

Getting Started in Aquaculture/Aquaponics

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Sleep well tonight-

Aquaculture start-ups rarely fail
due to unforeseeable catastrophic events

They fail due to predictable and avoidable events

Universal truth:

Most aquaculture businesses fail
because of poor business planning

Growing fish is easy--

Operating a successful business is hard

Don't get trapped by the technical
and lose sight of the practical

Universal truth:

You can't make money growing fish

To make money you must sell them profitably

Idea

- Filling a hole in the marketplace
- Using existing resources
- Being self-sufficient
- Making lots of money
- Feeding the world
- Global peace and unity

Goals

- Long term
 - Build assets for future use
 - Augment income
 - Provide opportunity for next generation

Basic plan of action

- Develop alternatives
 - Information gathering
 - Market, location, scale, species, technique
 - Small scale experience
- Set criteria for comparison
 - Based on goals
 - Making best use of available resources
 - Keep expectations reasonable

Decision

- Select the one or two “best” plans
- Based on achievement of goals
- Judged by relevant criteria
- Invest in your decision, but don't become married to it
 - New information may make the plan unworkable
 - Take advantage of other's mistakes, don't replicate them

5 Areas of concern

- Market identification
- Bio-programming
- Facility characterization
- Financial analysis
- Rules and regulations

Market identification

Ultimately the question to be answered is:

How is my product different from existing products in the marketplace?

Some of the answers to this question are:
availability, quality, freshness, price,
local production, feel-good factor.

Locavore movement

Market identification

- Target audience
 - Wholesale to processor or retailer
 - Minimal sales planning and effort
 - Typically one customer
 - Low profit margin to farmer
 - Profit space for processor and retailer
 - Commodity scale production
 - Batch-style harvest
 - Storage costs passed on
 - Key-holders

Market identification:

- Target audience
 - Retail
 - Requires marketing plan and sales effort
 - Expanding and changing customer base
 - High profit margin
 - No middleman
 - Usually continuous harvest
 - Product flow critical to control storage costs and satisfy customers
 - Vertical and horizontal integration
 - May require a retail sales outlet

Market Integration: expanding market penetration

- Vertical
 - Variety of products and product forms
 - Sales opportunities from several markets
 - ‘Value Added’ - more producer input therefore more profit potential
- Horizontal
 - Variety of customers
 - Adds stability

Products

- Species choice
 - Outdoor culture - environment driven
 - Indoor culture - market driven
- Product Use
 - Food, stocking, bait, ornamental
- Product Form
 - Live, dead, processed
 - Value added
 - Packaged, frozen, breaded, smoked, etc.
 - Vertical integration
 - Life stage
 - Eggs, fry, fingerlings, juveniles, adult

Pricing and Production

- Premium price
- Seasonal price
- Market price
- Discount price
- Wholesale price
- Breakeven price

- Production level- based on anticipated sales
 - Quantity (Inventory)
 - Flow (Turnover)

Bio-programming: the what, why and how of the operation

- Statement of intent, purpose, and methodology relevant to the biology of the fish.

Bio-programming

More Universal Truths:

Big Fish Eat Little Fish.

If you can fit it in your mouth
you get to eat it.

If you can't make little ones
you can't make big ones.

Biological criteria

- Species description
 - Propagation and life cycle
 - Legal limitations
- Negative biological characteristics
 - Cannibalism
 - Aggression
 - Dimorphic growth
 - Sexual maturation before market size
 - Reliance on live feeds
 - Reliance on fish meal

Biological criteria

- Culture techniques
 - Propagation
 - Specialized equipment and facilities
 - Specialized knowledge
 - Egg or brood stock availability
 - Juvenile needs
 - Feed-training
 - Size grading
 - Acclimation to grow-out
 - Grow-out
 - Primary culture protocol
- Environmental requirements
 - Water source and quality
 - System limitations

Biological criteria

- Environmental requirements
 - Species specific
 - Temperature
 - Dissolved oxygen
 - Ammonia tolerance
 - Light sensitivity
 - Population density
 - Loading
 - Reproduction
 - Water source and quality
 - System limitations

