TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Technical Assistance for Shrimp Fishermen

Developed by

M.G. Haby, R.J. Miget, & G.L. Graham

Texas Cooperative Extension
Sea Grant College Program
Texas A&M University

January, 2004

Texas Cooperative EXTENSION
The Texas A&M University System

Sea Grant

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Topics Covered in this Technical Assistance Program

- Roots of the economic crisis
- Response to the economic crisis by:
  - Industry
  - Government
  - Universities
- What can you do now?

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Roots of The Economic Crisis … A *"Perfect, Economic Storm"*

- **Growing supplies of farm-raised shrimp + a global, economic slowdown starting in 2000 = lower worldwide shrimp prices.**

- **U.S. shrimp prices were pushed even lower by:**
  - **enforcement of food safety standards in the E.U.**
  - **a strong U.S. Dollar (until recently)**
  - **higher tariffs for some Asian shrimp in the E.U.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Industry Response to the Economic Crisis

- **Southern Shrimp Alliance (SSA) created.**
- **SSA initiates anti-dumping litigation against some shrimp-exporting countries.**
- **Shrimp industry trade associations work to create generic marketing programs.**
- **SSA asks Sea Grant to create a quality certification program that would *"guarantee"* premium-quality, shrimp.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Government Response to the Economic Crisis

- **Congress authorizes $35 million for shrimp fishermen.**
- **GSAFF funds research that re-confirms how flavor differences occur in wild shrimp.**
- **FDA adopts worldwide standard for antibiotic residues.**
- **State shrimp marketing programs created.**
- **USDA declares commercial fishermen eligible for Trade Adjustment Assistance if injured by imports.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

University Response to the Economic Crisis

- **TAMU faculty documents the magnitude and scope of the unprecedented, economic crisis (2002).**
- **Sea Grant faculty begin designing a verifiable quality management program for cooperating producers and processors known as *"The Mark of Quality"* (2003).**
- **TAMU faculty prepare the report that establishes eligibility for Trade Adjustment Assistance (2003).**
- **TAMU conducts Technical Assistance (2004).**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

What has been learned over the last three years?

- **Industry trade associations have put the economic crisis of producers and processors on the *"radar screens"* of federal, state, and local elected officials.**
- **This economic crisis has been driven by an imbalance between worldwide supply and demand; not resource management concerns that exist in other fisheries.**
- **Fundamental changes are afoot in the American marketplace … the old ways will not be sufficient.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

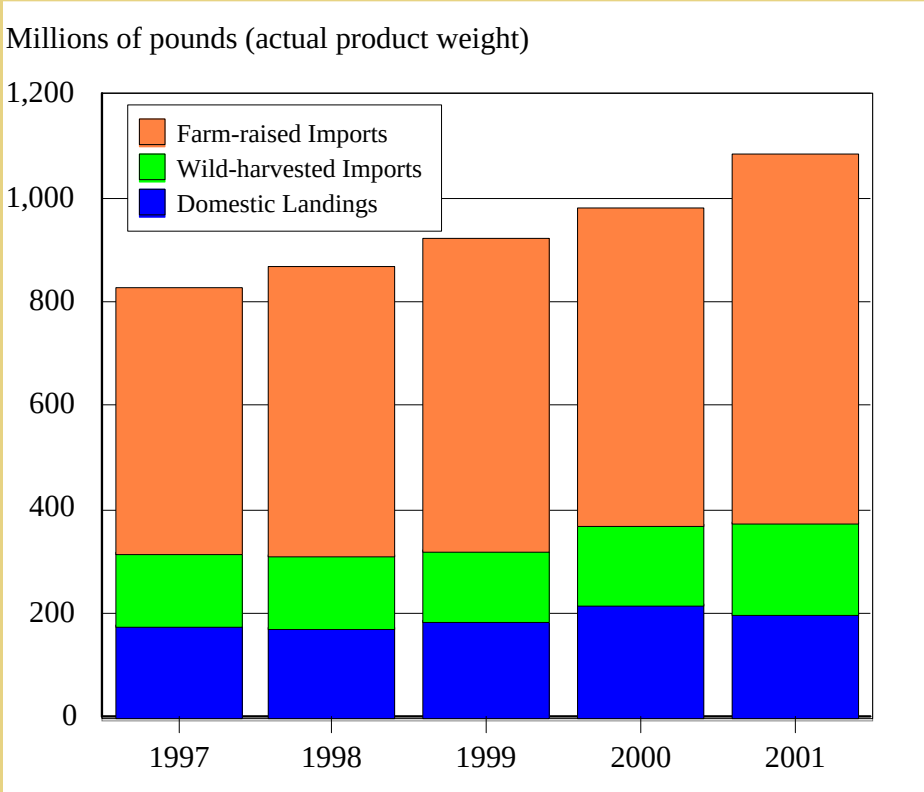
Meet the New Competitor … Internationally Farmed Shrimp

- 36 percent of world supplies.
- Further growth expected since:
  - wild resources fully utilized
  - better culture technology.
- Provides local employment.
- Export revenues fund national infrastructure improvements.

