

White Shrimp-red Tilapia Polyculture: a Response to Climate Change in Giao Thuy District, Nam Dinh Province

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Keywords: Aquaculture - Shrimp - Tilapia- Polyculture - North Vietnam

Giao Thuy, a coastal district, repetitively experiences direct impacts of climate change (CC), such as typhoons, heavy rains, very cold and hot spells. In addition, water pollution exposes the aquaculture industry to higher risk of damage. As a consequence, white shrimp farms, the most popular aquatic production in the district, are often confronted with mass mortality due to the limited capacity of shrimps to adjust to quick environmental changes and to higher incidence of diseases. Shrimp polyculture is a type of integrated model that shows beneficial effects to potential adopters. Several studies have demonstrated that culturing shrimp with other aquatic species, such as red tilapia in some coastal areas reduces the amounts of dissolved nutrients, filters suspended solids, utilises excess organic matter as feed (thus sometimes producing food for other species), improves water quality and enhances disease resistance against pathogens. Polyculture is still new to Giao Thuy district, and has not yet been tested as an adaptive solution to CC in the area. This study examines the results of the white shrimp-red tilapia polyculture to demonstrate that this can be a good adaptation strategy to CC for the local farmers. The experiments were carried out in six ponds with an area between 2000 to 2500 m² each in Giao Phong commune, Giao Thuy district, Nam Dinh province in 2014 and 2015.

The trials consisted of 6 models designed in six ponds: two integrated farms in brackish water and two integrated farms in freshwater, and for control, two monoculture shrimp farms, one in brackish water and one in freshwater. For the freshwater polyculture, the white shrimp had been gradually acclimatized to fresh water. In the integrated culture models, red tilapia was added at a density of 2 fish m⁻² to a stocking density of 100 white shrimp m⁻²; the shrimp was stocked twice per year but red tilapia was stocked only once. In the monoculture models, white shrimp was stocked at the same time and density as that of the integrated models.

In both brackish and fresh water, the polyculture of shrimp with red tilapia resulted in lower disease impact, lower cost of drugs and chemicals by about 70% and doubled economic benefits compared with the monoculture of shrimps. Farmers and the local authorities in the district highly appreciated the results of the integrated culture model. This model can be considered as a strategy to increase the adaptive capacity of aquatic production in the study area.

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