

THE WORLD MARKET FOR TILAPIA

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Depends on **Bulding a Tilapia Culture Industry Modeled After a Successful Poultry Industry.**

My talk today is about how we cant put wings into the Tilapia industry and the advanteges this will bring to both the bulders of the industry and the people who need the food we can produce.

To reach an understanding of just how important the poultry model is to the fish production industry we must first look at the success the poultry industry has had and how they achieved it.

The year of 1993 can be viewed as the year that poultry finally became the dominant meat producing industry in the United States.

Yes, the bird has finally beaten the bull the poultry eaten in the USA has risen to 105 pounds per person to take the number one position as the meat most eaten by americans.

This also means that the average american will eat over 200 meals per year of chicken and will be beager to be ableto afford a good tasting alternative like tilapia.

To accomplish providing enouggh meat to outsell the beef industry, the poultry industry is now producing over 50 billion pounds of live birds to feed our very demanding population.

The reasons the poultry industry is able to do this are because they are:

- 1 - Controlling production cost
- 2 - Achieving new scientific and genetic goals of;
 - A - Getting poultry to grow faster and
 - B - More efficiently on the resources available, and
- 3 - Finding better and more efficient methods of distribution.

The world poultry consumption is well over 300 billion pounds and rising. Modern chicken and poultry farming has provided us with a model for understanding what we have to do reach the goal of providing a low cost high quality fish product equal to poultry.

All we have to do to get tilapia to fly like chicken is:

- 1 - Produce the tilapia for under 25 cents per whole pound,
- 2 - Process a clean, good tasting, healthy and wholesome tilapia and
- 3 - Deliver billions of pounds of tilapia to an expanding global markets.

Sixteen pounds of fish are currently being eaten per person in the USA. Luckily since we are looking at tilapia as "the chicken of the pond" we do not need to be limited by these numbers which apply to fish.

Tilapia must be looked at as the poultry of the pond or as I call it ("**The chicken of the pond**") and not viewed as fish because the market consumption of fish is limited by the current aquaculture production cost or the cost of wild harvest fish.

Demand in the market place can only be measured as an animal that can be produced at the cost of the chicken and therefore that can be marketed under the same market economics as chicken.

This means that even the measures used to predict the market for aquaculture products can not work with tilapia because instead of millions of pounds we may be looking at a world wide demand for a boneless, mild clean fillet that approaches the **100's of billion of pounds**.

Current tilapia demand

As of now, premium quality fillets from **Purged** tilapia produced at relatively high cost, that are packaged with high standards are bringing good prices and have almost.

Unlimited demand now even at the relatively high price of \$4,00 to \$8,00 per pound currently being charged in the supermarkets.

We may someday see the same quality of fillets reaching the supermarkets at prices under \$2,00 per pound. These fillets will come from the **super low cost tilapia production facilities** located in **tropical and sub tropical** climates.

We must begin **today** to build the industry today that will bring these developments about.

Let's focus on how to set up and manage these super low cost farms to achieve these low cost of tilapia production, harvesting, purging, processing and distribution and how

The solar algae cycle will contribute the most to low cost production cost.

This fits into local in country and out of country marketing and distribution.

Tropical Potencial

The major advantages of tropical environments that allow the production of tilapia at low cost are:

- 1 - **The continuous growth of algae from sunlight and**
- 2 - **The enormous quantities of low cost resources such as vegetable waste and manure that can drive algae production.**

Low cost systems designed with these two advantages in mind can produce valuable fish which can be easily purged to meet the best quality standards of sweet white fish.

Grain based poultry production

Poultry production operations depend on **low cost grains** primarily produced in temperate areas of the world like the midwest of the USA and Argentina. These grains require cold weather for maximum production.

Tilapia production on the other hand taps into the oppsite resource of the tropics which is **warm weather and sunshine**. These when combined with low cost fertilizer will allow the super low cost production of tilapia.

Low cost grain based feeds may also be used to create better and faster tilapia production, but.

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Tilapia grown in solar driven algae systems fed on fertilizer and waste biologicals can achieve feeding cost for as little as on or two cents per pound of whole fish.

With algae production low cost feeds such as those used in poultry production can **also** be used to the best advantage and the combination will yield fish at cost comparable to those of poultry.

This **cost of production advantage** can and will drive a large export and internal fish production industry for **any country** with the resources and the will to develop a sensible plan of action.

Every country in the world needs lower cost high quality.

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Meat production, but none more than many of the **tropical areas** where foods based on cold weather carbohydrate storage (grains) can not be produced efficiently.

The **algae - Tilapia** production cycle in tropical countries can substitute for the low cost grain production by providing an immediately available nutrient resource right there in the water where the fish are growing and continuously filtering the algae directly from the water with tiny com like gill rakers.

Algae does not need to be transported to the fish, algae is self reproducing and new seeds do not need to be planted periodically to produce it. Algae reproduces readily on its own as long as it has sufficient sunlight and nutrients to fuel its growth.

Algae can double its weight in a pond in less than an hour and can drive tilapia production of over 12,000 pounds to the acre per year, at cost of 1 or 2 cents per whole pound of tilapia.

