



UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN
BOARD OF REGENTS

RESOLUTION NO. 17-31

**RELATIVE TO MAKING A DETERMINATION OF NEED FOR AN EXCEPTIONAL
TERM CONTRACT FOR THE RENOVATION OF THE HATCHERY (GUAM
AQUACULTURE DEVELOPMENT AND TRAINING CENTER)**

WHEREAS, the University of Guam (UOG) is the primary U.S. Land Grant institution accredited by the Western Association of Schools and Colleges Senior College and University Commission (WSCUC) serving the post-secondary needs of the people of Guam and the region; and

WHEREAS, the governance and well-being of UOG is vested in the Board of Regents (BOR); and

WHEREAS, UOG has a variety of planned projects which require a long-term contract in order to perform the project in a financially feasible manner; and

WHEREAS, one of the projects is the revitalization of the Hatchery (aka Guam Aquaculture Development and Training Center) through a public-private partnership wherein a private partner would make a substantial investment in the infrastructure of the Hatchery and have operational control over the Hatchery with the goal of earning profit on the sale of shrimp and other products, and the Hatchery would be available for the College of Natural and Applied Sciences to incorporate research opportunities for the benefit of UOG students; and

WHEREAS, Public Law 32-040 limits contracts with the government of Guam to five years unless exceptional term contract provisions are met; and

WHEREAS, one of the provisions of an exceptional term contract is the review and approval of the BOR for exceptional term contracts at UOG; and

WHEREAS, the Physical Facilities Committee and the Budget, Finance, Investments and Audit Committee have reviewed the proposal and justification for an exceptional term contract for this project and, together with the President, recommend that the BOR approve the determination of need for an exceptional term contract for UOG to enter into a public-private partnership for the renovation and operation of the Hatchery (GADTC).

NOW, THEREFORE BE IT RESOLVED, that the Board of Regents hereby determines that an exceptional term contract is justified and that UOG should be authorized to enter into a contract for a Public-Private Partnership, for a period of up to 30 years, for the renovation and operation of the Hatchery (GADTC).

Adopted this 26th day of October, 2017.

ATTESTED:

Dr. Robert A. Underwood, Executive Secretary

Elizabeth C. Gayle, Chairperson

Determination of Need

Project Title: Hatchery Public Private Partnership

Project Description: Revitalization of the Guam Aquaculture Development and Training Center

Project Cost: The procurement will result in net revenue to UOG.

Contract Type: Operational contract/lease

Construction Time: 18-24 months

Term of Contract: Up to 30 years

Options: UOG does not anticipate and options or extensions to this contract

Estimated Project Cost: \$2 million

Estimated Annual Payment: UOG is unable to estimate the monthly payment it will receive under this contract. However, the contract will require a monthly fee be paid to the University. The annual appropriation from the Government of Guam will no longer be required as soon as the contract takes effect.

Source of Repayment: There is no UOG financing associated with this project.

Collateral: The executed contract will address potential remedies under this procurement.

Background: The Guam Legislature created the Guam Aquaculture Development and Training Center (the Hatchery) and transferred it to the University of Guam in 2002. The University has attempted to improve the performance and production levels of the facility. These efforts have been largely unsuccessful. The University has concluded the Hatchery cannot operate to its full potential without an infusion of capital into the facility. The University has determined that the best method of obtaining this capital infusion is to develop a public-private-partnership. Under the terms of the partnership, a developer would provide the needed capital infusion to upgrade and expand the facilities at the Hatchery. The developer would pay the University a monthly fee for the use of the Hatchery. The developer would be given limited access to the Universities patented shrimp breeds. The University would retain access to the Hatchery and the developer would be required to comply with the University's efforts to incorporate the activities of the Hatchery into the research and instructional programs of biology, agriculture and aqua culture for the benefit of University students and faculty.

Contract Method: The University desires to enter into an operational contract with a developer after the most responsible vendor is identified through a Request For Proposal process.

Nature of Construction: UOG expects the construction to include a renovation of existing concrete ponds, an expansion of additional ponds, renovation of the facilities in general, possible construction of a new well, possible construction of a new cistern, possible replacement of piping system.

Determination of Need: The revitalization of the Guam Aquaculture Development and Training Center is a major project. A project such as this needs to be spread out over a term of 25-30 years in order to make the financing payments feasible for the University. This is in line with the best practices of the industry. Therefore, the University of Guam is seeking authorization for an exceptional term contract of up to 30 years in order to enter into a Public-Private-Partnership for the operation of the Hatchery.

STATEMENT OF DETERMINATION

For the Approval of an Exceptional Term to Support a Public-Private Partnership for the Guam Aquaculture Development and Training Center

The Guam Aquaculture Development and Training Center (GADTC aka the Fadian Hatchery) is a tropical bio-secure aquaculture facility operated under the auspices of the University of Guam (UOG) since its transfer to the institution from the Department of Commerce in 2001.

The University of Guam Board of Regents has determined that a 30-year lease of the 21,443 square meter GADTC property, Lot #2517-17, for the purpose of entering into a public-private partnership to commercialize specific-pathogen free (SPF) shrimp broodstock for export to Asian markets, is in the best interests of the institution, future research in this field, and the island's economic development.

The genetic lines of UOG's SPF broodstock, developed by UOG scientist Dr. Hui Gong Jiang, produce robust off-spring with characteristics valued by the Asian aquaculture industry. Her ongoing research has resulted in a successful SPF shrimp breeding program with viable commercial potential (Appendix A. Brown J. 2009. A Business Plan for the GADTC). However, the facility itself requires significant investment of at least \$1M and no private sector partner will invest in a partnership or facility without a long-term lease that exceeds the Government of Guam's maximum five-year lease restriction.

The GADTC has many strengths: its physical site is one of the best in the Pacific region both for water and biosecurity; its collection of shrimp genetics, stocks of tilapia strains and coralgroupers allow for the production of a variety of products; its location on Guam provides a local market, allows for servicing the Micronesian region and provides for access to Asia; its connection with the University of Guam provides for scholastic cooperation with Asian universities and institutes, access to Federal grant funds and a secure home for its academic researchers.

The weakness of the GADTC stems from its physical condition and its status a component of the Government of Guam. The GADTC was built more than 30 years ago and sits on the windward side of the island where it is subject to continuous salt-water spray. The corrosion has led to the demolition of its main building, spalling of the concrete structures and deterioration of its electrical systems. The limited budget provided by an annual appropriation has been sufficient to maintain operations, but the lack of capital investment has not allowed for any new construction or renovations of existing structures. GADTC's mission is to be financially self-supporting, but it has not been able to achieve this goal since the Government of Guam assumed responsibility in the 1980s.

The GADTC facility has numerous opportunities if it can become a public-private enterprise under a well-connected and managed parental company that is willing to undertake the investment necessary to bring the facility up to standards. A private sector company with robust logistics could use the facility as a base to develop regional aquaculture to provide high value products for the Guam and Asian markets (Appendix B. Brown, J. A Summary of the University of Guam's Needs under a Public-Private Partnership for the Fadian Hatchery). They could profit

from providing seed stock, feed, transportation and marketing services to regional aquaculture business from a Guam based center. The stock of coralgroupers could be used initially for reef restocking on Guam with grant support from the US Fish and Wildlife Service, and later expanded to provide high health seed stock to the region, Guam and Asia. The tourism industry would benefit from a local, high valued fresh seafood product. The University of Guam has developed a five point white paper regarding the establishment of a public-private partnership (Appendix C. Brown, J. 2015. Reasonable Expectations for the Proposed Public-Private Partnership).

Full development of the shrimp broodstock business will give Guam an export product to generate local incomes, employment and tax revenues. Spinning-off the GADTC as a public-private enterprise will generate revenue, create jobs, and eliminate operating subsidies.

UOG has been approached by multiple companies from Vietnam, China, as well as Saipan Aquaculture/Tan Family Holdings, but the lack of a long-term lease and the cumbersome nature of working within Government of Guam procurement regulations stymied progress (Appendix D. Brown, J. 2015. A Brief History of the University of Guam's Attempts to Find a Private Partner for the Fadian Hatchery). UOG believes that we will have many potential bidders once we are able to secure a long-term lease and are able to manage the partnership through the Research Corporation of the University of Guam (Appendix E. Brown, J. 2013. Position Paper Guam Aquaculture Development and Training Center).

With Board of Regent approval, executive leadership can pursue Legislative approval to enter a public-private partnership that includes a contract/lease up to 30-years of the GADTC property with a private sector partner.

Appendices

Appendix A. Brown, J. 2009. A Business Plan for the Guam Aquaculture Development and Training Center

Appendix B. Brown J. 2015. A Summary of the University of Guam's Needs under a Public-Private Partnership for the Fidian Hatchery

Appendix C. Brown, J. 2015. Reasonable Expectations for the Proposed Public-Private Partnership.

Appendix D. Brown, J. 2015. A Brief History of the University of Guam's Attempts to Find a Private Partner for the Fidian Hatchery

Appendix E. Brown, J. 2013. Position Paper Guam Aquaculture Development and Training Center

University of Guam

Hatchery PPP

Feasibility Analysis

Est. Project Cost	\$ 2,000,000					
Interest Rate	6%					
Estimated Annual Revenues	\$ 700,000					
Estimated Annual Expenses	\$ 518,000					
Estimated Amount available for debt service	\$ 182,000					
	5 years	10 years	15 years	20 years	25 years	30 years
Estimated Annual Debt Service	\$463,987	\$266,449	\$202,526	\$171,943	\$154,632	\$143,892
Estimated Debt Service Coverage Ratio	0.39	0.68	0.90	1.06	1.18	1.26

GADTC TIMELINE

- 1970s - The facility began as the Guam Aquaculture Research Institute (GARI) a subsidiary of Trafalgar Housing in the 1970s to conduct research in support of aquaculture ventures in Asia.
- 1980s – GADTC facility abandoned
- 1986 – GADTC reverted to the Government of Guam in lieu of taxes. Administered by the Guam Department of Commerce.
- 2001 – GADTC transferred to the University of Guam.
- 2003 – 2007 – Grants in cooperation with the University of Arizona: 1) National Marine Fisheries Service “Specific-pathogen free (SPF) marine shrimp culture on Guam.” in 2003 for \$80,135 and 2) a USDA T-STAR grant “Disease survey and marketing prospects for specific-pathogen-free shrimp production on Guam” for 3-years from 2003-2007 for \$184,135.
- 2005 – GADTC established two years of health monitoring history, minimum requirement to qualify as an SPF shrimp facility
- 2007 – Hire of aquaculture scientist, Dr. Hui Gong Jiang, allowed UOG to further strengthen broodstock genetic lines
- 2007 – 2008 – Discussions with Grobest, a Taiwanese Aquaculture Feed company including on-site technicians.
- 2008 – Grobest relationship suspended. University too cumbersome to work with.
- 2008 – Opportunistically obtained shrimp sales to China, Taiwan, Singapore, Texas, Saipan and Hong Kong but none of a recurrent nature. UOG’s strength is research, not in operating a business.
- 2009 - 2013– Discussions with Evergreen and Luen Thai.
- 2013 – 2017 – Inquiries from Vietnamese companies very interested in the partnership but UOG cannot move forward due to the Government’s five year lease limit.

