

# A Geographical and Longitudinal Approach to Rural Livelihood Security and Crisis Responses in Central Kenya

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学位授与番号	学術(環)博第115号
URL	<a href="http://hdl.handle.net/10097/51216">http://hdl.handle.net/10097/51216</a>

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授与学位	博士 (学術)		
学位記番号	学術 (環) 博第 1 1 5 号		
学位授与年月日	平成 21年 9月 1日		
学位授与の根拠法規	学位規則第 4 条第 1 項		
研究科, 専攻の名称	東北大学大学院環境科学研究科 (博士課程) 環境科学専攻		
学位論文題目	A Geographical and Longitudinal Approach to Rural Livelihood Security and Crisis Responses in Central Kenya (ケニア中央部における農村生計安全保障と危機対応への地理的・縦断的アプローチ)		
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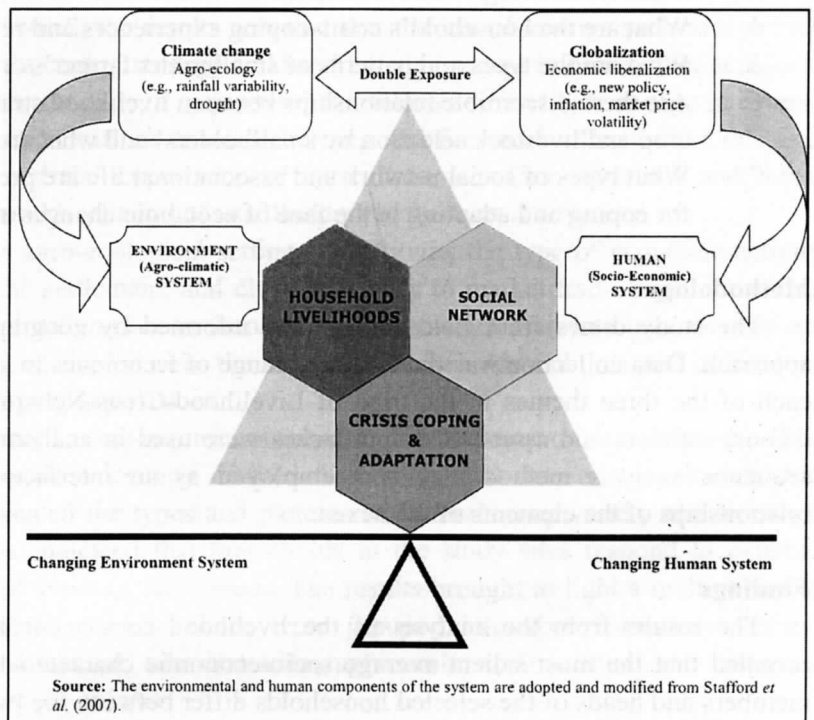
## 論文内容要旨

### Introduction

Despite the realization that the world is facing significant economic changes and agro-climatic events and that people's livelihoods are not static but constantly dynamic in response to the changing conditions, the subject of livelihood dynamism which has been addressed in the wider literature is rarely substantiated with empirical evidence especially in sub-Saharan Africa setting. Most studies are cross-sectional and lack a time-series perspective. This study is an attempt to redress this gap in existing understanding. The central argument of the thesis is that in order to fully understand the dynamic nature of livelihood strategies, it is required to take a geographical and longitudinal as opposed to cross-sectional approach of analysis into people's livelihoods.

The conceptual and analytical framework of analysis advanced for understanding the problem under investigation and thus the innovative aspect of the research is premised on the triad of Livelihood-Crisis-Network nexus approach (Figure 1). The overall objective is the detection of dynamic changes in livelihood strategies through understanding the ways in which households cope and adapt under increasingly evident and significant economic changes and agro-climatic events using the case of crop variety and livestock breed selection and the mediating role of social networks. The study draws from case study material from two study sites, Kabendera and Kiambogo in Central Kenya.