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

The American Shrimp Market

- **Demand has exceeded landings for over 40 years.**
- **Imports fuel growth in domestic shrimp market.**
- **Cultured imports comprise 65 percent of total beginning supplies.**



TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Cultured Imports Have Created A Higher Quality Expectation!

- **With 65 percent of beginning supplies, the quality standards of farmed production have become the new standard by which all other shrimp are judged.**

- **This upgraded quality standard is a fundamental change to which we must adapt.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Conformance to Specifications Determines Shrimp Value

- **Product condition:**
  - odor
  - texture
  - dehydration
  - no black-spot
  - no chemical abuse
- **Pack style:**
  - weights, counts & uniformity
  - no damaged tails or pieces
  - no soft-shells

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

It's true … there is a price for every shrimp … but

- **shrimp not meeting the new, upgraded quality standards will be relegated to a lower tier within the market and will be priced accordingly.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

What Can You do Now?

- **The fastest way to improve everyone's "bottom line" is to improve the quality of the shrimp you land.**

- **TAMU researchers found that by reducing physical damage defects, vessel revenues increased by about $22,000 a year (with about 55,000 lb. of production).**

- **TAMU researchers also found that improved quality significantly reduced the production expense ratio – the cost to land a dollar's worth of shrimp – from 98¢ to 93¢.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

What Conditions Impact the Quality of Wild Shrimp?

- Tow times
- Back-deck activities once shrimp are landed
  - culling
  - heading
  - washing / dipping
  - stowing below deck
- With freezer boats:
  - bagging or boxing
  - on-deck brine freezing
  - stowing IQF shrimp below deck

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

How Do Tow Times Impact the Quality of Wild Shrimp?

- **Unavoidably, wild shrimp usually die in the net.**
- **Upon death, bacteria and enzymes attack the "freshness" of shrimp at a rate dependent upon water temperature.**



TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

On the Other Hand …

- **Farm-raised shrimp typically die in a slush-ice bath as their body temperature drops to 32° F.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Shrimp Quality Improves With Shorter Tow Times

- **Physical damage is reduced. Pieces are a major drag on revenue. In summer 2003, a piece was worth about 38 percent of what a whole tail would have fetched.**

- **When shrimp spend less time in the net,**
  - **growth of spoilage bacteria is minimized and**
  - **accumulation of enzymes that discolor shrimp is reduced.**

- **Shorter tows create “spill over” benefits for back deck operations.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Recommended Number of Drags & Maximum Duration

Months	Number of Drags & Duration
January – April	3 drags per night
May – June	No drag longer than 3 hours
July – September	Only 2-hour drags
October – December	No drag longer than 3 hours

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

In Summer, "Smart" Back-deck Procedures are Essential (1)

- **44 percent of annual Texas shrimp production occurs between mid-July and August 31.**
- **The objective needs to be complete processing of the catch in segments rather than completing each step – culling, heading, washing, and freezing – as "one big job" before moving to the next task.**
- **Brine systems can destroy quality during heavy production periods if their freezing capacity is exceeded.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

In Summer, “Smart” Back-deck Procedures are Essential (2)

- **The preferred approach should be to make a basket of *“just-headed”* shrimp the control that triggers the next step like washing, dipping, or freezing.**



TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Management of Brine Freezing Operations for Premium Quality

- **Myths about brine tanks.**
- **Properly charging the brine tank before each cruise.**
- **Knowing when and how to recharge the brine tank with salt and dip.**
- **Managing the quantity of shrimp placed in the tank.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Myths Surrounding Brine Freezing Operations (1)

- ***"The longer my shrimp stay in the brine tank, the more weight they will gain."***

  - **brine is 25 times saltier than a shrimp's body fluids**
  - **water will migrate out of the shrimp into the brine and**
  - **salt will migrate out of the brine into the shrimp until the outside of the shrimp is solidly frozen.**

- **THE FASTER SHRIMP CAN FREEZE THE BETTER!**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

