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EFFECTS OF CLIMATE CHANGE ON SHRIMPS ON THE COAST OF INDONESIA

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Climate Changes, Shrimps, Coastal,.

ABSTRACT

Climate change is the most interesting issue, because it is a process length with high complexity so that the impact is difficult to predict with accuracy and affects the natural and social environment. Climate change has been proven to impact marine ecosystems through various stressors (e.g., wind, temperature, freshwater inputs) over several decades. Climate change is a world concern international life has had many negative impacts on various life activities on earth, including the forest-ry sector in coastal areas. Bappenas (2011) reports that global climate change has had direct and indirect impacts in various sectors in Indonesia. In the marine and fisheries sector, it was reported that between 2005 and 2007, Indonesia had lost 24 small islands. The negative impacts of climate change include inundation of coastal areas and the threat of sinking the smallest islands due to sea level rise, tropical storms, the impact of large waves and tidal waves as well as threats to the safety of human life due to increased intensity of topical storms. There is also overwhelming evidence that changes in climatic variables has detrimental effects on the ecosystem of shrimp farms, and thus, severe effects on survival, growth, and production of shrimp. One important fishery commodity is shrimp. Shrimp have high commercial value, have contributed a lot to foreign exchange for the country, and most of their life is in the bottom of the water. Crustacean species diversity is estimated reaching more than 1,502 species. Climate change affects climate change and can make shrimp more vulnerable disease because their resistance decreases. Climate change has an impact on shrimp growth on the coast of Indonesia because it can reduce shrimp immunity so that they are susceptible to disease. Climate change also affects coastal communities who forage by working as fishermen, this affects the amount of shrimp or other fishery commodities that are obtained when farming. So that many pond farmers have suffered losses.

INTRODUCTION

Climate change is the most interesting issue, because it is a process length with high complexity so that the impact is difficult to predict with accuracy and affects the natural and social environment (Joesidawati, 2016). Indonesia, as a country with a large population with a low economic capacity is very vulnerable to climate change, this condition is also supported by the dominance of the population occupying a very large coastal area, for example 65% of the population of the island of Java occupies a coastal area with all its activities (Dekimpraswil, 2002), can accelerate the process of global warming and ocean acidification (Beszteri et al, 2018; Alvarez-Fernandez et al, 2018; Gazeau et al 2017). Climate change has been proven to impact marine ecosystems through various stressors (e.g., wind, temperature, freshwater inputs) over several decades (Le Corre et al., 2021), although considerable spatial variabil- ity has been observed (Frölicher et al., 2018; Ramírez et al., 2017).

Climate change is a world concern international life has had many negative impacts on various life activities on earth, including the forestry sector in coastal areas (Pereira & D-Incao, 2012). The negative impacts of climate change include inundation of coastal areas and the threat of sinking the smallest islands due to sea level rise, tropical storms, the impact of large waves and tidal waves (Read & Robert, 2010) as well as threats to the safety of human life due to increased intensity of topical storms (UNFCCC, 2007).

As a developing country that takes the form of archipelago and located in the tropics, Indonesia is very vulnerable to the impacts of climate change. Bappenas (2011) reports that global climate change has had direct and indirect impacts in various sectors in Indonesia. In the marine and fisheries sector, it was reported that between 2005 and 2007, Indonesia had lost 24 small islands. In the agricultural sector, drought and floods have disrupted agricultural yields in various regions of Indonesia and decreased the production capacity of land resources, water sources and agricultural infrastructure (irrigation). There is also overwhelming evidence that changes in climatic variables has detrimental effects on the ecosystem of shrimp farms, and thus, severe effects on survival, growth, and production of shrimp (Ahmed & Diana, 2015).

Shrimp Species

One important fishery commodity is shrimp. Shrimp have high commercial value, have contributed a lot to foreign exchange for the country, and most of their life is in the bottom of the water. In Indonesian waters, there are more types of shrimp from the Penaeidae family, especially the Penaeus genus, including Penaeus merguiensis. The spread of shrimp in Indonesia covers almost all Indonesian waters, from western Indonesian waters to eastern waters (Adnyana, 1992).

Crustacean species diversity is estimated reaching more than 1,502 species. Of these, there are 83 types of shrimp belonging to the Penaedae tribe which are the types of consumption shrimp and are categorized as economically important species in trade. It is estimated that there are 11 species of crayfish (Penaeidae), 7 species of crayfish (Dahuri et al., 2001).

Climate Changes Effects on Shrimp

Based on the results of surveys and interviews with 50 respondents in the study (Joesidawati & Tribina, 2019), it was shown that as many as 55.12% said that the impact of climate change has had an effect on their farming activities since 2000, while 30.15% said the impact had had an effect since 2005 and 14.73% said they had not paid attention to the phenomenon of climate change. However, 100% of respondents said the losses and crop failures were due to climate change.

According to respondents, long drought has resulted in shrimp ponds experiencing dryness and increased pond water temperature which causes the pH of pond water to decrease or become acidic. This condition causes stress for the shrimp which can lead to disease. And the worst impact is the mass death. The number of rainy days and increased rainfall intensity can increase tidal flooding and increase water in their ponds and result in crop failure. This crop failure caused huge losses for farmers. Based on the results of the interview, the losses due to crop failure per hectare of pond land were around Rp. 2,000,000, - to Rp. 4,000,000, -.

Climate change affects climate change and can make shrimp more vulnerable disease because their resistance decreases (Supriyadi and Erlania, 2013). In addition, changes in weather and water temperature can stress shrimp. Stress is what causes shrimp disease caused by viruses (such as Myo or Infectious Myo Necrosis Virus (IMNV) and White Spot Syndrome Virus (WSSV) to spread faster. Water quality parameters such as temperature, salinity, DO, pH and current velocity will greatly affect the quality of life of shrimp. Shrimp really want specific water conditions for their life. If there is a significant change in water parameters, it will eventually also affect the system and its life cycle. So that climate change that affects the waters will also affect shrimp growth directly(Arreguín-Sánchez et al., 2015).

Conclusion

Climate change has an impact on shrimp growth on the coast of Indonesia because it can reduce shrimp immunity so that they are susceptible to disease. Climate change also affects coastal communities who forage by working as fishermen, this affects the amount of shrimp or other fishery commodities that are obtained when farming. So that many pond farmers have suffered losses.

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