

AQUACULTURE ECONOMICS AND MARKETING GAQF 5421

Instructor: Dr. Carole Engle **Office Hours:** Monday 3:00 - 5:00 p.m.
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(I have 2 teenagers at home, though) **E-mail:** cengle@uaex.edu

TEXTBOOK: There is no textbook that adequately covers both the critical theory and real world examples of aquaculture in the depth that is necessary for good understanding of the material of this class. Dr. Quagraine and I are writing a textbook to cover the first half of this class. Drafts of the chapters written to date will be posted on the Network Neighborhood along with the majority of other reading assignments. The remaining readings will be handed out in class at least one week in advance of covering this material.

The concepts presented in each unit will be reinforced through examination of a synopsis of the market for a particular type of aquaculture product.

CLASS STRUCTURE: You are urged to read the assignments prior to arriving in class. Class time will be spent in discussion of the reading material, on problem-solving exercises related to the issues covered in the readings, and on application of the information to analyses that you will develop in the laboratories.

COURSE OBJECTIVES

1. To identify the largest seafood markets and to name the seafood products whose sales are growing the most quickly and have the greatest impact on aquaculture product sales.
2. To explain the difference between shifts along demand or supply curves and shifts in demand and supply.
3. To develop a marketing strategy and plan that identifies appropriate market segments and pricing mechanisms.
4. To describe the structure, margins, volumes, and product forms relative to major marketing channels, including: direct sales, brokers, food service distributors, and processors.
5. To compare and contrast effectiveness of generic advertising programs, marketing cooperatives, and farmers' bargaining groups in terms of market development and pricing policies.

6. To list and compare the results of international trade disputes involving aquaculture industries over the past decade.
7. To calculate break-even costs of production from an enterprise budget, net worth from a balance sheet, net farm income from an income statement, and net cash balance from a cash flow budget.
8. To identify profit-maximizing levels of production.
9. To define economies of scale and to develop appropriate marketing strategies for different farm sizes.
10. To estimate profit levels when elements of risk are explicitly accounted for.
11. To develop a complete business plan for proposed aquaculture business and correctly assess its feasibility.
12. To identify the major regulations that affect the economics of aquaculture and to list the potential economic effects of each.

COURSE OUTLINE

Marketing

I. Seafood and Aquaculture Markets Worldwide

This unit will establish the global nature of seafood markets and provide an overview of characteristics and trends. The student of aquaculture needs to understand that aquaculture products must compete successfully in the global seafood market. The synopsis covered in this unit will be: Tilapia Markets.

II. Demand and Supply of Seafood and Aquaculture Products

This unit will define the fundamental economic concepts of demand, supply, and price discovery mechanisms of the market. Determinants of demand and supply will be reviewed to allow students unfamiliar with economics to understand the use of these terms later in the course. The synopsis used in this chapter will be on shrimp markets.

III. Developing Marketing Strategies

This unit will develop a framework and methods to develop market plans based on well-conceived market strategies. Market segmentation, product and strategy formulation for products with existing demand will be contrasted with those for new products and species. Commodity and niche markets will be contrasted. Pricing systems will be discussed. Successful aquaculture businesses are those that develop insightful marketing

strategies. The synopsis that will be discussed in this unit is: Hybrid Striped Bass Markets.

Exam 1

IV. Aquaculture Market Channels

Aquaculture products can move through a complex food distribution network. Aquaculturists must understand the supply chain for their products to develop successful market plans and strategies. The synopsis that will be covered is: Salmon Markets.

V. Aquaculture Growers and Their Marketing Choices

Aquaculture products present some unusual supply characteristics and challenges that have implications for successful marketing strategies. The synopsis to be presented in this unit will be: Baitfish Markets.

VI. Seafood and Aquaculture Product Processing

This unit will review the structure of the processing sector for aquaculture products. Processing innovation, branding, and associated challenges will be discussed. The synopsis to be discussed is: Catfish Markets.