A BUSINESS PLAN
FOR THE
GUAM AQUACULTURE DEVELOPMENT
AND TRAINING CENTER (GADTC)



Submitted By:

Dr. John Brown
CNAS Room 205, UOG Station
Mangilao, Guam 96923
Ph: 735-2145
Email: jbrown@ugam.uog.edu

Updated 3 November, 2009

CONTENTS

- I. EXECUTIVE SUMMARY**

- II. BUSINESS DESCRIPTION**
 - a. History and Business Ownership
 - b. Description and Location of Business Products and Services
 - c. Mission Statement and Business Goals

- III. INDUSTRY ANALYSIS AND MARKETING PLAN**
 - a. Market Analysis & Target Markets
 - b. Competitive Analysis
 - c. Product Differentiation
 - d. Key Success Factors
 - e. Marketing Plan

- IV. MANAGEMENT AND OPERATIONS PLAN**
 - a. Key Officers, Management & Personnel
 - b. Facilities
 - c. Production Methods and Quality Control
 - d. Risk Analysis and Risk Mitigation Programs
 - e. Billing, Collection Policies and Recordkeeping

- V. FINANCIAL PLAN**
 - a. Introduction & Assumptions
 - b. Financial Plan Attachments
 - c. Monthly Revenue and Expenses FY-2010
 - d. GADTC Income Statement Projection
 - e. GADTC Cash Flow Statement Projection
 - f. GADTC Capital Expenditures Projection
 - g. GADTC Shrimp Broodstock Enterprise Projection

APPENDIX A: GENERAL ATTACHMENTS

- 1. Personnel, Costs and Accomplishments
- 2. Federal Programs and Grants
- 3. Capital Expenditures
- 4. First Year Travel Plans

APPENDIX B: PUBLIC PRIVATE PARTNERSHIP

Updated 3 November, 2009

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

I. EXECUTIVE SUMMARY

The GADTC operates as a program of the University of Guam (UOG), housed within the Western Pacific Tropical Research Center of the College of Natural and Applied Sciences. It is a biosecure facility on a five acre site. It is fully fenced on three sides and bordered by a rugged coastline on the Pacific Ocean side. Its location provides isolation from casual visitors and other aquaculture operations on Guam.

The GADTC has three primary functions:

- To conduct research and educational programs on aquaculture;
- To provide technical support and to produce fish fry and shrimp post-larvae for the local aquaculture industry;
- To be financially self-supporting through the production of genetically improved SPF shrimp broodstock.

While GADTC aims to be a center of excellence for the aquaculture industry, it also aims to become financially self-supporting and independent of the UOG General Fund over time. This business plan outlines our view of the process.

There are two ways this can be achieved. First, the GADTC can independently market its intellectual property, expertise and resulting SPF shrimp broodstock to the industry. This is the focus of the main body of the business plan. This option will be limited by the pace of our development of the market for these products. This business plan targets:

- The elimination of the current UOG General Fund subsidy to GADTC after three years; and
- Subsequently generating a contribution to UOG in excess of the cost of operating the facility of up to \$220,000 per year by end of the fifth year.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Second, UOG/GADTC can enter into a long-term Public-Private Partnership (PPP) through which UOG would lease land and facilities and provide breeding program services to allow a private enterprise to operate a SPF shrimp broodstock business. This alternative could provide quicker market development and more rapid independence from the UOG General Fund. The current physical production capacity of GADTC is estimated to be 28,000 individual shrimp broodstock per year. At a price of \$25 per animal, this would generate estimated revenues for the PPP of \$700,000 per year.

Because of the initial market development activities of the GADTC, a potential PPP has emerged. The company, Evergreen, is the largest shrimp producer in China. Additional information on these recent developments is set out in Appendix B.

In the event that GADTC/UOG enters into a PPP for the SPF shrimp enterprise, it would still be necessary for GADTC to continue to have access to the facility for an independent aquaculture research, development and education program including shrimp. This would also give GADTC/UOG the option to pursue other growth paths at some point in the future in the event that the PPP is terminated.

Under either option, we believe that GADTC/UOG has the opportunity to grow and to continue to meet its current responsibilities as a part of the UOG Land Grant, while ultimately achieving financial independence from the UOG General Fund.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

II. BUSINESS DESCRIPTION

A. History and Ownership

The Guam Aquaculture Development and Training Center (GADTC) was originally built about 1980 as a private facility designed to produce shrimp and fry for the Asian market.

After the parent company experienced a number of setbacks and financial problems, it was closed and subsequently transferred to the Government of Guam in 1986, where it was placed under the oversight of the Department of Commerce. In 2001, it was transferred to the University of Guam when the Guam Department of Commerce was dissolved.

The GADTC now operates as a program of the University of Guam housed within the Western Pacific Tropical Research Center of the College of Natural and Applied Sciences.

B. Location and Physical Plant Description

The GADTC is located on the Guam East Coast in Mangilao on the south side of Fidian Point, which provides its nickname, the Fidian Hatchery. It is less than 10 minutes by car from UOG, and approximately 20 minutes from the Guam International airport. It is accessed by private road from Route 15 (also known as the Back road to Anderson).

It is a bio-secure facility on a five acre site. It is fully fenced on three sides and bordered by a rugged coastline on the Pacific Ocean side. Its location provides isolation from casual visitors and other aquaculture operations on Guam.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

The physical plant is currently undergoing significant changes due to the recent condemnation and demolition of the main hatchery building. This 7,200 square foot building is being replaced by several smaller, temporary structures. These will house an indoor larval rearing room, a broodstock maturation room and a building for raising multiple shrimp families for a breeding program.

The Guam Delegate to the US Congress has requested a \$750,000 appropriation from the US Government for the construction of a permanent concrete hatchery building. Unfortunately, we were not successful in getting this request included in the FY 2010 US budget. The Guam Delegate has ranked this as number two among her requests, and we remain hopeful that this request will be renewed in the next US budget cycle.

Current facilities include:

- Both fresh and salt water wells,
- An automatic generator back-up system,
- Six 200 m² concrete ponds,
- Four 200 m² concrete raceways ,
- Three 50 m² concrete raceways and a 50 m² concrete pond
- A phytoplankton laboratory,
- A feed preparation room,
- A tool/work room,
- A separate office building,
- A duplex of two-bedroom living quarters,
- Numerous fiberglass tanks ranging in size from 0.5 to 20 metric tons,
- A refrigerated feed storage container and two storage containers.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER



C. Products and Services

The primary products and services of GADTC include:

- High health (Specific Pathogen Free), genetically improved shrimp post-larvae and broodstock for sale to the Asian-Pacific shrimp industry;
- Research, research facilities and associated deliverables, which are supported by formula funds for faculty salaries and competitive federal grants for projects;

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

- Technical support and seed (improved strains of tilapia, shrimp post-larvae and Claris catfish fry) for local farmers, which are supported by a direct Government of Guam appropriation and local sales revenue.

D. Mission Statement and Goals

The mission of the GADTC is:

- (1) To produce high quality fish fry and shrimp post-larvae on-island to support a growing and promising aquaculture industry, thus reducing the reliance on imported seed stock;
- (2) To be a center of excellence for public information on the aquaculture industry, and provide educational programs on aquaculture;
- (3) To serve the needs of local aquaculture farmers regarding technology transfer and extension service;
- (4) To conduct research on aquaculture in support of the industry; and
- (5) To be financially self-supporting and independent of UOG funds.

For the GADTC to be financially self-supporting, our financial goals for the next five years are as follows:

First Year Goals (FY 2010):

- Successfully complete performance trials of broodstock with a major Asian shrimp broodstock buyer;
- Secure contracts with major Asian shrimp broodstock buyers; and increase in total sales of Shrimp broodstock to up to \$200,000 in the first year.
- Obtain new grant funding of at least \$100,000 to begin work on the production of coralgroupers on Guam

Third Year Goals:

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

- Increase annual sales of broodstock to between 12,000 to 16,000 at \$25.00 each; resulting in an
- Increase in total sales to between \$300,000 and \$400,000 per year; which is well within the present physical production capacity of 20,000+ shrimp broodstock per year.
- Continue work under grant funding at a level of \$100,000 on coralgroupers and produce the first fish for reef stock enhancement

Fifth Year Goals:

- Secure a minimum of 10% of the Asian Shrimp broodstock market;
- Increase annual sales of broodstock to between 12,000 to 16,000 at \$25.00 each; resulting in an
- Increase in total sales to between \$300,000 to \$400,000 per year;
- Increase the physical production capacity from 20,000 to 28,000 shrimp broodstock per year; and
- Expand the coralgrouper product from reef restoration to include seed for local farmers for a live tourist market product.

