学 位 論 文 審 査 の 要 旨

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学 位 論 文 題 名

Climate impact on child health and its possible solution
-Social scientific approach in the Democratic Republic of Congo-

（気候変動が子供の健康に与える影響と対応策
–コンゴ民主共和国を対象とする社会科学アプローチ–）

This thesis comprises 84 pages, 17 figures, 19 tables, and five chapters, with one reference literature. The dissertation is summarized as below.

Climate change increasingly undermines public health and economic development, particularly in vulnerable countries. Children are among the most threatened populations in the context of climate crisis. The Democratic Republic of Congo (DRC) is classified as one of the most climate-vulnerable countries, where children's health is disproportionately and negatively affected due to limited adaptive capacity and insufficient institutional preparedness.

This study investigates the relationship between household socioeconomic factors and climate variability in shaping child health outcomes in the DRC. It also examines the effectiveness of nursing assistance in reducing pediatric anemia. Climate change in the country is characterized by increasing precipitation variability, including heavy rainfall and flooding, as well as rising temperatures manifested through more frequent heatwaves.

Chapter 1 describes the context of climate change, child health conditions, and selected government strategies in the DRC. Chapter 2 examines the effects of climate change on the functioning of the health system, environmental conditions and agriculture, drawing on data from national and international organizations. The chapter highlights that the health system in the DRC lacks essential resources and remains unable to meet public health demand.

Chapter 3 analyzes the impact of climate change on child health of those under five years of age. This study constructs pooled individual-level data using Demographic and Health Survey (DHS) modeled with territorial fixed effects, and investigate impact of household characteristics on child health. This study also integrates climate data using Geographic Information Systems (GIS) to assess the impact of climate change. Height-for-age (HAZ) and weight-for-age (WAZ) z-scores are used as indicators of children's nutritional status. Child malnutrition remains widespread nationwide, as evidenced by the negative average values of both WAZ and HAZ indicators, reflecting the prevalence of both acute and chronic undernutrition. The climate variability, particularly fluctuations in temperature and precipitation, has a significant negative impact on both WAZ and HAZ scores. Poverty, limited access to health facilities, and inadequate access to safe water are identified as significant contributors to poor nutritional outcomes among children. Frequent heatwaves and heavy rainfall events have detrimental effects on child health. The climate variability, particularly fluctuations in temperature and precipitation, has a significant negative impact on both WAZ and HAZ scores.

As climate change is expected to persist and disproportionately affect vulnerable populations, sustainable investment in public infrastructure is vital to protect children from both malnutrition and climate-related health risks. It is strongly recommended that policymakers and international donors prioritize socially disadvantaged and climate-vulnerable populations in their investment decisions.

Chapter 4 evaluates the effectiveness of nursing assistance to mothers in reducing pediatric anemia, using nationally representative DHS data on child health and healthcare providers. The analysis is based on the hypothesis that children under five whose mothers receive nursing support during critical early-life stages, are less likely to develop anemia. The chapter further examines how nursing assistance to maternal care promotes child health, with a particular focus on anemia prevalence, and evaluates two complementary strategies: supplementation and nutrition-sensitive eating practices.

Given the challenges facing the DRC's healthcare system and the high prevalence of pediatric anemia, propensity score matching is employed to reduce selection bias and address potential endogeneity, as access to nursing assistance is generally nonrandom. The results show that, on average, nursing assistance to mothers reduces childhood anemia prevalence significantly. Supplementation for both mothers and children, combined with nursing support, leads to large reductions in anemia prevalence, particularly when mothers receive vitamin A within the first two months after delivery. However, the share of mothers receiving assistance in the postnatal period is low, meaning that most mothers stop receiving nursing support once they deliver their baby. The consumption of tubers (including cassava leaves) and meat is also associated with anemia reduction when mothers receive nursing assistance.

Chapter 5 presents the conclusions. Recognizing the central role of children in shaping future societies, investment in human capital, particularly child health and development, constitutes a critical pathway to economic growth in the long term. Given that climate change has adverse effects on child health, developing better health systems is urgent. Since human capital generates significant positive externalities, and it is a key for a country to develop and escape from poverty, investing in health sector is a wise political decision.

Given the results of each chapter, and its policy implications, we acknowledge that the author is qualified to be granted the Degree of Doctor of Philosophy in Food Resources from Hokkaido University.