Biological criteria

- Nutritional requirements
 - Feed conversion ratio
 - Lbs of feed/lbs of weight gain
 - Specialized diet for fry-fingerling
 - Live forage -an expensive way to raise fish
 - Minnow size is critical
 - Single source protein may be risky
 - Formulated feeds
 - Fish meal vs. grain based diets
 - Protein and fat content
 - Shelf life

Biological criteria

- Growth rates
 - Time to market size
 - Intermediate stages for vertical sales
 - Overlapping production cycles
- Mortality rates
 - Survival at different life stages
- Fish health
 - Veterinary needs
 - Health certification
 - Reportable and species specific diseases
 - Best management practices (BMP' s)
 - Biosecurity
 - Disease
 - Release to the wild
 - Aquatic invasive species

Facility characterization

- Integrates goals, design criteria, financial constraints and site conditions into a functional facility plan

Production fits site or Site fits production

- Predetermined site
 - Assess economic viability given limits imposed by site constraints
- Undetermined site
 - Optimize biological and physical requirements

Facility characterization

1st rule of aquaculture:

Keep the fish wet!

2nd rule of aquaculture:

Provide 3 levels of redundancy for critical components

Facility programming

- Production schedule
 - Populations at each life stage
 - Batch production
 - Continuous production
 - Environmental needs
 - May differ for life stage
 - Impacted by egg or fingerling availability

Facility programming

- Infrastructure
 - Water system
 - Source and effluent
 - Air system
 - Electrical system
 - Lighting
 - Feeding
 - Pumping
 - Production space
 - Spawning - Incubation
 - Fry - Fingerling
 - Juvenile
 - Grow out

Facility programming

- Infrastructure
 - Support space
 - Feed storage
 - Equipment storage
 - Supply storage
 - Processing / Packaging area
 - Transfer / Holding facilities
 - Office space
 - Sales
 - Records
 - Administration

Facility programming

- Logistics of moving fish
 - Water and aeration available at transfer points
 - Capture from pond, raceway or tank
 - Crowding, netting, trapping, draining, seining
 - Transfer to new culture vessel
 - Moving fish and water
 - Time sensitive handling
 - Minimize stress
 - 0.7% NaCl

Schematic design

- Translates criteria and site characteristics into a workable design
- Identify and solve major design problems
- Verify no constraints to production goals

Results in:

- Report describing facility design concept
- Site layout with location of major components
- Floor plans for support buildings
- Schematic diagram of hydraulics, air and power systems -REDUNDANCY!
- Topographical survey-emphasis on water flow
- Preliminary construction cost and schedule

Financial analysis

Universal truth:

If it doesn't work on paper,
it won't work in the real world.

Corollary of unforeseen circumstances:

If it does work on paper,
it still may not work in the real world.

Financial analysis

More universal truth:

Smart business owners should not expect to
be financial geniuses

They should expect to
hire financial geniuses

Environmental analysis

- Influences on the environment
- Positive and negative impacts
 - Wetlands
 - Native and non-native species
 - Water table
 - Effluent discharge

Environmental analysis

- Permitting
 - Construction and building permits
 - Zoning and pond construction
 - Fish hatchery license
 - Livestock premises registration
 - HAACP food processing license
 - Well drilling and use permits
 - Retail sales license and sales tax number

Project notebook what it is

- Composite results of bio-programming and planning
- Describes a properly evaluated and functional facility
- Includes cost projections, construction and operations schedule

Project notebook

what it does

- Enables immediate decisions without further work
- Provides a framework to sell your idea to financial backers
- Guide for subsequent phases of development in spite of
 - Postponements
 - Changes in permitting
 - Changes in designer

Questions?

Unsuccessful businesses
do not plan to fail-

They fail to plan!!

Resources

- RAC publications
 - ncrac.org
 - srac.tamu.edu
 - nrac.umd.edu
- White Papers
 - aquanic.org
- Aquaculture associations
 - wisconsinaquaculture.com
- Extension specialists
 - Aquaculture.uwsp.edu