III. COMPETITIVE ANALYSIS AND MARKETING PLAN

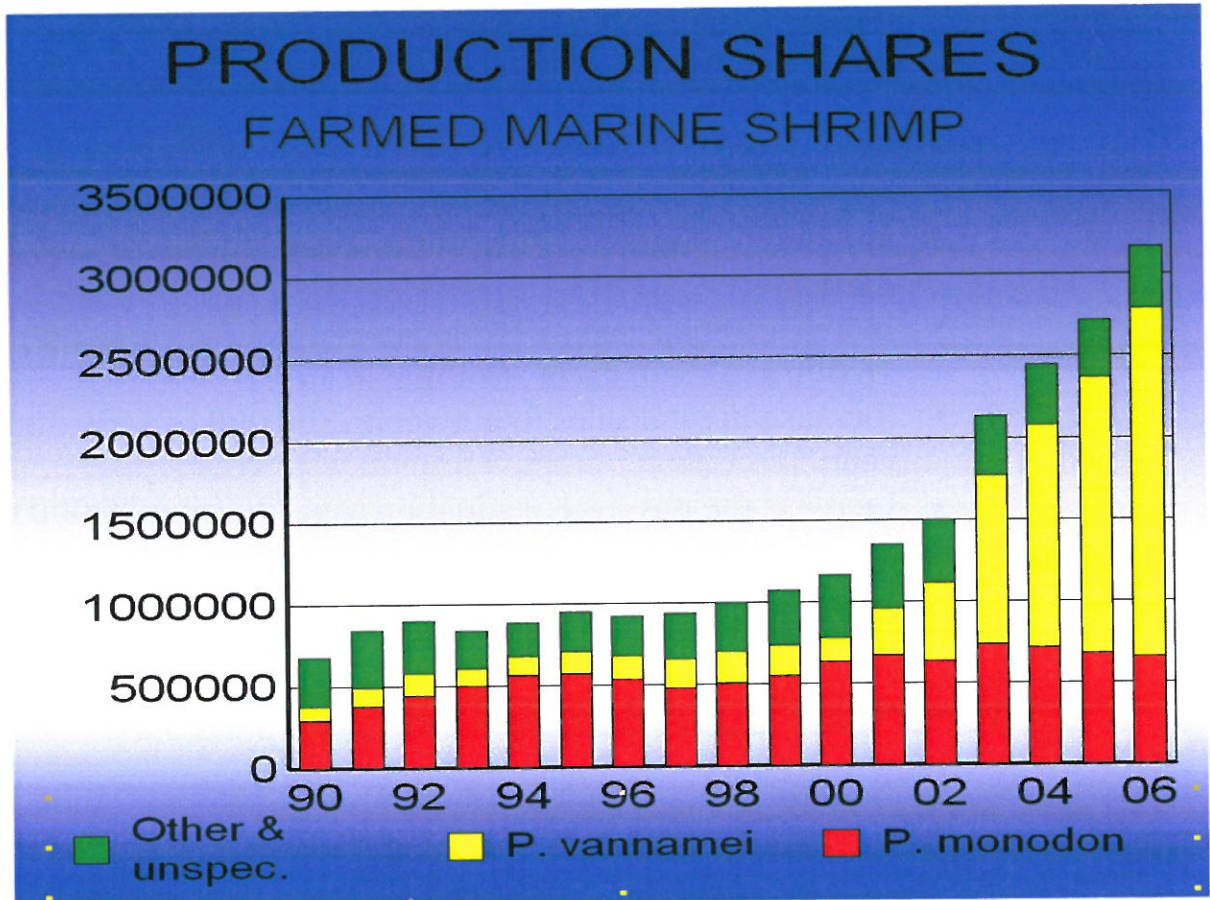
A. Market Research and Target Markets

GADTC intends continue to breed, produce and market a line of genetically improved, SPF *P. vannamei* to the Asian Shrimp Industry.

In the early 1990's, shrimp diseases ravished the global shrimp industry, and its recovery and recent growth has been largely due to two factors:

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

- Improved methods of dealing with shrimp diseases including increased bio-security in the industry, and
- The use of genetically improved, Specific Pathogen Free (SPF), pacific white shrimp, *Penaeus vannamei*, broodstock the majority of which were the results of US based breeding programs.



Source: Created from the U.N. Food and Agriculture Organization database

When one looks at the growth of the shrimp aquaculture industry and the share of by species in the chart above, three things stand out. First, the growth has been extremely rapid since the late 1990's. Second, two species account for the vast majority of global production: *Penaeus monodon* (the tiger prawn) and *P. vannamei* (the pacific white shrimp). Third, while production of *P. vannamei* was relatively insignificant

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

during most of the 1990's, its share of production expanded with great rapidity after the year 2000. It now dominates global shrimp production. This rapid expansion in the production of *P. vannamei* has been in response to the virus pandemics of the 1990's, and it has played a major part in resolving a number of the problems experienced by the shrimp production industry.

One way to estimate the SPF broodstock requirements of the global shrimp industry is from the production side:

- 3 million MT global production = 150 Billion Shrimp PLs stocked
- At 1 million PLS per pair of broodstock = 150,000 pairs needed.

A second estimate can be made from the industry cost structure:

- Seed at 8% of \$5B Cost of production = \$400M
- PLs at \$2.5/1000 = 160 Billion shrimp PLs purchased
- At 1,00,000 PLs per pair of broodstock
- 160,000 pairs of broodstock per year of all species.
- If all broodstock were SPF at \$50/pair the market would be equal to at least \$8 million/year.

However, much of the seed for the industry is not produced from SPF broodstock. The estimated size of SPF broodstock market is \$3-4 million per year using what is known of the various producers.

An alternative view broodstock production:

- 1 pair of broodstock (cost: \$50.00);
- Produces 1,000,000 post-larvae;
- At \$2.50/1,000 = \$2,500 cost to the hatchery;
- At 80% survival and 25 g. = 20,000 kg of shrimp;
- At \$2/kg = \$40,000 to aquaculture farmer;
- Performance takes 6+ months to measure; and

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

- Reputation of the broodstock is critical - you cannot compete on price alone with an 800:1 product value to input cost ratio.

When Dr. John Brown visited the facilities of Evergreen, the largest shrimp producer in China (Zhangjian), in May 2009, he learned that:

- Most large shrimp companies are seeking to vertically integrate and many are pairing-up with the established shrimp breeders.
- Everyone in the industry is concerned about where future breeding stock will come from because of this.
- Evergreen previously negotiated with OI (Hawaii) several years ago for a breeding program, and OI wanted \$8.6 million, however the two could not agree on terms.
- If GADTC shrimp broodstock pass their on-going performance trials, then Evergreen may want to:
 - Purchase broodstock for coming winter market (as much as can be produced – up to 20,000 pieces);
 - Inspect the GADTC facility for consideration as a back-up facility or as a contractual Nuclear Breeding Center;
 - Obtain the ATP (DOD/C Advanced Technology Program) line of shrimp that GADTC currently produce.

B. Competitive Analysis

The Competitive Environment is Changing:

In the past 4 to 5 years, partially in response to the dominance of the US vannamei broodstock breeding programs, and partially due to the critical position of broodstock in the shrimp production cycle, many of the largest shrimp producers have moved to vertically integrate their businesses. In particular, this vertical integration has led them to seek to implement their own breeding programs. Among these producers, the major players are:

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

- Charoen Pokphand (CP),
- Grobest,
- Evergreen, and
- Thaiunion.
-

The protection previously enjoyed by US shrimp breeders was derived from their use of an “in-breeding patent”, which precluded the use of broodstock from successive generations, has been circumvented by the larger Asian hatcheries by purchasing broodstock from multiple sources.

Traditional Small Broodstock Operation:

Oceanic Institute (OI) ran a nuclear breeding program funded by the US Marine Shrimp Farming Program (USMSFP). This program annually sold “surplus research” post-larvae (PLs) with certified genetic attributes to small brood stock producers who then raised them to broodstock size and sold them to hatcheries worldwide. When problems developed with the funding of the USMSFP, OI stopped selling PLs and entered the broodstock business.

Asian Competitor Analysis:

- **Oceanic Institute** (OI, Hawaii) - Runs US Marine Shrimp Farming Program and the US Nucleus Breeding program of the USMSFP. When the funding for the USMSFP was suspended for a year, they entered the SPF *P. vannamei* market and sold more than \$1 million of animals in their 2nd year of marketing.
- **High Health Aquaculture Inc.** (Hawaii) - Jim Wyban started the OI Shrimp Program and is now the largest private shrimp breeder. The company has sales of possibly \$2 million per year. They have had an off and on relationship with Thaiunion.
- **Kona Bay Marine Resources** (Hawaii) - Had sales of as much as of \$1.2 million/year. Their Kona facility was bought by Charoen Pokphand (CP), the world largest shrimp producer. Kona Bay then

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

bought CEATECH's 'Kauai facility which developed White Spot disease for the second time.

- **SyAqua USA** (Thailand) - Started in Kentucky by Sygene. Sygene was purchased by Genius LLC, which spun-off the shrimp enterprises to management. It now operates in Thailand and Saipan. The first broodstock exports from Saipan were in 2008.
- **Molokai Sea Farms** (Steve Chaikin, Hawaii) - A minor producer used to use OI "surplus research PLs". OI stopped selling these when it entered BS market.
- **Shrimp Improvement Systems Inc.** (SIS / Florida & Singapore) - Has sales of \$1.6M. It was bought by Charoen Pokphand's Indonesian subsidiary and now operates in Miami and Singapore. As CP undertakes a massive expansion of its internal operations in Indonesia, SIS's willingness and ability to supply broodstock to the general industry is in doubt.

C. Product Differentiation

Customers buy shrimp broodstock for their improved, genetically based performance.

The SPF status of the broodstock is a given. It is not a sales factor. It is required for the international shipment of shrimp. SPF status is a part of the farm level biosecurity efforts that has allowed the industry to cope the widespread disease risks. SPF seed reduces the risk of crop losses for the farmer.

To reduce costs of the overall production system, the genetic performance of the animals is critical.

Performance means production: for the hatchery performance means more seed per pair of broodstock; for the farmers performance means faster growth on less feed; and for the processing plant performance means a larger head to tail ratio less waste in the processing plant. Thus, the critical criteria used by broodstock buyers to evaluate the

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

performance of GADTC animals and their off-spring are largely determined by the genetic quality of the animals. Thus, GADTC must maintain an ongoing breeding program, as this will ultimately determine the marketability of its broodstock product.