Taking Advantage of the Algae-Tilapia cycle

Many things about growing tilapia are the same as those for growing other aquatic species, however the most important things are not the same and so a project designed to take advantage of the tilapia-algae cycle can not be properly designed by just using the same criteria used for designing projects for other species. *NOT EQUIPED FOR CONSUMPTION IS*

Water depths are different, nutrient loadings are different. *OF ALGAE*
Aeration and oxygen methods are different. Fish densities are different. Algae fish interactions are different. Carbon dioxide balances are different. All of the designs, methods and infrastructure for low cost production must be planned and coordinated to keep total production, processing and distribution cost low.

Building an industry from the egg up.

In the poultry industry we always here the question of which came first the chicken or the egg?

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Someone experienced in breeding knows that from a development standpoint the egg must be our first focus because it is in the embryo that we create our new and better breeds of animals and plants.

World tilapia production must start with high quality broodstocks produced through sound genetic development programs just as has and is being done in the poultry industry, these development programs must provide a variety of good brood stocks to produce superior growing hybrids as is done in the chicken industry.

Tilapia producers then must have a variety of feeding strategies using low cost feeds and growing methods that produce a market fish for a total growing cost of under 25 cents U.S. per pound. **The backbone of this strategy is the algae cycle**, but it can be augmented or helped by waste agricultural materials and well formulated low cost feeds.

The current estimated cost for producing a market size chicken ready for processing is 23 center per whole pound.

We must equal or better that cost in our planning for both local and global tilapia production if tilapia is going to become as common as chicken in the market place.

Tilapia physical advantages

The most important and easiest **physical ability** of the tilapia for us to use to keep production cost low is the tilapia's ability to filter feed very small algae and zoo plankton from the water in which it is being grown.

Very simple and inexpensive fertilizers can be applied to produce substantial blooms of algae and zoo plankton. In general the cost of these fertilizer additives is less than one cent per pound of weight gain of the tilapia.

Inexpensive vegetable and animal by-products can also be applied to the water as feed and as fertility drivers for the algae to improve both the direct weight gain of the tilapia and the algae and zoo plankton bloom densities.

ALTERNATIVAS - ARE THERE ANY?

Aquaculture as we know it in the United States has little chance of becoming an industry of the scope of the poultry industry without the tilapia.

HERE ARE SOME OF THE REASONS WHY:

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1 - **All** other current species of fish being cultured, including catfish, trout, bass, salmon, etc. Have production **cost** at least **double** that of **poultry**. Since the production cost of the fish are already double that of poultry, the elasticity of supply and demand when applied to the decision process of buying fish in the supermarket cannot predict more than a modest growth for these species. In other words, **all of the other fish species are too expensive**.

2 - The same kinds of science and technology efforts that are rresponsasible for the economics of the poultry industry **have not benn consistently applied** to the other aquaculture species and no change is visible in the near future:

A - No currently produced strants of fish have any appreciable level of genetic improvement comparable with those in the chicken industry and

B - None of the curently produced strains of fish are hybrids that bring together multiple improvements into the same growable production fish, not trout, not catfish, not salmon.

Whereas, all production poultry strains have many generations of specific genetic improvements that are brought together to combine into each of the current production strains of poultry many specific characteristics such as feed conversion, growth rate, meat distribution, disease resistance and others.

C - Most of the current research aimed at fish improvement is in hi-tech areas such as gene splicing which have no history of success and has a low probabilitu of either official approval or widespread acceptance, in other words all of the other currently grown species of fish **will remain too expensive** to become a reasonable replacement for poultry in the supermarket.

Tilapia is the ONLY fish that is ready now to become the chicken of the pond.

Tilapia are the only fish which are curently an aquaculture possibility allowing achievements in the **the solar algae cycle will contribute the most to low cost production cost.**

Economic and technical areas similar to poultry. The basis for this is that qualities and attributes of the tilapia including filter feeding, and efficient digestion, hardiness and disease resistance, can be and are being improved on rapidly with specific breeding programs.

Some examples are:

1 - There are a number of species of tilapia which are being selected for specific gene line improvements and more gene lines can and will be added to selection programs as the need for them increases.

A - Each gene line with each species of tilapia can be selected for very specific improvements needed in the industry and reselected for with a new generation as often as four times a year in a carefully managed genetic program.

B - A single species may have any number of improved strains each of which is selected for a different desired improvement.

C - These improved strains can then be brought together to combine the improved traits and the combined traits can be passed on in the next generation to an F-1 hybrid.

2 - Most of the species of tilapia can be hybridized with each other to produce F-1 hybrids which carry the improvements of both strains to combine several improvements in the same animal as is done with chickens.

3 - Tilapia can be raised using a variety of different food resources depending on local availability and still achieve low production cost.

A - Algae driven production can be produced for a little as 2 or 3 cents per pound of whole weight.

B - Waste agriculture materials such as vegetable waste, rice hulls, palm oil waste, citrus waste, grasses, etc. Can be used to directly feed or improve algae production.

