Impacts of COVID-19 on U.S. tilapia farms:

Quarter 1 Results

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Introduction

On March 23rd, 2020 Virginia Tech Seafood AREC and The Ohio State University Extension initiated an online survey of the U.S. aquaculture, aquaponics, and allied businesses. This survey was designed to capture and quantify the effects of the coronavirus disease (COVID-19) on the aquaculture, aquaponics, and allied industries. The survey closed April 10th, 2020 at 11:59 pm. The survey will be distributed at the conclusion of every quarter for 2020, to attempt to capture the evolving impacts of COVID-19 over time.

Survey methods are detailed in the Virginia Cooperative Extension Fact Sheet VCE-AAEC-218, available at: https://www.arec.vaes.vt.edu/arec/virginia-seafood/research/Impacts_of_COVID19.html. This report is a supplemental report to the overall survey that summarizes results of **tilapia farm** respondents.

Results

Characterization of Tilapia Respondents

Quarter 1 survey results showed that there were **36 tilapia farm participants.** Thirty-nine percent of tilapia respondents sold their fish directly to customers, 19% sold to grocery stores/supermarkets, 19% sold to distributors, 11% to "other", un-categorized channels, 8% to restaurants, and 3% to other aquaculture farms (Table 1). No respondents reported selling to processors.

Table 1. Primary marketing channel for tilapia respondents.

Category	Percentage
Direct to customers	39%
Grocery stores/supermarkets	19%
Distributors	19%
Other	11%
Restaurants	8%
Other aquaculture farms	3%
Processor	0%

Tilapia farms vary in terms of their production scale. Respondents to the survey included those with scales of production from sales of $1 to $1,000 a year up to those with annual sales greater

than $1 million (Table 2). The greatest percentage (17%) of respondents had sales from $250,001 to $500,000; $100,001 to $250,000 (14%); $1 to $1,000 (14%), $1,001 to $5,000 (11%); $5,001 to $10,000 (8%); $50,001 to $100,000 (8%); $25,001 to $50,000 (3%); $10,001 to $25,000 (3%); and 3% reported sales of more than $1 million. No respondents had sales than $500,001 to $1 million. Nineteen percent did not respond to this question.

Table 2. Scale of tilapia respondent farms/businesses.

Category	**Percentage**
No response	19%
$250,001 - $500,000	17%
$100,001 - $250,000	14%
$1 - $1,000	14%
$1,001 - $5,000	11%
$5,001 - $10,000	8%
$50,001 - $100,000	8%
$25,001 - $50,000	3%
$10,001 - $25,000	3%
> $1 million	3%
$500,000 - $1 million	0%

The greatest percentage of tilapia farm respondents (57%) were located in the Southern Aquaculture Region, followed by the North Central Aquaculture Region (23%), the Tropical and Sub-tropical Aquaculture Region (11%), and the Western Aquaculture Region (9%) (Table 3). There were no tilapia respondents from the Northeast Aquaculture Region.

Table 3. Participation by aquaculture region.

Category	**Percentage**
Southern Aquaculture Region	57%
North Central Aquaculture Region	23%
Tropical and Sub-tropical Aquaculture Region	11%
Western Aquaculture Region	9%
Northeastern Aquaculture Region	0%

Key Findings

Eighty-one percent of tilapia respondents reported that their farm or business had been impacted by the COVID-19 pandemic. A few respondents who reported not having been affected by COVID-19 indicated that they were either in a construction phase without sales, that they grew aquaponic crops only for family consumption, or that they were a university, not a commercial program.

When asked whether their farm or business would survive the next 3 months without external intervention (such as government assistance), 50% said, “yes.” Thirty-four percent reported that their farm would “maybe” survive 3 months without external assistance, and 13% said that their

farm or business would not survive 3 months without external assistance. When asked the same question, but for the next 6 months, 31% said that it would survive, 41% said "maybe," and 25% said that their farm/business would not survive the next 6 months without external assistance. Responses related to 12 months without external assistance were that 22% indicated that they would not survive, 28% said that their farm or business would "maybe" survive, and only 47% said that they would survive.

Lost Sales

Sixty-nine percent of tilapia farm respondents indicated that they had lost sales due to the COVID-19 outbreak. In addition, 17% of tilapia respondents indicated that they had lost sales to international or export markets outside the U.S. In terms of the volume of sales that had been lost, 21% reported losses in the range of $5,001 to $10,000. An additional 17% of respondents reported that they had lost either $1,001 to $5,000, $10,001 to $25,000, or $25,001 to $50,000. Eight percent of respondents reported sales losses of either $1 to $1,000, and 4% reported losses of $50,001 to $100,000 and $100,001 to $250,000. No respondent reported losses greater than $250,000. Thirteen percent of respondents indicated that they could not estimate the losses at the time the survey was administered.

The lost sales reported included canceled contracts of various sorts. Seventy-nine percent of tilapia respondents reported losing private contracts for sales, and 14% reported losing government (state or federal) contracts for sales.