The reasons why we believe that GADTC shrimp broodstock are likely to be in high demand are as follows:

- GADTC is a bio secure facility – meaning that the opportunities for disease to penetrate the shrimp broodstock population is minimal;
- GADTC is physically isolated from other shrimp breeding centers;
- GADTC is located in a pristine area of Guam, further limiting the possibility of contamination or disease from entering the shrimp broodstock population; and the
- Quality of GADTC's ongoing shrimp broodstock breeding program.

D. Key Success Factors

The first key to success in marketing the broodstock will be the GADTC ability to breed a line of genetically improved shrimp that meets the needs of the Asian shrimp industry. The expressed needs from the hatcheries are for certified SPF Status broodstock that is quick to spawn so that they have a short maturation time after arrival, and the broodstock should produce lots of eggs per female and these eggs should have a high hatch and survival rates, which ensures sufficient product at a lower cost. The expressed needs from the farmers are that the seed produced by the hatcheries be fast growing, be hearty and disease resistant, have good feed conversion rates and produce an easily marketable product e.g. head to tail ratios and good color.

The second key to success will be the GADTC's ability to document the value of its genetic lines through performance trails in hatcheries and farms in Asia and to disseminate this information to the market through trusted media – either word of mouth or scientific presentations and publications.

The final key to success will be reliably delivering quality product at a reasonable CIF price. The genetic potential of an animal for reproduction can be stunted if they are not raised in a good environment and feed properly, or if they are stressed during shipping by improper packing or overly long shipping times. The customers do not see the animals that are put into the box. They see the animals that come out of the box. The same hold true for the price. Shipping and air freight costs play important roles in the satisfaction of customers with the price and quality of GADTC's product.

E. Marketing Strategy

There are several difficulties the GADTC will have to overcome in order to successfully market broodstock to the Asian shrimp industry. The first is that the shrimp industry is spread out all over coastal Asia. Hatcheries have local service areas thus geographically dispersed with the industry. Interacting with many dispersed customers who purchase broodstock once or twice a year will be difficult. There are many countries involved and each country has its own import regulations and requirements. Many of these countries are actively seeking to develop their own biosecure, nuclear breeding program, and the large, multi-national shrimp producers have their own captive hatcheries and are seeking the same. GADTC has a lack of reputation and documented performance of its products. GADTC also has a lack of strong industry contacts.

In order to overcome these difficulties, a multi-pronged strategy will be used. These will center on the development of long term relationships with key members of the Asian industry and on the quality of the shrimp genetic lines already at the GADTC, and the widest dissemination of information about the performance of our lines as possible.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

The first prong of our marketing strategy, therefore, will be focused on the GADTC shrimp broodstock currently being tested in performance trials by Evergreen. If these trials are successful, we believe that this private company will have a very high incentive to secure exclusive access to GADTC shrimp broodstock.

This shipment has passed the hatchery phase of the evaluation and the post-larvae have been stocked for the grow-out phase of the evaluation. They have not given us the results, but have recently contacted Dr. Brown with an informal request as to how best to establish a long term relationship with the University. For more information on how such a public-private partnership would work, please see Appendix B below.

The second prong will be the development of working relationships with as many Asian brokers or agents "on-site" as possible. We currently have an informal marketing agreement with a Taiwanese corporation who acts as a broker and contact within Taiwan and with the Taiwanese overseas industry. An additional budget of \$20,000 in FY2010 has been included for market development and materials, website development and travel costs associated with this effort.

We have developed a five-year MOU with the Guangxi Fisheries Institute in Nanning, China. They have purchased broodstock genetic lines and have sent two post-docs to UOG for advanced training. A formal visit is scheduled in early November to Nanning by a University of Guam delegation. It will be headed by Regent Ada, and President Underwood. Dean Yudin and Dr. Gong will also participate.

The third prong of the marketing strategy is to initialize a small breeding program at the GADTC. We have good lines, but they must continually be improved to keep up with other broodstock producers and the market's expectation. If we have a "good product," we need performance trials whenever possible to demonstrate this to the industry. We are again working with the Guangxi Fisheries Institute in

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

China, a hatchery on the East coast of Taiwan and we will provide local farmers with post-larvae for evaluation.

As information is obtained, we will work to raise the industry profile of the GADTC and the performance of its shrimp lines. We will attempt to keep a strong presence at Asian shrimp or aquaculture meetings. Presentations or posters on performance trials can effectively serve as "Infomercials" to the industry. Articles written for trade publications can have the same effect. We will post information on our Internet Site and expand it as is warranted.

Once physical plant is improved, we will also seek export permits to Thailand & Vietnam. We hosted a delegation of the Thailand government, but they found the physical condition of the hatchery to be deficient. Vietnam often bases their permit decision on the facility's status with Thailand. The remainder of the Thai inspection was acceptable. Their feedback to us was that once we have bought the physical condition of the GADTC up to standard, then we could document this photographically and they would not need a second site visit.

Our pricing is in the lower end of market price range for US genetically improved, SPF white shrimp broodstock. This is due to two factors. The first is that the GADTC has not developed a performance reputation that would support a premium price. Second, shipping materials and air freight are very expensive on Guam. Customers often ask why the air freight charges are higher from Guam to Asia than they are from Hawaii to Asia. Thus, the net price to UOG has to be lower to maintain an equivalent CIF price to the customers.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

IV. MANAGEMENT AND OPERATIONS

A. Key Officers, Management & Personnel

The GADTC has one full-time permanent position - that of the hatchery manager. It is a Biologist IV level civil service position. Mr. Frank Alig has a B.S. degree in Wildlife Biology and 12 years experience at the GADTC. Over the years, he has attended several training courses related to his position. He has been to courses in shrimp pathology, shrimp production methods, mangrove crab culture and aquaponics among others.

Over the years, the GADTC has lost several permanent positions. The two most crucial are a skilled maintenance position and a second, biologist position. The duties of these positions are currently filled with semi-skilled, limited term employees with relative high turn-over rates. The skills of those hired on limit-term employment needs to be upgraded by searching off-island for highly experienced personnel.

The management of the GADTC is overseen by Dr. John Brown who is a research scientist in the Western Pacific Tropical Research Center (the Agricultural Experiment Station). Dr. Brown has a PhD. in Agricultural Economics from North Carolina State University, and he many years experience working with the aquaculture industry. He is not a biologist and must rely on Dr. Hui Gong for the biological expertise necessary to properly operate the facility. Dr. Gong has a PhD. in Aquaculture Nutrition and many years experience working in molecular biology and the shrimp industry. Their resumes are attached as Appendix A.

The hiring of a 2nd Aquaculture Researcher who is a shrimp breeder is absolutely necessary to the long-term success of the shrimp broodstock enterprise that is envisioned as the keystone to making the GADTC independent of the UOG general fund. A search has been conducted and a highly qualified candidate has been selected. The hiring is presently under negotiation between the CNAS Dean and the President.

B. Facilities

The 7,200 square foot main hatchery building was condemned, and it was demolished in July at a cost of \$24,000 in FY2009. As mentioned earlier, we are in discussion with the Guam Delegate about funding for a permanent replacement. In the meantime, it is being replaced with multiple small metal arch buildings at a cost of \$60,000 starting in FY 2009. The first two buildings have been ordered, and they should arrive on island this month. The use of temporary metal buildings has several advantages besides cost. They can be erected by existing staff. There is no need for internal partition of a larger building for biosecurity isolation of different projects. They allow for smaller maintenance projects as compared to the complete replacement of a single 7,200 square foot roof as before. We have applied for US Fish and Wildlife Service Sport Fish Restoration funds to construct a salt water fish facility (\$100,000 in the first year). This will be used to purchase broodstock tanks and to purchase and build additional temporary buildings for the introduction of a SPF grouper fry product for reef restocking. In the long run the groupers will also be made available to local farmers as seed for a new high valued aquaculture product. Groupers also may also serve as a new product for the Asian SPF market.

C. Production Methods and Quality Control

The GADTC spawns and raises its own shrimp seed from one or more selected family lines each year. At the age of 12 days post-metamorphosis (PL-12), they are stocked into one of the six 200 m² shrimp ponds at a density of 50 to 100 per m². They are reared for several months, and then thinned to the final production density of 40 per m², and raised to sexual maturity. During grow-out shrimp are fed standard shrimp production feed. They take seven to nine months to mature on Guam. Broodstock are normally sold at 40 grams for males and 45 grams for females.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Once an order is received, the broodstock are sourced from the production ponds, inspected for defects, separated by sex and stocked into 20 ton fiberglass tanks. The movement stresses the shrimp. Some die, and most undergo a molting. They are fed a supplement of frozen squid to begin the enrichment of their nutritional status. Timing is important. If the shrimp remain in the conditioning tanks too long, they will molt for a second time during shipping and the mortality rate will increase. If they do not have sufficient time to recover from the initial molting, they will not ship well. Two weeks is about the proper duration.

At the same time the shrimp are sourced, preparation of the shipping documents is started. It begins with securing space, obtaining an air waybill and price quotes for the air freight. Once a date is confirmed, a certificate of origin and a health certificate are obtained. Finally a USF&WS export clearance is completed.

Once the paperwork has been completed, the shrimp are caught, inspected and transferred to chilling tanks the day before packing is scheduled. It is extremely important that this not be done until everything is confirmed, because if the shrimp are chilled and not shipped as scheduled, then a new batch of animals must be prepared. Chilling begins about 14 hours before packing is scheduled. The shrimp are cooled to 17° C and the packing water to 15° C. At packing, the shrimp are individually inspected for body firmness, color, clean gills and spermatophore condition. Six males or five females are packed in a bag with clean shipping water and inflated 2X with oxygen. The proper sealing of the bags with rubber bands is critical. If the Oxygen leaks, the shrimp will die. Two bags are placed in a foam box with a gel pack or two. The foam box is sealed and put into a cardboard shell. Once the shrimp are packed, there is a 48 hour window to deliver them to the customer and to have them unpacked and put into clean, aerated water.

D. Risk Analysis and Risk Mitigation Programs

Risks to the favorable outcomes outlined in this business plan can be divided into two classes - physical and financial.