VII. Participation and Leadership in Marketing Channels

This unit will review the dynamics of channel organization, ownership, and control in aquaculture marketing. The synopsis to be presented is: Trout.

VIII. Marketing by Farmer Groups

Aquaculture marketing initiatives will be contrasted with those of other farm commodity groups. Aquaculturists need to understand what has been attempted and the outcomes. The synopsis that will be covered is: Goldfish Markets.

IX. The International Market for Seafood and Aquaculture Products

Recent trade disputes related to aquaculture products will be discussed. These have been the largest issues in the industry and students should be able to discuss them intelligently. The synopsis to be covered in this unit is: Shrimp Markets.

Exam 2

Production Economics and Aquaculture Farm Management

X. Budget and Financial Analyses in Aquaculture

Enterprise budgets are the basic tools to estimate general profit levels in aquaculture. Aquaculturists need to be able to understand and interpret the following types of economic analyses: enterprise budgets, balance sheets, income statements, and cash flow budgets. The synopsis that will be covered in this unit will be: Shrimp Economics and Financial Analysis.

XI. Fundamental Economics Relationships

This unit will present the concept of production functions, the three stages of production and where profit-maximizing production levels occur.

XII. Economies of Scale

One of the most important economic concepts for aquaculture is that of economies of scale. Economies of scale dictate levels of costs of production and selection of profitable market channels. The synopsis to be studied in this unit is: Catfish Production Economics.

XIII. Risk Analysis

Yields, prices, and interest rates vary over time and subject farmers to risk. Profit estimates that explicitly account for risk are more realistic.

XIV. Economic Feasibility and Business Plan Development

It is critical for the student to understand how to assess and interpret the feasibility of aquaculture businesses. This unit will pull together and integrate the various analyses that have been discussed to date. Student laboratory analyses will serve as the basis for class discussions in this unit. The synopsis that will be covered in this unit is: Tilapia Production Economics in RAS.

Exam 3

XV. Policies and Regulations That Affect the Economics and Marketing of Aquaculture

There has been an increasing number of regulations that affect the profitability of aquaculture businesses. Aquaculturists need to be conversant with these issues. FDA HACCP programs for aquaculture, the new country-of-origin labeling laws, the EPA and the status of its Effluent Limitation Guidelines evaluation of aquaculture, producer quality assurance programs and Best Management Practices will be discussed and analyzed. The synopsis to be covered in this unit is: Trout Production Economics.

Final Exam (Comprehensive)

DISCUSSION PAPER AND REVIEW

1. Each student will develop a discussion paper on an economics or marketing problem that is of current importance to some segment of aquaculture. The student will carefully compile a summary of the research base relevant to this issue and develop a series of recommendations for strategies to alleviate the current economics or marketing problems. Recommendations must be research-based, justified logically, and be based on economic theory.
2. Each student will critically review the discussion paper and recommendations and prepare a written analysis of it. The student will question the author of the discussion paper orally in class and will render an opinion as to the overall feasibility of the recommendations.

TEACHING MODEL

Basic information will be presented in the reading materials for this course. Class time will be spent discussing the material, working on solving problems related to the reading materials, presentations of real-world examples of the concepts in the readings, and active discussion of current events in aquaculture economics and marketing, based on the concepts presented in the reading materials.

INSTRUCTIONAL STRATEGIES

Students will have the information presented in the reading materials reinforced in the classroom through active discussion of applications, and solving current, real-world problems using the materials in the readings.