C - Low cost feeds are being formulated which reduce or eliminate expensive ingredients such as fish meal required for many other species of fish.

D - Manure resources from a variety of animals can directly be used to drive algae and bacteria rich culture systems for the tilapia to filter feed from.

4 - Tilapia handle well during processing and freezer test done by a major U.S. food company demonstrated that tilapia.

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Are as good or better after 18 months in frozen storage as the day they were frozen.

5 - The same breeding attributes of always being ready to breed that are such a great asset in genetic development of new gene lines also provides the opportunity of quickly increasing production of fry and fingerlings which gives the industry great flexibility to meet rapidly increasing demand.

6 - Design construction of new farms can allow the management of growing operations can be fine tuned to deliver fillets and or whole fish to the processors and to the market as purged clean product and to produce these tilapia at the lowest possible management and physical cost.

A - Farms can be designed with optimal management considerations in mind.

(1) Ponds can be big enough to provide economies of scale for feeding and harvesting.

(2) Ponds can be designed to be easily harvestable with a minimum of labor and using modern equipment that improves transferring quality and survivability with low cost.

(3) Ponds can be designed to take advantage of tilapia capabilities that can maximize algae contributions and other low cost feed promoters to achieve very low per pound production cost.

(4) Technologies are available to fine tune the growing of algae and use of these low cost ingredients to further reduce the pond bank growing cost of the tilapias.

(5) Processing and distribution plans and agreements can be worked out that maximize the amount of cooperation between government and private industry to pave the way and encourage the investment needed in the development of this new industry.

In short tilapia provide the best opportunity of any new species of animal to quickly and efficiently develop a new industry with all of the requirements and capabilities needed to bring to the supermarket a new high quality meat at prices challenging those of the poultry industry.

For this to become a reality those involved must understand that tilapia are a completely sort of

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Fish and we must think through all of the ways we can take advantage of these differences and put the industry together in an intelligent well planned way.

If all of this is done and done well, I believe we will see the day when tilapia fillets are on sale at prices below those of on sale chicken even.

In doing so those of us helping to provide this delicious fish will be amply rewarded, and in the process we will be reducing our economic and environmental impact on our land and resources, because if you produce the tilapia you will be producing an animal that is cheaper both in food cost, and land needed, you can by producing this alternative free up vast acreages of land to be returned to managed as forest or prevent further destruction of the remaining forest.

An acre of land that can produce 300 pounds of marketable beef can produce 20 to 40 times as much tilapia with similar management and fertility resources.

The world needs cheap high quality food and we need to produce it with less environmental impact and the tilapia can do both.

Current world production is estimated by F.A.O. as approximately 880 million whole pounds of farmed tilapia and 600 million pounds of wild caught tilapia. I believe that we may well see world production of tilapia reach the fifty billion pound level within the next 15 to 20 years, provided we pursue all of the ways to reduce the production and distribution cost.

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This chart shows the percentage increase in infant mortality as the percentage of daily quality protein available in each country diminishes

FISH AND POULTRY CALORIES/ INFANT MORTALITY

**WHAT CAN
TILAPIA
DO FOR YOUR
COUNTRY?**

Many factors are important in the welfare and conditions of life in each country. Some of these things have to do with money but most have to do with good health.

Healthy birth, healthy growth and development and on into old age the good health of well fed mature citizens.

We speak of the quality of life, but good nutrition is the foundation of a quality life, because good health can not exist as a condition within a society in the midst of poor nutrition.

The level of health in each country can be measured by the span of life and freedom from disease.

While it is difficult to measure all of the nutrition factors in each country and there are many arguments for and against animal protein and its effects, both good bad, if we look at the amount of animal calories consumed in each of a number of countries and at the same time look at the infant

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Mortality and the average age span, we see what looks like a clear trend. **This trend suggest that the availability and consumption of a level of animal protein daily between 500 and 900 calories is necessary to bring a country population into the family of nations that are not in poor health due to poor nutrition.**

A Tilapia a day per person can bring almost every nation in the world above the nutrition poverty level and can be achieved at a lower cost than any other known agriculture crop.

If tilapia aquaculture is chosen as the method to change the nutrition level available in your country, it will be the best choice because it will take 30 to 60 times less land, 5 times less money, can be accomplished in a relatively short time span, and does not depend on a grain oriented production base. **TILAPIA AQUACULTURE DEPENDS ONLY ON THE SUN, FERTILIZER AND THE WILL OF THE GROWER TO BE SUCCESSFUL.**

A tilapia aquaculture industry in each country will create a renewable resource within each country that will not only provide the basis for bringing country out of the poverty of poor nutrition, but will also provide a basis for drastically reducing imports of animal proteins which will reduce the balance of payments.

A TILAPIA INDUSTRY DEVELOPED PROPERLY WILL PROVIDE AN EXPORT INDUSTRY CAPABLE OF BRING IN VAST QUANTITIES OF MONEY.

THE SOLAR ALGAE CYCLE WILL CONTRIBUTE THE MOST TO LOW COST PRODUCTION COST..lm 1.00"