Physical Risk:

The maintenance of our shrimp stocks depends upon the continuous operation of several pieces of equipment that supply the animals with both oxygen and clean water. If there is an equipment failure, then there is a limited time period during which the problem must be resolved or the shrimp stocks will start to die. The primary method used to mitigate this risk is maintaining the equipment on a regular basis and ensuring sufficient inventories of replacements and spare parts. To better mitigate risk, fully redundant systems could be used, but this would increase costs substantially. Currently, GADTC has a partially redundant system. We have a backup generator for electricity, two sets of fresh and salt water pumps, and two air blowers for oxygenation.

A secondary method of mitigation is to keep all of the ponds and tanks as lightly stocked as possible. This serves to lengthen the time between equipment failure and the beginning of shrimp mortalities, but also reduces the productivity of the facility. Therefore, as shrimp stocking levels increase, risk of shrimp mortalities will also increase but can be mitigated by additional investment in back-up systems, monitoring equipment, and personnel.

The facility has flooded one time in the past twenty years. It happened during Supertyphoon Yuri in 1991. The lower ponds flooded, and the caretakers' house was breached. Most of the existing shrimp stocks were lost. The risk of flooding can be mitigated by the construction of a sea wall (which has been designed but not funded). In the past two years, the walls of the shrimp grow-out ponds have been raised by approximately two feet and strengthened. This will provide some additional protection in the event of flooding. Further protection of the

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

core genetic shrimp lines would be provided by the construction of a concrete main hatchery building with an independent back-up generator.

The breaching of the facility's biosecurity status, and the introduction of any one of several diseases, would be a difficult problem to solve. If the disease appeared in the broodstock, then one year of production would be lost. However, if the disease appeared in the core genetic shrimp lines, replacements could not easily be purchased, and the shrimp lines may be lost to the GADTC permanently. To mitigate this risk, we have closed the facility to casual visitors, classes and farmers. Staff training on the need for biosecurity and disease prevention is emphasized, but we do rely on the continued good will of our current and former employees. Further mitigation in the form of physical access control facilities is programmed into the capital improvement budget for 2011.

Financial Risk:

The immediate financial risk is the failure of the GADTC to sell as many broodstock as forecast in this business plan due to an inability to gain entry into the Asian markets. In order to mitigate market risk, GADTC has laid out a multi-pronged strategy in this business plan. It will focus on the development of long term relationships with key members of the Asian industry, maintaining the quality of the shrimp genetic lines already at the GADTC, and by widely disseminating information about the performance of our shrimp lines at industry meetings and conferences.

Longer term financial risks could develop from technological changes in the shrimp broodstock industry. One possible change could be the industry returning to farming a larger share of *Penaeus monodon* shrimp because of the development of a genetically improved, SPF broodstock for this species. A second potential change could be the development of national nuclear breeding centers for SPF *P. vannamei* shrimp in multiple Asian shrimp producing countries. While GADTC will always

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

have to live with the risk of technological change, the risks outlined above will take some time to implement and their progress is being closely monitored by senior GADTC personnel. In the longer-run, GADTC is diversifying potential product lines by beginning a coral grouper research program.

This business plan allows for capital expenditures to be deferred in the second to fifth years. Since non-UOG General Fund expenditures are based on the availability of cash in the GADTC revenue account, shortfalls in sales will force cuts in expenditures. In the event of a shortfall in revenues, capital improvements would be cut first, followed by cuts in staffing, feed and maintenance.

E. Billing, Collection Policies and Record Keeping

The GADTC does not grant credit terms as a standard practice. A 90% deposit is typically required before shipment is made. This is usually done by wire transfer once the air cargo availability and shipping date has been confirmed. A second payment of 10% is due upon satisfactory delivery. We ship 110% of the number of animals ordered. This provides a 10% mortality cushion. Payment and delivery are based on the number of animals ordered. Lack of payment for a broodstock shipment has never been an issue.

All financial records are kept by UOG accountants using the Colleague System of financial software.

V. FINANCIAL PLAN

A. Introduction & Assumptions

The attached financial projections include all of the income streams and all of the expenses for the GADTC projected monthly for 2010 and annually for five years.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

B. Attachments

- A. GADTC Monthly Revenue and Expenses FY-2010 – a monthly projection of revenues and expenses including capital expenditures for FY-2010.
- B. GADTC Income Statement Projection – a five year income statement projection for the overall GADTC operation.
- C. GADTC Cash Flow Statement Projection – a five year cash flow projection for the overall operation.
- D. GADTC Capital Expenditures Projection – five year schedule of capital expenditures assuming that there is no earmark for a new hatchery building from the federal government.
- E. GADTC Shrimp Broodstock Enterprise Projection – this assumes that the University continues to operate the shrimp broodstock enterprise without a Public-Private Partner. It breaks out the financial information for GADTC's main economic engine, and shows the potential for a public-private partnership between a private company and UOG. However, to remain consistent with the other financial information provided, it is shown as a purely UOG operation.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

ATTACHMENT A: GADTC MONTHLY INCOME AND EXPENSES – FOR FY-2010

ATTACHMENT A: GADTC MONTHLY INCOME AND EXPENSES - FY-2010

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug	Sep.	Tot.
Income sources													
Supplement from UOG Gen. Fund*	12,583	12,583	12,583	12,583	12,583	12,583	12,583	12,583	12,583	12,583	12,583	12,583	151,000
Export shrimp genetics & broodstock	0	0	8,333	33,333	50,000	50,000	33,333	16,667	8,333	0	0	0	200,000
Government Guam appropriation	10,917	10,917	10,917	10,917	10,917	10,917	10,917	10,917	10,917	10,917	10,917	10,917	131,000
Local industry shrimp and tilapia	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	1,667	20,000
Sport Fish Restoration – Groupers	833	833	833	833	833	833	833	833	833	833	833	833	60,000
Research Grant Facilities Charges	26,000	26,000	34,333	59,333	76,000	76,000	59,333	42,667	34,333	26,000	26,000	86,000	10,000
Total Income	26,000	26,000	34,333	59,333	76,000	76,000	59,333	42,667	34,333	26,000	26,000	86,000	572,000
Expenses													
Faculty Salaries **	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	5,344	64,125
Marketing & Sales commissions	0	4,000	2,083	8,333	12,500	12,500	8,333	4,167	2,083	0	0	0	50,000
Travel expenses	0	0	4,000	0	4,000	0	0	0	4,000	0	0	4,000	20,000
Feed & supplies	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	60,000
Permanent Salaries	4,583	4,583	4,583	4,583	4,583	4,583	4,583	4,583	4,583	4,583	4,583	4,583	55,000
Limited term employees	8,750	8,750	8,750	8,750	8,750	8,750	8,750	8,750	8,750	8,750	8,750	8,750	105,000
Utilities	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	96,000
Maintenance	3,083	3,083	3,083	3,083	3,083	3,083	3,083	3,083	3,083	3,083	3,083	3,083	37,000
Operating Expenses	34,760	38,760	40,844	43,094	51,260	47,260	43,094	38,927	40,844	34,760	34,760	38,760	487,125
Capital Improvements		25,000										35,000	25,000
Comp. of renovation of main building													35,000
Const. of Grouper holding & spawning													18,000
Purchase of pick-up truck							18,000						18,000
Total Expenses	34,760	63,760	40,844	43,094	51,260	47,260	61,094	38,927	40,844	34,760	34,760	73,760	565,125

Updated 3 November, 2009

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

B. GADTC Annual Income Statement Projection

ATTACHMENT B: GADTC ANNUAL INCOME STATEMENT PROJECTION

	2010	2011	2012	2013	2014
Income sources					
Supplement from UOG Gen. Fund*	151,000	75,500	37,750	0	0
Export shrimp genetics & broodstock	200,000	300,000	400,000	500,000	600,000
Government Guam appropriation	131,000	60,000	60,000	60,000	60,000
Local industry shrimp and tilapia	20,000	20,000	25,000	25,000	25,000
Sport Fish Restoration - Groupers	60,000	100,000	100,000	100,000	100,000
Research Grant Facilities Charges	<u>10,000</u>	<u>20,000</u>	<u>20,000</u>	<u>20,000</u>	<u>20,000</u>
Total Income	572,000	575,500	642,750	705,000	805,000
Expenses					
Faculty Salaries **	64,125	66,049	68,030	70,071	72,173
Marketing, Travel & Sales commissions	70,000	75,000	100,000	125,000	150,000
Feed & supplies	60,000	65,000	75,000	80,000	85,000
Permanent Salaries	55,000	55,000	90,000	90,000	90,000
Limited term employees	105,000	105,000	160,000	160,000	160,000
Utilities	96,000	96,000	96,000	96,000	96,000
Maintenance	37,000	37,000	37,000	37,000	37,000
Total Expenses	<u>487,125</u>	<u>499,049</u>	<u>626,030</u>	<u>658,071</u>	<u>690,173</u>
Net Surplus / (Deficit)	84,875	76,451	16,720	46,929	114,827

* FY 2010 UOG General Fund Supplement Hatchery manager sal. 55,000 + Utilities 93,000

* FY 2011 UOG General Fund supplement at 50%

** Faculty Salaries - John Brown at 25% & Hui Gong at 25% of total cost,

This financial projection assumes no PPP, and that whether or not a PPP is executed, GADTC can grow independently over time and reduce its dependence on the UOG General fund.