GRADING

Activity graded	Maximum points possible
Exam 1	100
Exam 2	100
Exam 3	100
Final exam	100
Laboratories	
Survey development	20
Market analysis	25
Logit analysis	20
Enterprise budget	25
Partial budget	15
Balance sheet	10
Income statement	10
Cash flow budget	20
Investment analysis	20

Spreadsheet risk analysis	20
Mathematical programming	30
Discussion paper	100
Review of discussion paper	50
TOTAL POINTS POSSIBLE	765*
Grade	
A	688-765
B	612-687
C	535-611
D	459-534
E	<459

***Students are expected to adhere rigidly to the due dates for each activity as outlined in the attached list of due dates. For each day an activity is late, 10% of the possible points will be docked. This will be automatic and there will be no discussion. Thus, the maximum points possible on a market analysis that is submitted 2 days late is 20 points. All deductions for errors will be subtracted from the 20-point score.**

ATTENDANCE

Attendance will be taken in class daily. You are expected to attend every class. Roll will be taken at the beginning of each class. Students entering the classroom after the lecture has begun will be marked absent. After three (3) unexcused absences, your advisor will be notified in writing. After six (6) unexcused absences, you will be advised to withdraw from the class. You will have missed too much material to do well.

EXTRA HELP

I am available for extra help during office hours, by appointment, and any time that I am in my office. However, it is best to make an appointment if you need to see me. If you do not understand something after reading the materials and participating in class, come see me. It is up to you to keep up and you must bring your questions to me.

ATTENDANCE AT EXAMS

Attendance at exams is mandatory. **I DO NOT GIVE MAKE-UP EXAMS.** In the event of an extreme emergency that prevents a student from attending an exam, I will weight the comprehensive final exam to account for it. Students who miss regular exams usually have lower grades than others.

INSTRUCTOR ATTENDANCE

I want to be in class with you and help you to learn all that you can about the economics and marketing of aquaculture. I have devoted my entire professional career to this area

because I believe it to be one of the most fundamental and critical aspects of aquaculture, at least if there are to be viable aquaculture businesses anywhere in the world. I want to spend time discussing these issues with you this semester.

At the same time, there will be times during the semester when I will be out of town. I have been called upon to serve the U.S. Aquaculture Society, a Chapter of the World Aquaculture Society, as President during this current year. I am expected to represent the U.S. Society at the international board meeting in Bangkok, Thailand in September. In conjunction with that trip, I have been invited to visit and tour the *Pangasius spp.* industry in Vietnam. As you will come to know (if you are not already aware of it), the trade dispute between the U.S. and Vietnam over catfish and *Pangasius spp.* has been headline material for quite some time. This trip will give me an opportunity to bring back photos and direct, first-hand knowledge to you of what the realities are in Vietnam (rather than the media hype that we have been subjected to). I may be called to attend a meeting with the Environmental Protection Agency in Washington this semester and have been asked to attend a meeting in November with USDA related to some important funding for our Center. You will hear of what I learn throughout these trips.

YOU WILL GET YOUR MONEY'S WORTH OUT OF THIS CLASS!!! No class will be canceled. When I must be out of town, I will schedule field trips, guest speakers, in-class projects, and exams. You need to plan to be at each and every class because there will always be much to do there, even when I am out of town.

CHEATING

Cheating will not be tolerated. Cheating includes copying someone else's homework, using "cheat sheets" in class, looking at someone else's answers during a quiz or an exam, etc. Anyone caught cheating will receive a "0" on that exam, quiz, or paper.

STUDENTS WITH DISABILITIES

It is the policy of the University of Arkansas at Pine Bluff to accommodate students with disabilities, pursuant to federal and state law. Any disabled student who needs accommodation, such as special arrangements for seating or transportation, should inform the instructor at the beginning of the course. The Chair of the Department offering this course is also available to assist with accommodations. Disabled students are also encouraged to contact Michael Washington in Caldwell Hall, Room 205, phone: 870-575-8293, email washington_m@uapb.edu.