Figure 1: The Triad of Livelihood – Crisis – Network Nexus



The research takes households as analytical frame of reference in investigating the themes embodied in the three legs of its triad approach. Theme 1: livelihoods, concerns an assessment of household livelihood components and their combination strategies through annual net total income estimation and assets. Theme 2: crisis, focuses on household crisis-coping experiences and examines crisis events objectively and longitudinally using the case of crop variety and livestock breed selection to identify adaptive strategies. Theme 3: social network, is devoted to the mediating role of social network and community associational life in exchange and sharing of information and knowledge on seed sources by the smallholder farmers. Finally, the study deals with the issue of operationalizing the concept of livelihood strategies with quantitative household-level data and how then to use the identified strategies to test the livelihood-crisis-network nexus.

### *Research questions*

The overriding question to the farmers and to which this study addresses is on how to maintain or increase agricultural production under variable and adverse conditions of economic change and agro-climatic events, and on how constraints and opportunities shape variations in decision-making process of crop and livestock selection among households and over time as a coping and adaptation strategy. Specific research questions are:

1. What are the socio-economic characteristics of the study sites and selected households?
2. What are the household livelihood components/activities and their relative importance in the production aspect of the household economy?
3. How do households combine different livelihood components/activities and what are the resultant livelihood strategies and areal differences between the two sites?
4. What are the household's crisis-coping experiences and responses?
5. What are the types and patterns of smallholder farmer's crop variety and livestock breed selection?
6. Are there discernible relationships between livelihood strategies and decision-making patterns in crop and livestock selection by smallholders' and what are the determinants?
7. What types of social network and associational life are present in the research sites that are useful for coping and adapting in the face of economic changes and agro-climatic events?

### **Methodology**

The study draws from field survey data informed by geographical and longitudinal methodology of approach. Data collection was done using a range of techniques to generate a wide variety of information on each of the three themes in the triad of Livelihood-Crisis-Network nexus. Both realized annual net total income estimate and asset-based approaches were used in analyzing household livelihood strategies while sequence analysis methodology was employed as an interface for comprehensive assessment of the relationships of the elements of the nexus.

### **Findings**

The results from the analysis of the livelihood component of the Livelihood-Crisis-Network nexus revealed that the most salient average socio-economic characteristics of the research sites referring to all members and heads of the selected households differ between the two study sites and among the households. They in turn determine the livelihood strategies pursued. A classification of the households into distinct groups based on per capita values of five indicators of socio-economic differentiation followed by a cross-tabulation of the indicators revealed a clear relationship between annual net income flow, asset ownership, education, and unexpected clear relationship with age of the household head. As such, direct examination of an individual household's asset endowment which records the past experience of income accumulation can be used in longitudinal studies to alleviate the problem of time mismatch associated with annual net income flow estimates.

The study found that households in the two sites engage in a variety of economic activities as a strategy for coping with and adapting to variable and adverse conditions. The production aspect of household economy was classified into five activity sectors from the survey data. The results revealed the order of importance (in terms of aggregate income portfolios) of the five sectors to be agriculture, non-farm activities, livestock, forest product extraction and off-farm activities. Unlike many previous studies which underestimate the role of forest resource use, the current study found the sector/activity to be an important one in livelihood diversification.

An attempt to show how households choose and combine options across the five sectors through partitioning of the households into four groups with reference to the sectoral composition of their annual net total incomes revealed that all the four identified livelihood strategy clusters comparatively employ one dominant sector/activity with percentage contribution to annual net total income being above average and the other sectors/activities playing a secondary role except for one cluster which is truly diversified. These were referred to as forest product extractors, non-farm activity entrepreneurs, diversified livestock keepers and agriculturists. This finding is different from studies which stress rural livelihood diversification.

