Thesis Summary

論 文 の 内 容 の 要 旨

論文題目　Mobile Phone Based Services for Household Adaptive Capacity Development in Rural Africa: A case study of Makueni County, Kenya

（アフリカ農村部における家計の適応力開発のための携帯電話サービス：ケニア共和国マクエニ郡における事例研究）

氏　　名　MUASA LILIAN MBINYA
（ムアサ リリアン ムビニャ）

The energy crisis, rapid urban population, food insecurity, poverty, economic hardships and climate change are some of the complex challenges experienced in the 21st century threatening lives and livelihoods of millions in both developed and developing countries. In developing countries, the impacts are more pronounced to the rural population due to overreliance on environmental based activities for food and livelihoods such as agriculture and fishing. In Sub-Saharan Africa (SSA), the rural population comprises of households that rely on rain fed agriculture for livelihood and such households are vulnerable to climate related shocks which contribute to total crop and livestock failure.

In Kenya, one of the SSA countries, around 78% of the rural population rely on rain fed agriculture for livelihood. Such rural households frequently experience several shocks including droughts/floods, crop and livestock diseases, death of livestock, total crop failure, and water shortages. Since most of the households rely on their own resources to cope and adjust to the challenges as well sustain their standards of living, the severity and frequency of these shocks outweigh their limited resources bulging them into more risks. There is a need to develop their adaptive capacity to copy and adjust with both short and long term impacts. Previous studies have recognized adaptive capacity to be an essential component that encourages development at the household level. Information Communication and Technologies (ICTs) form a crucial part in adaptive capacity development through increase of resource accessibility. Although there is a wide range of developed ICTs, this study focuses on mobile phone, one of the dominant device across ICTs which has many developed innovations targeting the rural population.

In order to ensure household adaptive capacity development of rural households in Kenya, the aim of this study is to assess the impact of mobile phone-based services on household adaptive capacity with the purpose to aid

household capacity development. This will ensure sustainability of household development outcomes in rural Kenya. The study is divided into two parts; adaptive capacity assessment and adaptive capacity development and the following specific objectives were developed to answer the study aim; 1) analyze household adaptive capacity and identify resources that need to be developed, 2) assess households mobile phone statistics and accessibility to adaptive capacity resources, 3) evaluate the impact of mobile phone-based services on household adaptive capacity, and 4) examine the influence of mobile phone-based services on household networks to access and exchange resources that facilitate capacity development.

A mixed method approach employing qualitative and quantitative methods, using both primary and secondary data collection were applied to achieve the aim of this study. First and foremost, an extensive literature review was conducted to understand the adaptive capacity concept, estimation frameworks, adaptive capacity development and current developed mobile phone-based services targeting rural population in Kenya. From the literature review, five resources which include financial resource, information resource, physical resource, human resource and diversity of livelihood from the Sustainable livelihood framework were adopted to estimate household adaptive capacity. A field survey was then conducted in Makueni County in which a total of 250 randomly selected households comprising of 125 users (use mobile phone-based service to access resources) and 125 non-users (do not use mobile phone-based services) from the 5 sub-counties in were surveyed by administering a household questionnaire. Also, a total of 25 key experts were interviewed and 10 focus group discussions conducted. Furthermore, an intervention session on mobile phone-based services was conducted targeting the 125 non-user where 83 were treated and 42 untreated.

Analytical Hierarchy Process (AHP), a Multicriteria decision-making tool was used for adaptive capacity assessment in which weights were assigned on the five selected resources. The resource weightings were then aggregated to obtain a comprehensive household adaptive capacity index (HACI) value. A combination of Propensity score matching (PSM) and Difference in Difference (DD) methods were applied to match the treated and untreated households and to evaluate the impact of provision of and training on mobile phone-based services on household resource accessibility and adaptive capacity. To visualize household networks to exchange and access resources, the Social Network Analysis (SNA) was used to create visualization maps.

The research findings show that adaptive capacity varies across the household's and the average adaptive capacity of households is 0.3529 which is relatively low given the range of 0 to 1 HACI level. Most of the households were categorized by low (48%) and moderate (50%) adaptive capacity level. Resource accessibility and adaptive

capacity levels vary based on the gender of the household head with the male-headed households registering higher accessibility and adaptive capacity level. Among the five resources assessed, information resource, financial resource and diversity of the livelihood are the most important resources for household adaptive capacity development and contribute to a greater disparity in adaptive capacity across the households.

The mobile phone is a commonly used asset across households in Kenya with the penetration rate estimated to be 81%. Although both user and non-user access information, the user household's accessibility was higher compared to non-user due to the utilization of mobile phone-based services to access the resources. Limited access to these resources was noted across the non-user group. A significant difference is noted on the user and non-user adaptive capacity indexes, whereby most of the user were categorized in moderate (81.6%) and high (11.2%) adaptive capacity index levels while most of the non-user were categorized in low adaptive capacity index level (91.2%). The user have a wider network to access and exchange information and financial services compared to non-users who have fewer networks. Mobile phone-based services increase networks to access and exchange adaptive capacity resources facilitating adaptive capacity development. This study proves that use of mobile phone-based services contributes to increased resource accessibility facilitating higher adaptive capacity and leads to increased household income, livelihood diversification, risk management, and increased social networks.

In conclusion, most of the households in rural Makueni County experience several shocks, have limited resources and low household adaptive capacity as clearly indicated in this study and therefore adaptive capacity should be increased significantly in order to help them cope and adjust to the impacts as well as sustain and achieve development outcomes. Mobile phone-based services increase resource accessibility and generally facilitate adaptive capacity development as depicted by this study, therefore inclusion of mobile phone-based services as a potential way to increase household resource accessibility and adaptive capacity should be considered in the current stakeholder adaptive capacity development interventions in rural areas to promote household adaptive capacity especially for the non-user.