

## 審査の結果の要旨

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This thesis concerns a fish-borne disease called the Ciguatera Fish Poisoning (CFP), which has adversely affected the food and public health system of many countries in the Pacific. While the climate change is considered to have effects on the CFP occurrence, literature that investigates the mechanism of the disease and the effects of this disease on people's dietary decision is scarce. In order to unfold the nexus between the climate change, the CFP, and food choices in the Pacific and derive implications for policies, this thesis uses the meteorological, epidemiological, and original household survey data to examine 1) the effects of the changes in the past sea surface temperature on the occurrence of CFP in French Polynesia and the Cook Islands based on time-series analyses and 2) the effects of the CFP incidence on dietary behavior for local people in Fiji based on cross-sectional regressions.

The thesis consists of six chapters. The first chapter introduces the CFP, the biological mechanism on how it occurs, available medical treatments, and geographical distributions of the disease before presenting the research objectives of the thesis. The second chapter summarizes the existing literature that investigates the climate impacts on CFP and impacts of CFP on food choice and explains where the research gap exists. The third chapter describes the history and current situation of the CFP in the Pacific Islands specifically. The fourth chapter examines the effects of climate variability on the CFP based on time-series data of Cook Islands and French Polynesia while the fifth chapter utilizes the original household survey data in Fiji to examine the impacts of CFP incidence on people's food consumption. Given the findings of previous chapters, the sixth chapter summarizes policy implications for future surveillance and response systems as well as for future research.

Major contributions of this thesis can be summarized by the following three points. Firstly, this thesis takes an inter-disciplinary approach to examine the occurrence of and the effects of a disease common to the Pacific. In the earlier chapters, he summarizes literature from various disciplines, including marine biology, oceanography, public health, climatology, sociology, and economics. Although the nature of the problem cuts across disciplines, most of existing studies are limited in scope. While the main analytical methods used in the thesis are based on economics, this thesis is based on a broad understanding of multidisciplinary research, and this approach effectively deepens understanding of the CFP.

Secondly, this thesis incorporated the effects of the seasonality in analyzing the effects of climatic factors on the CFP incidence and found that sea surface temperature and sea surface temperature anomaly have positive correlations with the CFP incidences in French Polynesia and Cook Islands. While a limited number of existing studies has examined the impacts of sea surface

temperature or tropical storms on the number of CFP incidence, all of them used yearly data, rather than monthly data used in this thesis, ignoring the effects of seasonal variation. Further, based on the Autoregressive Integrated Moving Average (ARIMA) Transfer Function model, this thesis found that sea surface temperature anomaly can predict well the future occurrence of CFP incidence, particularly with a 12-month lag in Cook Islands and a 32-month lag in French Polynesia. Several possible explanations were also offered on the difference in the time lags found from the cases of the two countries, such as the variety of toxic dinoflagellates and the instability of water motion.

Thirdly, this thesis revealed more accurate situation of CFP occurrence and the effects of the disease on local people by collecting primal data of 575 adult individuals of Gau Island in Fiji. The detailed survey enabled to illustrate experiences of local people and that the actual CFP incidence is severely under-reported. It was also found that the CFP incidence results in temporal or permanent changes in food choices for most victims as well as the people around them. In addition, based on logistic regressions, the thesis also finds that the consumption of risky species is associated with low income diversity and food diversity. Risk preference and optimistic bias are also found to be associated with higher tendency to make risky choices. Summarizing the results, the thesis provides policy implications for public health sector in disease control and effective interventions to avoid the consumption of risky fish.

Accordingly, the committee members agreed that thesis offers sufficient academic contribution as a doctoral thesis and unanimously agreed to award the degree of Doctor of Philosophy.

740 Words