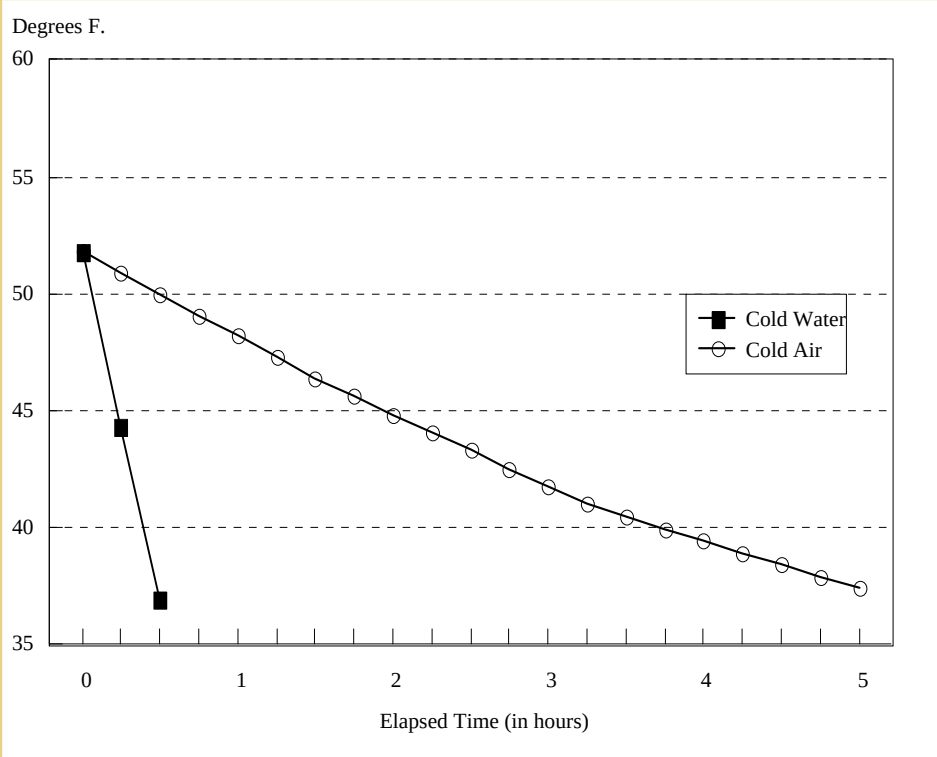
Myths Surrounding Brine Freezing Operations (2)

- ***"Brine units were never designed to freeze shrimp, only chill them so they will freeze faster in the hold."***
  - **Historically this was true, but today properly charged and managed brine units should freeze shrimp in about 20 minutes.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Myths Surrounding Brine Freezing Operations (3)

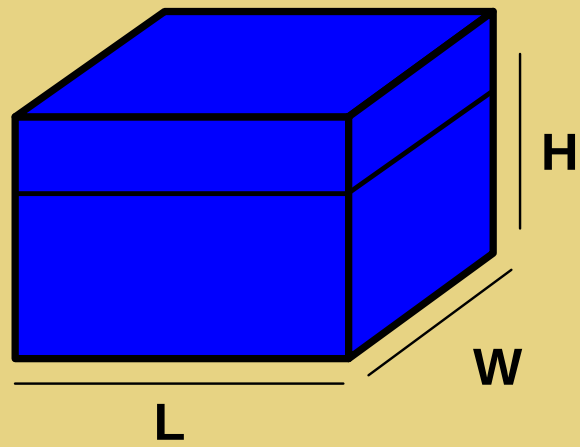
- ***"Putting my shrimp directly in the freezer hold is all that's necessary to ensure good quality shrimp."***
  - **spoilage occurs until the product freezes.**
  - **slow freezing creates large ice crystals that break cells open.**
  - **when thawed, much of the cell fluids leak out.**



TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Charging the Brine Tank Before Each Cruise (1)

- **Determine how many gallons your brine tank holds**
  - **Mark the “full line” (height) & measure it in inches**
  - **Measure the inside width and length of the tank in inches**
  - **Gallons = (height x length x width) / 231.**
  - **So… (36” x 84” x 36”) / 231 = 471 gallons.**
  - **Fill with fresh (city) water to the “fill line.”**



TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Charging the Brine Tank Before Each Cruise (2)

- **Add ingredients to the brine tank (salt, dip powder, and corn syrup or corn syrup solids). The table shows required proportions.**

Ingredient	Proportion	Quantity for 471 gallons
Salt	2.53 lb. / gal.	(2.53 x 471 gal.) = 1,192 lb.
Dip powder	0.074 lb. / gal.	(0.074 x 471 gal.) = 34.8 lb.
Corn syrup	0.12 gal. / gal.	(0.12 x 471 gal.) = 56.5 gal.
or		
Corn syrup solids	1.19 lb. / gal.	(1.19 x 471 gal.) = 560 lb.

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Charging the Brine Tank Before Each Cruise (3)

- **Thoroughly mix these ingredients before cooling.**
- **Use a submersible pump or drum mixer to move the ingredients into solution.**
- **Once ingredients are dissolved, start the compressor. If the brine is mixed correctly the temperature of the brine should approach the coldest temperature possible -6° F.**
- **A working temperature between 5° F and 0° F will freeze shrimp within 20 minutes.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Recharging the Brine Tank During the Cruise (1)

- During brine freezing operations the salt concentration is gradually reduced. As brine becomes less concentrated the minimum achievable temperature increases. This means a longer soak time to freeze shrimp.