INSTRUCTIONAL RESOURCES

Unit	Reading assignment
I	Chapter 1. Seafood and Aquaculture Markets. In Engle and Quagraine.
	Food and Agriculture Organization of the United Nations. Web site

	//www.usda.gov/nass/
	National Fisheries Institute web site
	Arkansas Farm Bureau web site
II	Chapter 2. Demand and Supply of Seafood and Aquaculture Products. In Engle and Quagraine
III	Chapter 11. Planning Marketing Strategies In Engle and Quagraine
	Chaston, I. 1988. Managerial Effectiveness in Fisheries and Aquaculture
IV	Chapter 3. Aquaculture Marketing Concepts. In Engle and Quagraine
	Anderson, J.L. 1994. The growth of salmon aquaculture and the emerging new world order of the salmon industry. Presented at Fisheries Management-Global Trends, University of Washington, Seattle, WA. USA.
V	Chapter 4. Aquaculture Growers and Their Marketing Choices. In Engle and Quagraine
VI	Chapter 5. Seafood and Aquaculture Product Processing. In Engle and Quagraine
VII	Chapter 6. Participation and Leadership in Marketing Channels. In Engle and Quagraine
VIII	Chapter 7. Marketing by Farmers' Groups. In Engle and Quagraine
IX	Chapter 10. The International Market for Seafood and Aquaculture Products. In Engle and Quagraine
	Liao, I.C. and Y.H. Chien. 1994. Culture of Kuruma Prawn in Asia. World Aquaculture 25(1):18-33.
	Csavas, I. 1994. Important Factors in the Success of Shrimp Farming. World Aquaculture 25(1):34-56.
	Engle, C., O. Capps, L. Dellenbarger, J. Dillard, U. Hatch, H. Kinnucan and R. Pomeroy. 1990. The U.S. Market for Farm-Raised Catfish: an Overview of Consumer, Supermarket and Restaurant Surveys. Arkansas Agricultural Experiment Station Bulletin 925. Southern Regional Aquaculture Center Publication 511.
X	Engle, C.R. 1998. Annual costs and returns of raising bighead carp stocked in fertilized earthen ponds. FSA 9079. Arkansas Cooperative Extension Program, University of Arkansas at Pine Bluff
	Engle, C.R. 1998. Annual costs and returns of raising bighead carp in commercial catfish ponds. Cooperative Extension Program Fact Sheet FSA 9078. University of Arkansas at Pine Bluff, Arkansas
	Csavas, I. 1994. Important Factors in the Success of Shrimp Farming. World Aquaculture 25(1):34-56.
XI	Kay R.D. and W.M. Edwards. 1994. Farm Management. McGraw-Hill, New York. Pp. 139-156; 159-169; 193-210.
XII	Engle, C. and P.J. Kouka. 1996. Effects of Inflation on the Cost of Raising Catfish. The Catfish Bargaining Association
XIII	Valderrama, D. and C.R. Engle. Risk analysis of shrimp farming in Honduras
XIV	Lasordo and Westerman. 1994. An analysis of biological, economic and engineering factors affecting the cost of production in recirculating aquaculture systems.

	Lutz, G. 2000. Production economics and potential competitive dynamics of commercial tilapia culture in the Americas
	Engle, C. and N. Stone. 1997. <u>Developing Business Proposals for Aquaculture Loans</u> . Southern Regional Aquaculture Center Publication No. 381, Stoneville, Mississippi.
XV	Lockwood, G.S. 1997. World shrimp production with environmental and social accountability: a perspective and a proposal. <i>World Aquaculture</i> 52-55.
	Engle, C.R. and Valderrama. 2002. Economics of environmental impacts of U.S. aquaculture.

