- Maintaining water quality for different feed quality and fish densities using
  - Aeration
  - Additional carbohydrate input
  - Solid removal
- Fish performance
  - Growth, survival, feed and crude protein conversion
- Cost of production

Tilapia Trials - Thailand

- Broad comparison of novel approach '*activated suspension technology' (AST)* with conventional *'recirculation aquaculture systems' (RAS)*
- So Far....
  - Encouraging results.....fish are growing (slower than conventional recirculation systems....)
  - Efficient floc removal system under development
- 3rd trials began April 06
  - Focus on feeding method:
    - Standard pellet V wet mix sourced on-farm

Trials

Tilapia Trials - Stirling

- Microbiological Analysis - Dr Ekram Azim
  - Feeding the fish? Microbial floc as fish food
- Floc quality & quantity
  - effects on water quality
  - effects on tilapia welfare

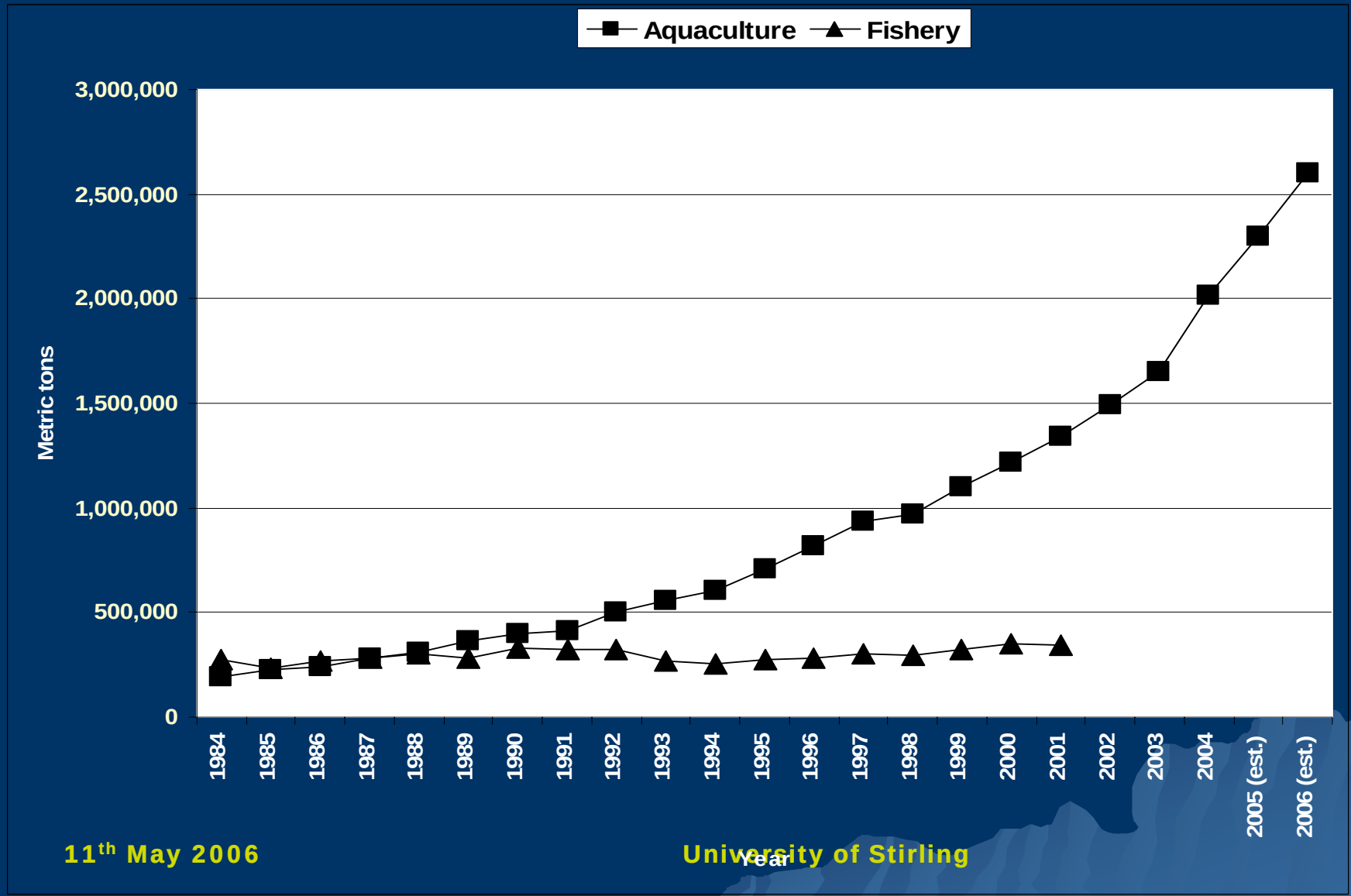
Tilapia Trials with Commercial Partner - Devon