Sales are FOB with the buyer paying all packing and shipping costs as is standard industry practice.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

C. GADTC Cash Flow Statement Projection

ATTACHMENT C: GADTC CASH FLOW STATEMENT PROJECTION

	2010	2011	2012	2013	2014
Cash at Beginning of Year	75,000	81,875	88,326	65,046	71,975
Operating Cash Flow					
Net Income	84,875	76,451	16,720	46,929	114,827
Capital Investment	78,000	70,000	40,000	40,000	70,000
Financing Cash Flow	0	0	0	0	0
Net Increase in Cash	<u>6,875</u>	<u>6,451</u>	<u>-23,280</u>	<u>6,929</u>	<u>44,827</u>
Cash at End of Year	81,875	88,326	65,046	71,975	116,802

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

D. GADTC Capital Expenditures Projection

ATTACHMENT D: GADTC CAPITAL EXPENDITURE PROJECTION

	2010	2011	2012	2013	2014
Comp. of renovation of main building	25,000				
Const. of Grouper holding & spawning	35,000				
Purchase of pick-up truck	18,000				
Const. of small metal replacements		20,000			
Fencing & control facilities		50,000			
Additional main building facilities			40,000		
Additional tank space				<u>40,000</u>	<u>70,000</u>
TOTAL CAPITAL EXPENDITURES	78,000	70,000	40,000	40,000	70,000

Please refer to General Attachment 3 in Appendix A for details of the capital improvement plan.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

E. GADTC Shrimp Broodstock Enterprise Projection

ATTACHMENT E: SHRIMP BROODSTOCK ENTERPRISE PROJECTION AS UOG OPERATION

	2010	2011	2012	2013	2014
Sales of broodstock	8,000	12,000	16,000	20,000	24,000
Market Price	25	25	25	25	25
Gross Receipts	200,000	300,000	400,000	500,000	600,000
Sales commissions	<u>70,000</u>	<u>75,000</u>	<u>100,000</u>	<u>125,000</u>	<u>150,000</u>
Net to GADTC	130,000	225,000	300,000	375,000	450,000
Expenses					
Shrimp labor	80,000	80,000	125,000	125,000	125,000
Shrimp utilities	38,400	38,400	38,400	38,400	38,400
Shrimp feed and supplies	36,000	39,000	45,000	48,000	51,000
Shrimp maintenance	14,800	14,800	14,800	14,800	14,800
Total Expenses	<u>169,200</u>	<u>172,200</u>	<u>223,200</u>	<u>226,200</u>	<u>229,200</u>
Net Surplus / (Deficit)	-39,200	52,800	76,800	148,800	220,800

This enterprise partial budget for the shrimp broodstock operation is a subset of the overall GADTC financial statement. It differs from the Income statement in Appendix B as it assumes that broodstock sales will be limited by the ability of the GADTC to develop markets over time.

APPENDIX A:
GENERAL ATTACHMENTS

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

GENERAL ATTACHMENT 1: Current University of Guam Employees affiliated with the GADTC

1. John W. Brown, PhD
Tenured Professor - Agricultural Economics
Research appointment in the Agricultural Experiment Station
Funding source - Hatch Formula Funds
Total staffing pattern cost - \$152,500.
2. Hui Gong, PhD.
Tenure track Assistant Professor - Aquaculture
Research appointment in the Agricultural Experiment Station
Funding source - Hatch Formula Funds
Total staffing pattern cost - \$104,416.
3. Frank Alig
Civil Servant -Biologist IV - Hatchery Manager
Funding source - UOG staffing pattern - General Funds
Total staffing pattern cost - \$57,217.
4. Jinhua (Jerry) Xiong, PhD. in Molecular Genetics
Limited term employee - "J Visa - Scholarly Exchange"
Funding source - NOAA Shrimp Grant
Annual cost - \$15,200.
5. Yongzhen (Fisher) Zhang, PhD. in Animal Breeding
Limited term employee - "J Visa - Scholarly Exchange"
Funding source - NOAA Shrimp Grant
Annual cost - \$15,200.
6. Ricardo Manabusan
Limited term employee - grounds & general maintenance
Funding source - hatchery revenue account
Annual cost - \$23,000.
7. Michael Morta
Limited term employee - Animal care and general maintenance
Funding source - local appropriation
Annual cost - \$19,380.
8. Nichole San Nicholas
Limited term employee - Animal care and general maintenance
Funding source - local appropriation
Annual cost - \$20,040.
9. Jeremy Paulino
Limited term employee - Animal care and general maintenance
Funding source - local appropriation
Annual cost - \$17,025.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Resumes & Professional Accomplishments

John William Brown

College of Natural and Applied Sciences
University of Guam
Mangilao, Guam 96923
Phone: (671) 735-2100 Fax: (671) 734-4600
e-mail: jbrown@uog.edu

Professional Experience:

- 1989-present **Professor, Associate and Assistant Professor** of Agricultural Economics, University of Guam. (since 2001, faculty supervisor GADTC)
- 1995-2004 **Associate Director, acting Associate Dean/Director for Extension and Research** (intermittent) Agricultural Experiment Station and Guam Cooperative Extension Service, College of Natural and Applied Sciences, University of Guam.
- 1983-1989 **Teaching and Research Assistant**, North Carolina State University.
- 1980-1983 **Industry Economist**, South Carolina Sea Grant Consortium, and National Marine Fisheries Service.
- 1978-1980 **Research Assistant**, University of Florida.

Education:

- 1983-1989 **North Carolina State University**, Ph.D. in Economics, August 1989.
- 1978-1980 **University of Florida**, completed all course-work for M.S. in Agricultural Economics.
- 1977-1978 **University of Cincinnati**, graduate business courses in night school.
- 1972-1975 **Indiana University**, B.S. in Biology, May 1975.

Publications: Selected Journal Articles

- Brown, John W. 2003. "Agricultural Research Institutions in the Tropical Insular Pacific." in Proceedings of a Workshop on Sustainable Agriculture in the Pacific and Asian Regions. Micronesica Supplement No. 7:3-11.
- Marutani, M., J. Brown, F. Cruz and G. Wall. 1997. "Agricultural crop production on Guam during the 20th century." Micronesica 30(2):389-415.
- Muniappan, R., G. R. W. Denton, J. W. Brown, T.S. Lali, U. Prasda and P. Singh. 1996. "Effectiveness of the Natural Enemies of *Lantanna camara* on Guam: A site and Seasonal evaluation." Entomophaga 41(2):1-16.
- Brown, John W., Paul Chirichetti and David Crisostomo. 1994. "A Cage Culture Trial of *Siganus randalii* on Guam." Asian Fisheries Science 7:53-56.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Bowen, Richard L., John W. Brown and John M. Halloran. 1994. "Agricultural-Tourism Linkages in Micronesia." ISLA 2(1):23-46.

Publications: Other Selected Publications

Goldman, Lee and John Brown. 2007. Evaluation of live food versus artificial food on the growth of the juvenile coral *Pocillopora damicornis* cultured from planulae. Presented at Asian-Pacific Aquaculture 2007. August 5-9, 2007. Hanoi, Viet Nam.

Brown, John, Stephen G. Nelson, Lisa Chau, and Kathy Tang. 2007. Survey of shrimp viruses in imported shrimp and crabs sold in local markets of Guam. Presented at Asian-Pacific Aquaculture 2007. August 5-9, 2007. Hanoi, Viet Nam.

Goldman, Lee and John Brown. 2006. From larvae to market: growing scleractinian corals from sexually produced larvae for the aquarium trade. Presented at: Skretting Auatralasian Aquaculture 2006. August 27-30, Adelaide, Australia.

Brown, John, Robert Tomasetti, Lisa Chau, Stephen Nelson, Kathy Tang and Donald Lightner. 2006. Survey of white spot syndrome virus in wild-caught crab and fresh shrimp sold in local markets of Guam. Presented at: Aquaculture America 2006, February 13-16, 2006, Las Vegas, Nevada.

Brown, John, Vic Camacho, Frank Alig, Stephen Nelson, Kathy Tang, Donald Lightner. 2005. "Detection and origin of White Spot Syndrome Virus from an Outbreak on Guam in 2004." Abstracted in: World Aquaculture 2005: Book of Abstracts. WAS Annual Meeting, Nusa Dua, Bali, Indonesia, May 9-13, 2005.

O'Brien, D. J. Bradley, J. Brown, P. Callaghan, R. Colfax, C. Hansen, J. Keck and J. Woodard. 1999. "Chapter II - Development Potential for Existing Industry (P.I.'s for this component: John Woodard, John Brown and David O'Brien)" in Development Planning for the CNMI's Economic Future. A report to the Northern Marianas College, Saipan, CNMI. TBC Consulting, Mangilao, Guam. 59pp.

Brown, John W. and Anthony Benavente. 1999. Guide to aquaculture on Guam: prospects, permits and assistance. Agricultural Experiment Station, College of Agriculture and Life Sciences, University of Guam, Mangilao. 24 pp.

Recent Grants:

Principle Investigator - USDA CTSA. "Inter-Institutional Coordination and preparation of a Guam Aquaculture Development Plan." 1-year 2007-2008. \$25,000.

Principle Investigator - USDA T-STAR. "Disease survey and marketing prospects for specific-pathogen-free shrimp production on Guam." 3-years, 2003-2006. \$184,135.

Cooperator - DOC NOAA NMFS S-K. "Specific-pathogen free (SPF) marine shrimp culture on Guam." 1-year, 2003. \$80,135.

Cooperator - USDA, IFAFS. "Demonstration of a model integrated small farm for the U.S. Caribbean and Pacific Islands." 4-years, 2000-2004. \$750,000.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

CURRICULUM VITAE – Hui Gong

P O Box 5348, UOG Station, Mangilao, GU96923, USA

Phone: (671) 735-2144 Fax: (671) 734-4600

E-mail: hgong@uguam.uog.edu

Education

- Ph.D. Department of Wildlife and Fisheries Sciences, Texas A&M University, Dec. 1999.
M.Sc Institute of Oceanology, Chinese Academy of Sciences, Jul. 1994.
B.Sc Ocean University of China, Jul. 1991.

Professional Experience Highlight

- Feb. 2007 ---- Present Assistant Professor, College of Natural and Applied Sciences, University of Guam.
Apr. 2003 ---- Jan. 2007 Shrimp Health Assurance Manager and ShrimpTraq Database Manager, Sygen International at Franklin, KY.
Sept. 2003 ---- Apr. 2005 Research Associate in Molecular Biology, Sygen International at Berkeley, CA.
Mar. 2003 ---- Aug. 2003 Visiting Researcher, Comprehensive Cancer Center, Univ. of California in San Francisco.
Dec. 1999 ---- Oct. 2002 Biologist and Assistant Production Manager, Arizona Mariculture Associates, LLC. in Dateland, AZ.

