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Economic feasibility of tilapia culture in southern Brazil: A small-scale farm model

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ABSTRACT

Brazil is following the growing trend of world aquaculture production. Among the cultured fish species, Tilapia (*Oreochromis niloticus*) presents itself as a potential commodity in the "aquabusiness" sector owing to its versatility. This study was conducted to evaluate the economic-financial viability of tilapiculture in southern Brazil. Therefore, small-scale production was evaluated over several floodplain configurations in different scenarios (feed conversion, stocking density and marketing price) in relation to two segments of activity in the region: trade for slaughter (700 g fish^{-1} of final live average weight – *Condition A*) and "Fish and pay farm" (1100 g fish^{-1} of final live average weight – *Condition B*). The methodology recommended by the Institute of Applied Economics of the State of São Paulo (IAE-SP) was applied to evaluate the production and profitability of tilapiculture in Santa Catarina. The activity is profitable in several scenarios with average variations from $3,285.09 to $11,288.36 of net revenue per hectare, Annualized Net Present Value up to $10,837.85 and Modified Internal Rate of Return of 23.75%. These values support the economic feasibility of tilapiculture on a small-scale farm basis and an important economic supplement to the family economic base. Among the possible profitable scenarios, we point to some of the options best suited to conditions encountered by micro and small producers.

1. Introduction

Tilapia production in Brazil in 2017 was estimated at approximately 283.25 thousand tons, which represents a contribution of US $1.58 billion to the Brazilian economy and places the country among the four largest producers of this species in the world behind China with 1.8 million tons, Indonesia at 1.1 million tons, and Egypt with 800 thousand tons in the same period (IBGE, 2018; PeixeBR, 2018). According to the Brazilian Fisheries Association (PeixeBR, 2018), it is estimated that Brazil will produce 500 thousand tons of tilapia in the biennium of 2019/2020.

According to data from the Brazilian Institute of Geography and Statistics (IBGE), Brazil has approximately 5.07 million rural properties with enough water for aquaculture, including, for example, excavated tanks, lakes and dams. Of this amount, 1.89 million properties (37.33%) have up to five hectares of water table (IBGE, 2018). This same report indicates that southern Brazil has 22.61% of these rural properties with up to five hectares of water.

In southern Brazil, the states of Paraná and Santa Catarina stand out for their impressive aquaculture production. In 2017, Paraná produced 91.72 thousand tons of tilapia, which is about 32.28% of the national production, placing it as the largest tilapia producer in Brazil (IBGE, 2018). In this ranking, the State of Santa Catarina deserves special attention owing to the strong contribution of its production with 24.16 thousand tons (8.53% of the national production), occupying fourth place in terms of production, behind only São Paulo with 42.64 thousand tons (15.05%) and Minas Gerais with 26.42 thousand tons produced (9.33%). The tilapiculture from Santa Catarina contributed approximately US $37.43 million to the public offers (IBGE, 2018).

According to data from the IBGE (2018), in 2017, 192,934 agricultural establishments had up to five hectares of water surface in Santa Catarina. Silva et al. (2017) reported that fish farming in Santa Catarina is characterized by producers who can be classified as Amateur and Commercial. Those who cultivate fish species for leisure and eventual commercialization are characterized as amateur producers. Commercial producers are distinguished from the former by systematic and regular marketing of production.

Although national aquaculture production, particularly of tilapia, appears to be a promising activity for the production of animal protein, challenges still need to be addressed so that the chain of production can grow in a harmonic and sustainable way (Schulter and Vieira Filho, 2017). Based on the geographic characteristics of the state of Santa

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