Respondents were further asked what challenges they expected to experience on their farms or businesses as a result of the coronavirus pandemic in 2020. Seventy-five percent of tilapia respondents indicated that they expected to lose sales, with 13% expecting to lose international markets. In terms of the volume of sales expected to be lost, 21% expected to lose from $5,001 to $10,000, 17% expected to lose from $25,001 to $50,000, 13% each expected to lose from $1,001 to $5,000 and $50,001 to $100,000, 8% expected to lose $10,001 to $25,000 and from $100,001 to $250,000, with 4% expecting to lose from $1,001 to $5,000. Seventeen percent indicated that they could not estimate the amount of losses at the time of the survey.

When asked how long tilapia respondents thought their farm or business could survive without sales before suffering longer term cash flow effects, 41% said 1 to 3 months, 19% said 4 to 6 months, 16% said less than 1 month, and 6% each said 7 to 10 months and more than 10 months. Thirteen percent did not respond. It should be noted that some respondents completed the survey four weeks prior to the preparation of this report.

Labor

Twenty-one percent of respondents reported that they had laid off employees as a result of the COVID-19 pandemic and another 24% indicated that they "will have to soon." Fifty-five percent had not laid off employees. In terms of the number of employees laid off, 33% of tilapia respondents who had laid off employees indicated that they had laid off 1 to 3 employees. Another 17% had laid off from 4 to 6 employees, 7 to 10, 11 to 15 employees, or greater than 20 employees.

Respondents were further asked how many weeks it would be before they would have to lay off employees. Seventy-one percent of tilapia respondents indicated that they would have to decide within 1 to 3 weeks whether to lay off employees and 29% said 4 to 6 weeks. It should be noted that data collection for the survey was open for a period of 3 weeks. Tilapia respondents were further asked how many employees they would need to lay off at that time. All tilapia respondents indicated that they would have to lay off from 1 to 3 employees. Of those employees who had been laid off, 38% of tilapia respondents indicated that these were "Short-Time" or "Shared-Work" employees. Twenty-three percent did not respond to this question.

Fifty-six percent of tilapia respondents had experienced some type of labor challenge. Twenty-eight percent of tilapia respondents indicated that employees had missed work due to COVID-19, while 72% reported that employees had not missed work due to the coronavirus. Employees who missed work did so mostly due to self-quarantine. Another respondent reported that those who feel sick must be tested before returning to work, but testing was difficult to find and the availability issues with testing resulted in extended work absences. Of those respondents who reported employees missing work, 38% reported 1 to 3 days, 25% 11 to 14 days and more than 14 days, and 13% reported that employees missed 7 to 10 days.

In addition to employees missing work, other respondents commented that work time was lost due to implementing COVID-19 safety measures on arrival and during the work day. Other respondents reported that reduced shipments of product made it more difficult to find wok to keep employees employed. Another respondent reported having to cut back on labor hours to minimize the number of employees in the greenhouse at one time; therefore, only essential tasks were being completed and other tasks were lacking the proper attention. One respondent indicated that the respondent was put at risk each week as he/she delivered product. Respondents expected the challenges of labor shortages due to employees missing work due to illness, childcare, or self-quarantine to continue. One respondent expected to lose all labor for the farm.

Challenges to the Farm or Business

Tilapia respondents reported a variety of different challenges to the business that included production challenges not related to labor. Respondents reported delays in repair contracts and services, delayed supplies and challenges related to receipt of the quantity of supplies and delivery times, delays related to expansion of facilities, and delivery challenges. One respondent from a school-based enterprise reported liquidating all harvest size fish since the school has closed. Another respondent reported several system leaks, alternative energy conversion efforts, delays in stocking, and transitioning to alternative media in beds. One respondent reported being unable to get fish to the farm from other farms in the area, because no one was coming to work and no one was pulling fish to complete orders. Thus, this farm was low on inventory and could not receive any new inventory of fish for at least the next 30 days. For this particular farm, this was the high season, and the business was at a standstill.

Forty-seven percent of tilapia respondents expected to experience continued production challenges not related to labor. Contractors were expected to continue to be unavailable and limited personnel on site had halted or slowed several ongoing projects. Delivery challenges were expected to continue. One respondent reported the potential loss of the business.

Sixteen percent of tilapia respondents reported having experienced increased costs of production, including feed, and 34% expected to experience increased costs of production in the coming months. Respondents reported increased costs of materials that are used for manufacturing processing, including those to meet FSMA regulations.

Forty-four percent of respondents indicated that they could hold market-ready product for less than 1 month, 38% said 1 to 3 months, and 6% said 4 to 6 months. A respondent reported that fish could not be sold and had to be held in tanks, thereby increasing the total cost of harvest size fish for every additional day. Holding fish longer was also reported to create challenges related to maintaining health of the fish as the density increased. Holding market-ready fish also requires more oxygen, electricity, gas for heat, and feed in addition to creating additional stress on the fish that will likely increase mortality and risk.

Challenges related to production inputs (feed, therapeutants, etc.) were reported by 44% of tilapia respondents. One respondent reported problems with the availability of seed for aquaponics. Problems getting deliveries of feed and therapeutants were reported as a challenge by some respondents.