- MSc student received RELU Work Shadow funding
  - Compare tilapia production using the AST system with their current recirculation system
  - Local resources to make wet feed on-farm
  - Financial costs comparison of both systems
  - Value of effluent floc for horticulture

Tilapia Markets

- Tilapia is one of the most popular farmed fish: produced in c.75 countries
- Traditionally a low-value fish farmed for subsistence
- Firm, white flesh, mild taste – substitute for white fish
- Forecast as a partial solution to over-fishing
- Emerging markets in the west

Global aquaculture production of tilapia



Tilapia Markets

- Strong US demand ~ 6th most popular species
- Imports
  - frozen whole China & Taiwan
  - fresh S. America
  - Domestic market, growing
- Europe & UK undeveloped markets

Tilapia Production 2003Est

Sources: FIGIS stats (FAO), US Dept of Commerce, Globefish 2005

	Europe (Tonnes)	USA (Tonnes)
Imports Frozen Whole	7808	56835
Imports Frozen Fillet	648	34717
Imports Fresh Fillet	430	21388
Domestic Production	577 *F*	43257
TOTAL	9463 approx	156000 approx

European Tilapia Market

- **UK is the major European tilapia market**

- France, Belgium, Germany & Netherlands following UK lead
- European producers: Belgium, France & UK
  - Whole fresh – supermarket availability approx £8 /kg
  - Fresh and frozen fillets increasingly available
  - Expanding range of outlets

UK Tilapia Markets

- Niche markets: Ethnic & Speciality
  - Ethnic markets: African, Chinese and Asian communities (whole frozen)
    - Bangladeshi, Filipino
  - Non-ethnic markets emerging and growing (fresh and frozen fillets)
    - Top-end retail market

Harrods Fishmongers, Tilapia

Tilapia fillets
European Seafood Exposition, 2005

Key Emerging Trends

- Fresh, traceable, local production
  - Local production – food miles?
  - Rural-urban focus for production
  - Green consumers: local & sustainable production
  - Organic tilapia? Certification a possibility
  - Gastro-pub & other food service markets?
- Ethnic markets
  - fresh/live product of higher quality than imports
  - different attitudes towards tilapia amongst various ethnic groups

Consumer Research

- Exploratory Questionnaire – Fish as Food
- Consumer Focus Groups
  - General UK public
  - 'Foodies' – Health Food shoppers & Gastro-pub set
  - Mixed Ethnic Groups
  - Bangladeshi Groups
  - Consumer Confusion: organic, sustainability, information & labelling

Farmer Diversification

- Dr Sarath Kodithuwakku – 3 months
  - Identify the profile of farmers interested in adopting warm water fish culture
  - Innovation process
- Case studies/interviews
  - In-depth study in to their motives, perceptions, environmental context and market orientation
  - Previous diversification experience and current purpose
  - Decision-making process and concerns

Farmer Diversification

- Those who have approached us!
  - Farmers (arable, dairy, poultry, pig & fish) & non-farmers
    - Re-use on-farm resources (food, energy), interest in sustainable production, current farming concerns - avian flu
- Farmer Forum/ online discussion group
  - Requests for information and contact with other current or potential tilapia farmers
  - Allows us to maintain contact with entrepreneurial farmers
  - dissemination and engaging stakeholders
  - observe the online discussions – netnography

Questions/Comments?

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