Published Papers

- Ciobanu, D.C., J.W.M. Bastiaansen, J. Magrin, J.L. Rocha, D.-H. Jiang, N. Yu, B. Geiger, N. Deeb, D. Rocha, **H. Gong**, B.P. Kinghorn, G.S. Plastow, H.A.M. van der Steen, A.J. Mileham. 2009. A major SNP resource for dissection of phenotypic and genetic variation in Pacific white shrimp (*Litopenaeus vannamei*). *Animal Genetics*. (Accepted).
- Velasco-Escudero, M., **H. Gong**. 2009. Applications of SCOs for Aquaculture (Book chapter). *Single Cell Oils*. (Pending).
- Pontoja, C.R., X. Song, X. Lee, **H. Gong**, J. Wilkenfeld, B. Noble, D.V. Lightner. 2005. Development of a Specific Pathogen-Free (SPF) population of the Chinese Fleashy Prawn *Fenneropenaeus chinensis* Part 1: Disease Pre-screening and Primary Quarantine. *Aquaculture* 250, 573-578.
- Gong, H.**, D. H. Jiang, D. V. Lightner, C. Collins, D. Brock. 2004. A Dietary Modification Approach to Improve the Osmoregulatory Capacity of *Litopenaeus vannamei* Cultured in the Arizona Desert. *Aquaculture Nutrition* 10, 227-236.
- Gong, H.**, D. H. Jiang, A. L. Lawrence. 2004. Phospholipids: Essential Nutrients for Shrimp. *Global Aquaculture Advocate* 7(3), 40-42.
- Gong, H.**, A. L. Lawrence, D.H. Jiang, D.M. Gatlin III. 2003. Effect of Dietary Phospholipids on the Choline Requirement of *Litopenaeus vannamei* Juveniles. *Journal of the World Aquaculture Society*. 34 (3), 289-299.
- Gong, H.**, D. H. Jiang, D. V. Lightner. 2003. Dietary Modification for Desert Shrimp Farming. *Global Aquaculture Advocate* 6(4), 50-51.
- Pontoja, C.R., D.V. Lightner, X. Song, X. Lee, **H. Gong**, J. Wilkenfeld. 2003. SPF Line of *Penaeus chinensis* Shrimp Under Development. *Global Aquaculture Advocate* 5(2), 10-11.
- Gong, H.**, A. L. Lawrence, D. M. Gatlin III, D. H. Jiang, F. Zhang. 2001. Comparison of Different Types and Levels of Commercial Soybean Lecithin Supplemented in Semipurified Diets for Juvenile *Litopenaeus vannamei* Boone. *Aquaculture Nutrition* 7, 11-17.
- Gong, H.**, D.H. Jiang, A.L. Lawrence, D.M. Gatlin III. 2001. Lipid Nutrition of *Litopenaeus vannamei*. *Global Aquaculture Advocate* 4(2), 48-50.
- Jiang, D. H., **H. Gong**, A. L. Lawrence, W. E. Grant, 2001. A Simulation Model for Shrimp Growth: Effects of Temperature, Salinity and Dietary Protein/Energy. *Proceedings of the V Latin American Aquaculture Conference*. Guayaquil, Ecuador. October 24 - 27th.

Gong, H., A. L. Lawrence, D. H. Jiang, F. L. Castille, D. M. Gatlin III. 2000. Lipid Nutrition of Juvenile *Litopenaeus vannamei* I. Dietary Cholesterol and Phospholipid Requirements and Their Interaction. *Aquaculture* 180, 305-324.

Jiang, D. H., A. L. Lawrence, W. H. Neill, **H. Gong**. 2000. Effects of Temperature and Salinity on Nitrogenous Excretion by *Litopenaeus vannamei* Juveniles. *Journal of Experimental Marine Biology and Ecology* 253 (2), 193-209.

Gong, H., A. L. Lawrence, D. H. Jiang, D. M. Gatlin III. 2000. Lipid Nutrition of *Litopenaeus vannamei*. II. Active Components of Soybean Lecithin. *Aquaculture* 180, 325-342.

Recent Presentation/Abstracts

Gong, H., A.L. Lawrence, F. Alig, D.H. Jiang. 2008. Performance of Two Different Lines of *Penaeus vannamei* in Response to Different Dietary Protein Sources and Levels. World Aquaculture Society Annual Conference. Busan, Korea. May 19-23.

Gong, H., D.H. Jiang, A. Rojas, L. Juarez. 2008. Evaluation of Family Effect on *Penaeus vannamei* Refractory to IHNV Infection. World Aquaculture Society Annual Conference. Busan, Korea. May 19-23.

Jiang, D. H., H. Gong, A. Rojas, L. Juarez. 2008. Quantitative Effect of IHNV Prevalence on Production Performance of the Pacific White Shrimp, *Penaeus vannamei*. World Aquaculture Society Annual Conference. Busan, Korea. May 19-23.

Jiang, D.H., **H. Gong**. 2007. Genetic selection of SPF shrimp in US: History, Current Status and Application of Biotechnology in Shrimp Breeding. Proceedings of the 5th Global Chinese Symposium for the Crustacean Aquaculture (Nov. 2-5, 2006, Shanghai, China). Pages 398-399.

Jiang, D.H., **H. Gong**, M. Torremorell and G. Illing, 2006. Shrimp Health Management in Breeding Program. Thai Fish Expo 2006. Jun 24-27, Bangkok, Thailand.

Jiang D. H., M. Torremorell, **H. Gong** and A. C. Guerrelhas, 2006. SPF and SPR Lines: Myths and Realities – Are They Possible in Brazil? FENACAM (Feira Nacional De Camarao). Natal, Rio Grande de Norte, Brazil. March 21-24. 38pp.

Jiang, D. H., M. Torremorell, **H. Gong**, H. van der Steen, 2005. Specific Pathogen Free and/or Resistant Broodstock: a Conflict, Compromise or Opportunity? The 2nd International Aquaculture Forum. Hermosillo, Sonora, Mexico. December 1-3.

Gong, H., D.H. Jiang, A.L. Lawrence, 2004. Phospholipids in Shrimp Nutrition: A review. World Aquaculture Society Annual Conference. Honolulu, Hawaii. March 1-5. 230pp.

Gong, H., D.H. Jiang, D. V. Lightner, C. Collins, 2003. Improving Osmoregulatory Capacity of *Litopenaeus vannamei* Cultured in Brackish Water through Dietary Modifications. *Aquaculture America* 2003, Kentucky.

Gong, H., D.H. Jiang, A. L. Lawrence, D.M. Gatlin III, 2002. Lipid Nutrition of *Litopenaeus vannamei*: Phospholipids and Application. The 93rd AOCS Annual Meeting & Exp., Montreal, Canada. May 5-8.

Competitive Grants

Promoting Health Management of Shrimp Aquaculture on Guam and the Commonwealth of the Northern Mariana Islands (CNMI). PI: **Hui Gong**. CTSA. \$35,000 for 2008-2009.

Evaluation of Genetic Variability of Plant Protein Utilization Efficiency in the Pacific White Shrimp, *Penaeus vannamei*. PI: **Hui Gong**, Co-PIs: Donghuo Jiang, Addison L. Lawrence. NOAA. \$60,000 for 2008-2009.

Value Added Approach for Tuna Fish Roe: Local Ingredient for Shrimp Maturation Diet? PI: **Hui Gong**. CTSA. \$50,000 for 2009-2010.

Genetic variability study of specific pathogen free pacific white shrimp *Penaeus vannamei* on Guam. PI: **Hui Gong**. TSTAR. \$186,960 for 2009-2011.

GENERAL ATTACHMENT 2: Federal Programs and Grants

Formula Funds: USDA Hatch pays approximately 50% of the salaries of Drs. Brown and Gong, and in some years, it provides additional discretionary research funding (In FY-2009, this amount was \$10,000 each).

Grants at completion:

Inter-Institutional Coordination and preparation of a Guam Aquaculture Development Plan. 2-years from 2007 to 2009. USDA CTSA \$25,000.

On-going Grants:

Promoting Health Management of Shrimp Aquaculture on Guam and the Commonwealth of the Northern Mariana Islands (CNMI). PI: Hui Gong. CTSA. \$35,000 for 2008-2009.

Evaluation of Genetic Variability of Plant Protein Utilization Efficiency in the Pacific White Shrimp, *Penaeus vannamei*. PI: Hui Gong, Co-PIs: Donghuo Jiang, Addison L. Lawrence. NOAA. \$60,000 for 2008-2009.

Value Added Approach for Tuna Fish Roe: Local Ingredient for Shrimp Maturation Diet? PI: Hui Gong. CTSA. \$50,000 for 2009-2010.

Genetic variability study of specific pathogen free pacific white shrimp *Penaeus vannamei* on Guam. PI: Hui Gong. TSTAR. \$186,960 for 2009-2011.

Grants in Review:

Grouper facility construction - \$97,000 - one year. PI: J. Brown. DOI, USF&WS, Sport Fishing Restoration. The proposal has been included in the proposal package submitted by DAWR to the USF&WS

Grouper broodstock collection - \$60,000 - one year. PI: Hui Gong. USDA, CTSA. The proposal has been approved by the CTSA Industry Committee and returned for final revisions.

Development of Nutritional Complete and Optimized Practical Diets for Growing the Rabbitfish (*Siganus argenteus*) on Guam - \$60,000 - two years. PI: Hui Gong. USDA, CTSA. The proposal has been approved by the CTSA Industry Committee and returned for final revisions.

Grants in Preparation:

USDA, T-STAR. SPF Broodstock for Palau - not yet determined. Miguel Delos Santos of Palau Community College has approached Drs. Brown and Gong about submitting a USDA, T-STAR project on SPF groupers for the current year funding cycle. If the project is approved, will start about 1 Oct. 2010.