Thirty-nine percent of tilapia respondents reported challenges with repair, construction, consultant, or engineering services. One respondent reported making necessary upgrades and repairs while the aquaponics system was down, but other respondents reported having to put all repair work on hold. Another respondent reported that consultants were unable to come in when the farm staff was in the greenhouse so hours and scheduling had been a challenge, especially when other offices were closed.

Financial services challenges were mentioned by 22% of respondents. Obtaining agriculture loans for expansion was reported to be difficult. Another respondent mentioned challenges with making payments on loans, but that a finance company was going to work with them. The primary financial challenge was covering operating expenses. Respondents reported problems in obtaining responses from SBA and FSA, especially with the agricultural offices closed. One respondent reported that financial services were not doing SBA loans but were working on it.

In terms of expectations for the coming months, 75% of tilapia respondents expected additional lost sales, 47% continued production challenges, 34% increased costs of production, 50% labor challenges, and 19% expected increased demand for products. Respondents expected feed costs and costs of supplies to increase as well as the cost of shipping. Other respondents expected all variable and fixed costs to increase due to holding the fish longer than expected. Labor costs will increase due to increased inefficiencies due to social distancing and to markets that have closed forcing them to hold fish longer. One respondent reported that the price of fingerlings has increased by $0.01/inch, with increased air freight costs from Florida. Feed costs have increased by $21/ton, but sales were half what they had been. Holding fish longer in RASs cost more power, oxygen, and, most importantly, time.

Marketing of Products

Extended holding of product that is ready to be sold can cause a variety of problems. Forty-four percent of tilapia respondents indicated that holding market-sized product would make it less

marketable. More specifically, 57% of tilapia respondents said that holding product would reduce the quantity of tilapia sold and 50% said that it would reduce the price received. Respondents reported backlogs of market-ready fish with expectations that this will introduce stress and disease and result in greater production costs across the board.

Respondents reported other effects from holding market-ready fish. One respondent expected lower demand for the larger fish. Another respondent said that they sell leafy greens, herbs, microgreens and edible flowers, but if restaurants cannot buy them when they are ready, they will have to throw the produce away. Respondents reported that markets had either closed or were very slow with more competition. One respondent reported that they can sometimes sell older crops to the zoo, but at a 50% discount. Others also reported the possibility of selling into secondary markets, but at a discounted price. Fresh produce, however, cannot be preserved and will have to be thrown out. Others reported market saturation with fish.

Increased Demand for Products

Sixteen percent of tilapia respondents reported increased demand for their products and 19% expected demand for their products to increase. The amount of increased sales expected were reported to be from $1,001 to $5,000 (50% of those who expected increased sales) and $1 to $1,000 (17% of those respondents who expected increased sales). One-third of those who expected demand to increase were not able to estimate the amount of sales expected to be lost.

Assistance to Farms/Businesses

The survey included questions on the types of assistance that might be helpful to the farm or business of respondents. Thirty-one percent of tilapia respondents indicated that federal assistance would increase the likelihood of survival of their farm or business. Another 28% said that assistance from the state, 28% from local government, and 13% from associations would be helpful.

When asked more specifically what types of assistance would be helpful, 28% said that assistance with identifying new markets, 25% said that loan guarantees, 19% said waiving or delaying state fees, 13% said specialty crop insurance, and 9% that tariff relief would be helpful. Six percent of tilapia respondents indicated that there were existing programs that their business did not quality for, although 75% did not respond to this question.

Additional comments by tilapia respondents included a variety of suggestions on the type of assistance that would be of greatest help (Table 4). The most frequently mentioned type of assistance (42%) mentioned by tilapia respondents was the need for very immediate assistance in the form of cash payments or grants. This was followed by financing assistance (26%) that included debt forgiveness, government purchases of fish (16%), and other (16%), that included market assistance and tax breaks.

Table 4. Additional comments related to types of assistance reported by tilapia respondents that would be most useful.

Type of assistance	Tilapia respondents (%)
Cash payments, grants, credits, for expenses	42%
Financing assistance (guaranteed loans, debt forgiveness, deferred loan payments, exemption of interest, low-interest loans)	26%
Government purchases of tilapia	16%
Other (Marketing assistance, tax breaks)	16%

Discussion and Conclusion

Responses by tilapia farms to the Quarter 1 survey show that the U.S. tilapia farmers have been impacted severely by the COVID-19 pandemic. Seventy-nine percent of tilapia respondents had had sales orders from private customers canceled and 14% had had government (state/federal) orders canceled. While lost sales were the immediate impact, other challenges were mentioned related to increasing production costs, financing, and other essential services that are critical to survival of the farm or business. Effects on the tilapia industry will be felt more in the coming months if sales continue to be reduced, with only 31% indicating that they would survive over the next 6 months without external assistance. Given that survey results showed that there will be longer-term effects on the U.S. tilapia industry, it will be important to continue to monitor changes throughout the year.

Key findings from tilapia farm respondents include:

- 81% have been impacted by COVID-19
- 79% have had orders/contracts canceled
- 45% have or will soon have to lay off employees
- 69% have experienced lost sales
- 50% can survive 3 months without external intervention