An attempt was made to empirically assess smallholders' exposure to shocks at household level by investigating crisis-coping experiences and responses longitudinally. The household level data were in consonant with Kenya's national statistics that severe drought(s) were experienced in the research sites in the year 1984 and 2000, and they more recently (starting 2007) witnessed local expressions of global price hike in food and crude oil, inflation trends and resultant price related crisis. The results suggested an increasing household exposure to economic change related shocks such as price hike in consumer goods and agricultural inputs especially starting from the late 1990s to 2007. Households in both sites respond in various ways when faced with crises. Overall, the results revealed that the use of savings such as livestock and food reserves is relied upon more as a coping strategy followed by engagement in diversity of activities. When faced by drought and severe water shortage, a majority of the selected households engage in diverse activities including forest product extraction such as charcoal burning and firewood collection for sale as a coping strategy. The finding underscored the importance of agriculture, non-farm activities and forest resource use sectors in maintenance of rural livelihood of smallholders in the face of adversity.

It was found out that differences in agro-ecological setting and altitude, the type of economic activity pursued by the households, history of the settlement, and close proximity to market-trading centers among others result in significant local-regional differences in income portfolios which translate into variable net income distributions across the two sites, as also between the individual households and thus area differences in both livelihood strategies and crisis-coping experiences.

The second theme looked at concerned crisis-coping component. The theme provided solid empirical evidence of household coping and adaptation strategy derived from sequential data on crop variety and livestock breed selection. The study revealed the types and patterns of farmer's crop variety and livestock breed selection. A longitudinal analysis indicated that households in the study sites respond to external shocks by either selection/de-selection of varieties and breeds. The results brought to light a multiplicity of criteria upon which farmers base their decisions. These were grouped into six explanatory factors: geographic-environmental, economic-commercial, administrative, agronomic, socio-cultural and historical among others.

Investigation of patterns in the sequence of decision-making in crop and livestock selection overtime revealed two distinguishable but related features of smallholder's decision-making behavior, first, dominant selection criteria combination and irregular selection criteria combination and second, consistency and inconsistency of selection criteria combinations. The evidence from the results suggested a tendency by households to choose varieties based on one combination of factors whose percentage contribution to the overall selection criteria for a particular crop/livestock is dominant followed by complementing irregular selection criteria. The dominant selection criteria combination was found to have a component of geographical factor. This is seemingly the combination that households cannot change or have control of but

can only submit to mostly a geography-related factor. The second feature of smallholder's decision-making behavior in crop and livestock selection is about consistency and/or specialization and inconsistency and/or a multiple of selection criteria combinations. Inconsistency of selection criteria combinations was interpreted as dynamism of coping and adaptation strategy employed by households in both sites to navigate the adverse and variable economic and agro-climatic events. Households of high socio-economic status have been found to be inconsistent and/or use a multiple of selection criteria combination while low socio-economic status households are consistent and/or specialized in selection criteria combination.

The third theme of the Livelihood-Crisis-Network nexus dealt with social network component. In the study sites, the traditional system of property (land) ownership has gradually transformed into individual property ownership whereby the functions of the traditional systems have disappeared. This is as a result of lack of land in the original birth places of the migrants and the ensuing process of migration which in turn led to a breakdown of common household residence of the extended family, a basis for primary bonds and cohesiveness of the kinship system and as a result kinship relations have weakened. At the destination areas there emerged new associational life in form of voluntary organizations/local-based associational groups for securing livelihoods for the smallholders.

Seed sources and flow was shown to be a complex process, influenced by a variety of agro-climatic, economic and agronomical factors. The findings suggested high dependence on market sources of grain seeds such as maize as necessitated by the economic reforms and less dependence on social relations such as kinship, neighbors and friends. However, the case of potato is different owing to its agronomic attributes that make it be sourced from within the village via social network. High dependence on market mechanism was an evidence of farmer's exposure to variable market forces brought about by wider economic changes.

A comparative examination of the ecological gradient of interrelationship defined by a local-level geographical system revealed a complementary relationship among the studied settlements and their surrounding areas in terms of flow of goods and services. This was the case especially during crisis times such as drought whereby upland farmers have economic and social relationships with lowland farmers.

An examination of trading and marketing of agricultural/farm based produce identified three types of middle-men; traders, brokers and farm gate scouts, as information conduits for farmers with respect to crop and livestock selection. Information about market forces of demand and supply is passed from market to farm through the middle-men and ultimately influences farmers' decision in crop variety and livestock breed selection.