GENERAL ATTACHMENT 3:

Timing and Schedule of Capital Expenditures

1. Demolition of Main Hatchery Building - \$26,900 - completed FY-09
2. Installation of tin roofs on three concrete block wall areas - \$14,900 - completed FY-09
3. Repair and renovation of existing concrete roof - \$3,000
4. Purchase and erection of 2 small steel arch buildings (16x24 & 16x34) - upper area \$13,600 purchased - FY-09 and under construction
5. Purchase and erection of 1 large steel arch building (30x50) - lower area \$14,900 purchased - FY-09 and currently en route from mainland shipping costs FY-10 budgeted at \$5,000 erection costs FY-10 budgeted at \$5,000
6. Renovation - rewiring of electrical systems for hatchery complex FY-10 budgeted at \$15,000
7. Purchase of pick-up truck - FY-10 budgeted at \$18,000
8. Purchase and installation of 1 small steel arch building (16x34) - upper area and construction of grouper holding tanks - FY-10 \$35,000
9. Fencing and biosecurity control facilities - FY-11 - \$50,000
10. Purchase and erection of small steel building - FY-11 - \$20,000
11. Additional main building facilities - FY-12 - \$70,000
12. Additional tank space - FY-13- \$70,000

GENERAL ATTACHMENT 4:

Active Travel Plans - Drs. Brown and Gong for FY-2010

13-15 Oct., 2009

Integrated Technologies for Advanced Shrimp Production, Honolulu, HI
H. Gong - Continental endowment air ticket - \$2,400 paid by USDA, T-STAR
J. Xiong & Y. Zhang - unknown cost paid by Guangxi Fisheries Institute

10-12 Nov., 2009

Taiwan AquaSeed. Kaoshiung, Taiwan, ROC.
J. Brown and H. Gong unknown cost paid by Taiwan Government

Dec., 2009

University of Guam Delegation Visit to Guangxi, Nanning, Guangzi, China
H. Gong - \$4,000 to be paid by GADTC

8-11 Dec., 2009,

SPC Aquaculture Expert Consultation on Tilapia. Noumea, New Caledonia
J. Brown - unknown cost paid by SPC

Feb. 2010

Marketing trip to Evergreen in Hianan Province, China
J. Brown - \$4,000 to be paid for by GADTC

1-5 Mar., 2010

World Aquaculture 2010, , San Diego, CA
H. Gong - \$4,000 to be paid for by CTSA Health Management grant

31 May - 4 Jun., 2010,

The 14th International Symposium on Fish Nutrition and Feeding. Qingdao, China.
H. Gong - \$3,000 to be paid from CTSA Fish Roe Grant

9 - 12 Jun. 2010

Global Conference on Aquaculture 2010, , Bangkok, Thailand
J. Brown - \$4,000 to be paid for by GADTC

Sep. 2010

Follow-up on planed field trials in China either Guangxi or Hianan Provence, China
H. Gong or J. Brown - \$4,000 to be paid for by GADTC

Appendix B – Public-Private Partnership

Because of the restrictions placed by the laws of the Government of Guam on investment relationships between public and private organizations, opportunities for a public-private partnership between a private company and the University of Guam are limited.

For this reason, we believe that the best way to structure public-private partnership would through a license agreement. Under a license agreement, the private company will:

- Enter into a long term lease for parts of the GADTC facility, and makes monthly lease payments to UOG;
- Pay a periodic royalty payment to UOG based on breeder shrimp production;
- Agrees to hire and maintain employment for selected GADTC employees for a limited period of time; and
- Agree to allow aquaculture research and fingerling production in support of local aquaculture farmers to continue at the GADTC.

GADTC shrimp broodstock are currently being tested in performance trials by a major Asian buyer. If these trials are successful, we believe that this private company will have a very high incentive to secure exclusive access to GADTC shrimp broodstock. The reasons for this are as follows:

- GADTC is a bio secure facility – meaning that the opportunities for disease to penetrate the shrimp broodstock population is minimal;
- GADTC is physically isolated from other shrimp breeding centers;
- GADTC is located in a pristine area of Guam, further limiting the possibility of contamination or disease from entering the shrimp broodstock population; and
- GADTC would provide a competitive advantage for the private company by obtaining an exclusive source of supply to high quality shrimp broodstock.

Because we are still in the testing phase, we believe that the appropriate timeframe for a licensing agreement between a private company and UOG covering the GADTC facility would be three years.

Recent Correspondence between Evergreen and UOG:

October 1, 2009

Corp Mentalist wrote:
Dear John,

I am back in Kaohsiung for a 2-week rest.

I have a personal question for you. In your opinion, what would be the best working relationship between your institution and Evergreen? Would it be possible that two parties form a joint company in Guam? Before I came back to Taiwan, I asked the chairman of Evergreen whether he can make a trip with me to Guam. He indicated that it is possible if the time is permitted.

Before we come to see you, I hope that we have some ideas or mutual understanding on what to do in the future. Evergreen's simple goal is to ensure 10,000 to 20,000 pairs of good *L. vannamei* broodstock (same quality as SIS) per year for its own use.

I look forward to your opinions.

Best regards,

Hann-Jin

October 12, 2009

Dear Hann-Jin,

It is good to hear from you. I am sorry for being a little bit slow to get back to you. The upper administration of the University has recently demanded a lot of my time and attention as they try to determine the future of the hatchery.

You asked for my opinion about the best way for Evergreen to form a working relationship with UOG. Your stated goal is to ensure 10,000 to 20,000 pairs of high quality *L. vannamei* broodstock per year of a quality similar to that produced by SIS.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

SIS has been in genetic selection for many years, and we have started our breeding program in 2007, but with good genetic foundations from SyAqua and OI. I understand that SIS currently produces the best available broodstock, and it would not surprise me that we do not match them. I believe that we will produce comparable broodstock if given the resources to manage our breeding and to test our product.

Assuming that SIS won't be supply all Evergreen's needs in long run (which is very likely), we offer a chance to develop as an alternative supply source. Or better, I think that we offer an opportunity to become the primary source and to give Evergreen long term ownership and control of the quality of the product if the arrangement can be worked out properly

You asked about the possibility of forming joint venture. I think that a simple shared company with the University would not be in your best interest. We spent a lot of money getting a legal opinion. It said that a company in which the Government of Guam had an ownership stake would be subject to the Government procurement laws and regulations, which is a slow and complicated process. As such, any form of JV is not advisable.

I think that the best long-run solution for both parties would be a custom breeding program where Evergreen would retain ownership rights in the intellectual property developed. If the relationship ended, you could transfer your lines elsewhere.

We could produce custom breed PL's here and ship them to Evergreen for growout and maturation as broodstock, or we could produce broodstock on Guam from the breeding program, or some combination of the two approaches.

If you have additional breeding lines that you would like to incorporate into the program, we could include them after a sufficient period of quarantine. This would offer a safe haven in case you have disease issues elsewhere.

Since the quality of broodstock depends on both the genetics and the quality of the conditions under which they are raised, Evergreen could also form a local company on Guam and lease space at the hatchery to growout the broodstock under its control. This would mean that you would have control of the growout, maturation, packing and shipping of your broodstock.

The process of establishing this relationship could proceed along the following steps: First, UOG would sell Evergreen a set of shrimp families of different lines. This would establish Evergreen's ownership of the material. This can be done without too much procurement formalities. We have done this in the past. These lines would then stay in Guam, or they could be split and duplicate sets created. One set could stay on Guam and one set could be shipped to you.

Second, UOG and Evergreen would negotiate a custom breeding contract. This could be for 5 years with optional extensions. UOG would maintain the lines and do the breeding and

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Evergreen would do the field performance testing. Ownership would stay with Evergreen.

Third, UOG and Evergreen would determine the best way to product the numbers and quality of broodstock that Evergreen needs. This could be under a custom production contract (which would require a relatively simple paperwork process), or Evergreen could lease a part of our facility and take full control of the process (the paperwork would be somewhat more time consuming, but I think that it could be done).

A very similar alternative would be: Evergreen can (1) set up a company on Guam, (2) buy genetic resources from UOG (sole or partial ownership), (3) rent sufficient facility from our hatchery for breeding, (4) establish an agreement that UOG will provide technical support to run the breeding program and train your staff. In such case, you will have control over both strategy development and actual operation.

If Evergreen does not want to get into the breeding business, then I am sure that we can figure out an alternative. Some of the possibilities would be that we can negotiate a contract and generate a target number of broodstock, and you could post a quality control person here or contract out this function locally. The option of leasing a part of the facility and controlling the growout process yourselves would still be possible.

I think that there are only two possibilities that I would strongly oppose. One would be to completely lease the facility which would close-out our use of it to do research. The second would be any option that UOG would give up control of the biosecurity at the facility.

Finally, we are in the process of producing broodstock for this upcoming season. We usually do not prepare for a large amount of broodstock. If your broodstock need is in 10-20k range, we will need ~50% deposit (\$12/pcs deposit) in order to secure the supply. I would like to know - what is your interest in these animals? Are you still considering purchasing for this Winter/Spring?

Yours,
John

Note: An Estimated Income Statement for a Private Partner is set out below.

GUAM AQUACULTURE DEVELOPMENT AND TRAINING CENTER

Estimated Income Statement for a Private Partner*:

	2010	2011	2012	2013	2014
Sales of broodstock	28,000	28,000	28,000	28,000	28,000
Market Price	25	25	25	25	25
Gross Revenues	700,000	700,000	700,000	700,000	700,000
Expenses					
Breeding Program (UOG)	180,000	180,000	180,000	180,000	180,000
Lease Payment (UOG)	90,000	90,000	90,000	90,000	90,000
Shrimp Maintenance (UOG)	24,000	24,000	24,000	24,000	24,000
Shrimp Utilities (UOG)	54,000	54,000	54,000	54,000	54,000
PPP Contribution to UOG	348,000	348,000	348,000	348,000	348,000
Shrimp Labor	125,000	125,000	125,000	125,000	125,000
Shrimp Feed and Supplies	45,000	45,000	45,000	45,000	45,000
Total Expenses	<u>518,000</u>	<u>518,000</u>	<u>518,000</u>	<u>518,000</u>	<u>518,000</u>
Net Surplus / (Deficit)	182,000	182,000	182,000	182,000	182,000

The financial statements in the main body of the business plan were limited by GADTC's ability to market its shrimp broodstock. This pro forma income statement is what we believe a PPP can achieve subject to the production constraints imposed by the physical plant at the facility.