- The concentration of dip powder also drops with repetitive use. The practical effect of a low dip concentration is black spot formation as the product thaws.

- Corn syrup or corn syrup solids do not need recharging.

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Recharging the Brine Tank During the Cruise (2)

- **The initial charge is based on the gallon volume of your tank, but recharging is dependent upon the pounds frozen.**

- **After every 1,000 pounds frozen in the brine tank, add**

  - **28 pounds of salt (6.5” deep in a 5-gallon plastic pail)**

  - **1 cup of dip powder.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Recharging the Brine Tank During the Cruise (3)

- **Alternatively, recharging is signaled by a drop in the refractometer reading of 2 units.**

- **To restore those two units to the salt concentration**
  - **multiply tank capacity by 8.3 lb per gallon of brine by the 2 percentage units need to restore the brine to its original concentration.**
  - **So … (471 gal. x 8.3 lb. / gal. x 0.02) = 78 lb. salt**
  - **add three cups of dip powder.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Recharging the Brine Tank During the Cruise (4)

- **Regardless of the recharge method selected – pounds frozen or a 2 unit drop in the refractometer reading – someone needs to monitor one of those conditions.**

- **Remember, the practical effect of ignoring the brine or dip powder concentration during a cruise could mean having the product down-graded at the dock.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Ensuring Peak Performance from the Brine Tank (1)

- **Putting too much shrimp in the tank never allows the brine to get below 20° F. This creates quality problems.**

- **During heavy production periods:**
  - **once a basket of shrimp is headed, begin the next processing step with that container.**
  - **never load the unit with more than 15 pounds of shrimp per 100 gallons of brine. For the 471 gallon unit, a maximum of 70 lb. should be frozen at one time.**
  - **use a thermometer to ensure brine stays between 5° F and 0° F.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Ensuring Peak Performance from the Brine Tank (2)

- **During the first cruise off Texas in mid-July:**
  - **Consider carrying ice in insulated totes that can be secured on deck.**
  - **Use the ice to chill fresh water in a separate container.**
  - **If production exceeds the crew's ability to head and freeze, keep unprocessed shrimp in chilled water until they can be handled.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Quality Management Aboard Ice Boats (1)

- **Just as on freezer boats, the preferred approach should be to make a basket of *"just-headed"* shrimp the control that triggers the next step like washing, dipping, and stowage below deck.**

- **If you use dip powder in a pre-chill ice bath use 1 cup powder for every 10 gallons of water.**

- **If you use dip powder to treat shrimp with deck temperature water use 1.5 cups powder for every 10 gallons of water.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Quality Management Aboard Ice Boats (2)

- **Washing removes some spoilage bacteria – it is an important step.**

- **If Everfresh® is used to prevent black spot, mix one 200 gram pouch in 25 gallons of clean seawater. Agitate shrimp for 2 minutes, then drain and ice.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Summary and Conclusions (1)

- **Industry leaders suggest that wild shrimp be positioned as a premium, high-priced specialty product with attributes that cannot be duplicated in ponds.**

- **Wild shrimp have a flavor that distinguishes them from the vast majority of shrimp available in the U.S., but flavor alone will not establish domestic shrimp as a top-tier specialty product unless it compares favorably with shrimp from high-grade shrimp processors.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Summary and Conclusions (2)

- **Virtually all shrimp fishermen can deliver such a premium-quality product!**

- **Following the procedures outlined in this presentation will enable all operators to maximize their fraction of premium-quality shrimp.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Summary and Conclusions (3)

- **Remember:**
  - **Shorter tow times reduce damage, spoilage, and discoloration.**
  - **The objective of back-deck processing should be complete processing of the catch in segments rather than completing each step as "one big job" before moving to the next task. Use a *"just-headed"* basket of shrimp as the control that triggers next steps.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Summary and Conclusions (4)

- **Remember:**
  - **Brine systems should freeze shrimp in about 20 minutes.**
  - **Quick freezing occurs when the capacity of the system is not overloaded. Use the “15 lb. of shrimp to 100 gallons of brine rule.”**
  - **Brine temperature is key information. Buy a $20.00 thermometer and use it!!**
  - **Monitor the amount of shrimp you run through the tank and recharge with salt and dip powder after every 1,000 lb.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

Final Thoughts

- **The current economic crisis is the result of a worldwide demand/supply imbalance.**
- **Buyers have higher expectations of quality. We must adapt to this fundamental change.**
- **Other industries have found that higher quality doesn't cost; it pays!!**
- **Producing high quality shrimp requires that we work smarter; not harder.**

TAA
Trade Adjustment Assistance for Farmers
Technical Assistance

“It’s Your Future … Be There”