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Opinion Article

Environmental Conditions that Affect the Growth of Aquaculture Species

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DESCRIPTION

Aquaculture practices are a way to achieve sustainability in the production of marine products. With unsustainable harvests from captive fisheries continuing, this sector is seen as the only solution to the growing global demand for marine products. But the most urgent concern is whether this sector will grow sustainably fast enough to meet future projected demand, exacerbated by a rapidly growing population and changing climate. Climate change is now a risk to global food production and is recognized as a major threat to the quality and quantity of production. Access to food security, especially food protein, is increasingly threatened by the projected impacts of climate change [1,2].

The impact of climate change on aquaculture has been extensively studied and reviewed at both regional and global levels. However, most of these studies tended to look at the expected negative impacts of climate change on aquaculture, without paying too much attention to the positive impacts that are very important for adaptation strategies [3]. A more comprehensive study of both the downsides and the upsides of climate change can help prepare producers and minimize production risks. In addition, currently available literature reviews do not consider how the sustainability of the aquaculture sector will be affected by projected climate change. Such information can be very helpful in identifying appropriate climate change responses aimed at sustaining the livelihoods of aquaculture-dependent communities.

Climate change is expected to have a direct and indirect impact on aquaculture production. Direct effects include effects on the physical and physiological properties of finfish and shellfish resources in the production system, while indirect effects include primary and secondary productivity and ecosystem structure, it results from the supply of inputs or impact on product prices fishmeal, and fish oil costs. Other goods and services needed by fishermen and aquaculture producers [4,5].

Temperature plays an important role in the growth and development of aquatic animals. Fish, which are warm-blooded animals, can be particularly sensitive to temperature changes caused by climate change. Most fish, especially cold water species such as Atlantic halibut, salmon, and cod, and intertidal shellfish mortality from heat stress can be high, as global average temperatures in this century are projected to rise by 1.5°C. Therefore, long-term temperature stress can affect aquaculture productivity in many ways focused on reducing yields. For example, chronic stress can impair the neuroendocrine and osmoregulatory systems, alter cardiopulmonary function and aerobic levels, and the immune response of some economically important species.

Ocean acidification occurs because the absorption of CO_2 in the atmosphere lowers the pH of ocean water over a long period of time (usually decades). It is estimated that the ocean stores about 50 times more CO_2 than the atmosphere. The projected increase in CO_2 absorption by the ocean with global warming above 1.5° C adversely affects the growth, development, calcification, survival and abundance of some aquatic species. Increased accumulation of CO_2 in water can jeopardize the sustainability of the ecosystem of aquaculture production systems by increasing the acidity of the water, deteriorating water quality and reducing productivity. In addition, increased marine acid can reduce the availability of carbonates needed to accumulate coral skeletons (calcifications) in shell-forming organisms such as shrimp, mussels and oysters, threatening marine aquaculture production. Aquaculture diseases, such as bacterial, parasitic, viral, and fungal diseases, can be affected by changes in temperature regimes, but are almost unpredictable methods. But they become more susceptible to disease, and warmer conditions can lead to the establishment of exotic diseases. The susceptibility of fins and crustaceans to pathogens is an important determinant of the disease and can be affected by both direct and indirect heat stressors.

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