## **Conclusion**

This study argues that understanding local-level decisions in adoption of different livelihood strategies in the face of changing economic conditions and agro-climatic events should be informed by a holistic approach that revolves around analyses of macro-economic, agro-climatic and historical contexts and local-level processes. The results indicate that areal differences evident in livelihood strategies and crisis-coping experiences and responses, and social networks are attributable to settlement history, geographical/ecological gradient differences, and effects of economic liberalization. The study argues for place-based analysis at both household-level and local-level in enhancing understanding of location-specific context of the human-environment system interaction in which rural livelihoods of smallholders in Kenya take place.

# 論文審査結果の要旨

本論文は、農村の社会と環境の持続可能性について懸念されている熱帯アフリカ半乾燥地域から、ケニア中央部の新開農村を事例としてとりあげ、農家の資産・年間純所得の評価結果と作物・家畜の品種選択歴の関連を分析することを通して、農民が危機・不確実性（経済的諸変動、干ばつなどの農業気候的変動）にいかに対処・適応し、生計安全保障の実現を試みているのかを明らかにしようとしたものである。そのために、一時点の横断的調査手法のみでは把握することの困難な生計戦略の動態を縦断的手法をも用いながら定量分析した点に、本論文の特色がある。得られた知見とその新しさは以下の通りである。

① 2つの事例集落における対象農家の年間純所得が資産ストックとよく相関することを見出したうえで、対象世帯を生計構成・戦略の違いに応じて4つに類型化した。そして、既存研究が生計安全保障のために有効・有望であると指摘してきた生計多様化戦略を採用しているのは半数未満に留まり、多くはむしろ生計特化戦略に依存している実態を、そしてとくに相対的若年層世帯の社会経済的地位が二極化しており、これには生計特化戦略の内容と集落立地における差が関連している実態を指摘し、これらを生計安全保障上の問題として考察した。

② 対象世帯の危機対処・適応歴を概観したのち、とくに作物・家畜品種選択歴と品種特性知覚についての詳細な情報を収集し、この分野では応用されたことのほとんどないシークエンス・アラインメント法を用いて作物家畜別に代表的な品種選択歴パターンを見出した。

③ そして、社会経済的地位と危機対処・適応歴（品種選択歴）との縦断的な関連性という、既存研究が十分に検討してこなかった点を考察し、社会経済的地位の高い世帯はより多様な作物・家畜品種選択基準を採用しているのに対して、社会経済的地位の低い世帯は品種の地理的適合性のみで縛られて選択する傾向にあることを明らかにした。なお、生計多様化戦略と品種選択基準の多様性については明瞭な関係がないことを見出した。

④ 平常時・非常時における財・サービス流通の地域システムが果たす役割に注目しつつ、対象とした新開農村では親族関係が弛緩しているのに対して各種結社の役割が大きいことを、また、品種選択において市場の果たす役割も相対的に大きくなり結果として各世帯の生計安全保障上の脆弱性を高めていることを、定性的に指摘した。

本論文の手法に関してとくに評価されるのは、①横断的手法による資産・年間純所得の評価に基づき生計構成・戦略の定量的把握を試みた点、②対象世帯の危機対処・適応歴データとして詳細な作物・家畜選択歴情報を収集し、これを縦断的手法によって定量的に扱った点、③横断的手法で把握した社会経済的地位・生計戦略と、縦断的手法で明らかにした危機対処・適応歴との関連性を吟味するのに当たり、両者の時間的ずれの問題を緩和するために各世帯の資産ストックにも注意を払った点である。

以上のように、本論文は、社会経済的地位と生計戦略、危機・不確実性とそれらへの対処・適応、そして社会的ネットワークの相対的役割、これら3つの間の関連性を既存研究にない豊富なデータを用いて定量分析しつつ、半乾燥地域の農民による生計安全保障実現の試みを明らかにすることに成功したものと評価することができる。

よって、本論文は博士(学術)の学位論文として合格と認める。