BIBLIOGRAPHY

//www.ansc.purdue.edu/aquanic

- Chaston, I. 1997. *Marketing in Fisheries and Aquaculture*. Fishing News Books, Oxford, England.
- Hatch, U. and H. Kinnucan. 1993. Aquaculture Models and Economics. Westview Press, Boulder, CO. ISBN 0-8133-8434-2.
- Jolly, C.M. and H.A. Clonts. 1993. Economics of Aquaculture. Food Products Press. Haworth Press, Inc., Binghamton, NY. ISBN 1-56022-020-1.
- Bjorndal, T. 1990. The Economics of Salmon Aquaculture. Blackwell Scientific Publications. Oxford, England. ISBN 0-632-02704-5.
- Bush, M.J. and J.L. Anderson. 1993. *Northeast Regional Aquaculture Industry Situation and Outlook Report*. RI Agric. Experiment Station Pub. No. 2917, Northeast Regional Aquaculture Center/Department of Resource Economics, University of Rhode Island.
- Meade, J.W. 1989. Aquaculture Management. Van Nostrand Reinhold, NY. ISBN 0-442-20570-8.
- Shang, Y.C. 1990. Aquaculture Economics Analysis: An Introduction. The World Aquaculture Society, Baton Rouge, LA ISBN 0-9624529-1-2.
- Shaw, S.A. and J.F. Muir. Salmon Economics and Marketing. Timber Press, Portland, OR. ISBN 0-88192-077-0.

LABORATORIES

<u>Topic</u>	<u>Laboratory</u>	<u>Date Due</u>
1. Survey Development/Use of Survey Pro	Aug. 25	Sept. 8
2. Market Analysis	Sept. 8	Sept. 15
3. Logit Analysis	Sept. 15	Sept. 22
4. Enterprise and Partial Budget	Sept. 22	Sept. 29
5. Balance Sheet & Income Statement	Sept. 29	Oct. 6
6. Cash Flow Budget	Oct. 6	Oct. 13
7. Investment Analysis: IRR,NPV, etc.	Oct. 13	Oct. 20
8. Risk Analysis	Oct. 20	Oct. 27
9. Mathematical programming	Oct. 27	Nov. 10
10. Mathematical programming (cont.)		Nov. 10

DISCUSSION PAPER

Learning Objective: The student will learn the details of one currently important economic or marketing issue of importance to aquaculture. The student will learn to synthesize research information into a coherent summary and to restrict recommendations to the available research base of knowledge.

Outline of the Discussion Paper:

1. Balanced overview of the issue. This section will briefly present the arguments on both sides of the issue.
2. Summary of relevant economic theory.
3. Summary of research relevant to the issues.
4. Conclusions and recommendations.
5. Literature Cited.

Length of Paper: 5-7 pages, excluding Literature Cited.

Grading:

Correct grammar, spelling, neatness	5 points
Thoroughness, balance, and objectivity of statement of issue	25 points
Relevance of economic theory selected	15 points
Thoroughness of literature review	25 points
Insightfulness of conclusions	15 points
Logic and degree to which recommendations are consistent with economic theory and the relevant research base	<u>15 points</u>
TOTAL	100 points

DUE DATE: November 15, 2003

Potential Topics:

1. Trade dispute between Vietnam and the U.S. over imports of *Pangasius spp.*
2. Trade dispute between China and the U.S. over crawfish imports.
3. Selling smokeless (CO-treated) tilapia fillets.
4. Catfish Bargaining Association and its ability to affect farm prices.
5. Should a fathead minnow farmer raise normals or rosy reds?
6. Should a minnow farmer raise jumbo shiners or crappie minnows?
7. Should a catfish farmer feed catfish every day or every other day when prices are low?
8. Use of diuron for off-flavor control in catfish.
9. Use of astaxanthin in salmon farming.
10. Should processing plants pay based on dressout yield?
11. Should fish farms switch to automated monitoring systems from night crews with hand-held DO meters?
12. Other topics can be selected with approval of the instructor.

Review of Discussion Paper

The student will prepare a written review that discusses the strengths and weaknesses of the business loan proposal reviewed and evaluate its overall feasibility.

Grading of the Review of the Discussion Paper

Correct grammar, spelling, neatness of the review	5 points
Accuracy of comments related to the market & financial analyses	15 points
Depth and level of comprehensiveness of evaluation	10 points
Accuracy of decision as to whether or not to approve loan	5 points
Oral presentation of evaluation	15 points