

**Understanding Agricultural Vulnerability, Human Behavior and Relief  
in Southern Province:  
Thinking of Rural Farmer's Resilience**

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**1. Preface of Understanding Agricultural Vulnerability, Human Behavior and Relief**

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A vicious cycle of poverty and environmental degradation is a major issue of global environmental problems. Especially in semi-arid tropics (SAT) including Sub-Saharan Africa and South Asia where the majority of the poor is concentrated, poverty and environmental degradation is widely prevalent. People in this area largely depend on rain-fed agricultural production systems and their livelihoods are vulnerable to environmental variability. The environmental resources such as vegetation and soil are also vulnerable to human activities. In order to solve these global environmental issues, a key factor is a recovery from, or a resilience of human society and ecosystems to, the impacts of environmental variability. The general concept of vulnerability expresses the multidimensionality of disasters by focusing attention on the totality of relationships between the social situations and environmental forces, produces a disaster. The major research question of vulnerability is methodology, such as: measuring and assessing vulnerability, including finding appropriate indicators for various aspects of vulnerability, up- and downscaling methods, and participatory methods. Especially in the social vulnerability, it is focus on the problems of complex human interactions, vulnerability of groups' people, and shocks like natural hazards, climate change, and other kinds of disruptions. Our final goal is to identifying factors affecting resilience and the ways to enhance the resilience of rural people to various horrible environments. Human activities are affected by both social and ecological environments. Conversely, human activities themselves affect both social and ecological environments. Thus there is a cross-interaction among them. Especially social and ecological environments are vulnerable to human activities. And sometimes total system including human activities recover or does not recover from any shocks.

From the mentioned backgrounds, we have been conducting various field investigations at Southern province, Zambia in order to understand what rural farmer's resilience is. As one of the common results of FY2009, we had established the approach to resilience. For an empirical approach to resilience, we focus on the mechanism and the speed of recovery in food consumption

and livelihoods of agricultural households after shocks such as drought and flooding. The theme 4 has been conducting the visualization of spatial pattern of resource use from the agricultural household point of view.

Figure 1-1 shows our study area is located in Sinazongwe district, Southern province of Zambia. Here is located in Semi-Arid Tropics climate zone. The long term averaged annual rainfall in Sinazongwe is 695mm/yr. As for the field investigation, we set the study sites A, B and C where are located in the lower terrace, middle escarpment and upper terrace, respectively. This is the common study sites for our research project; thus many rain-gauges were installed at Sites A, B and C. The targets of field survey are total five villages; ASn and ASm (Site A), BKa and BCh (Site B) and CSa (Site C)

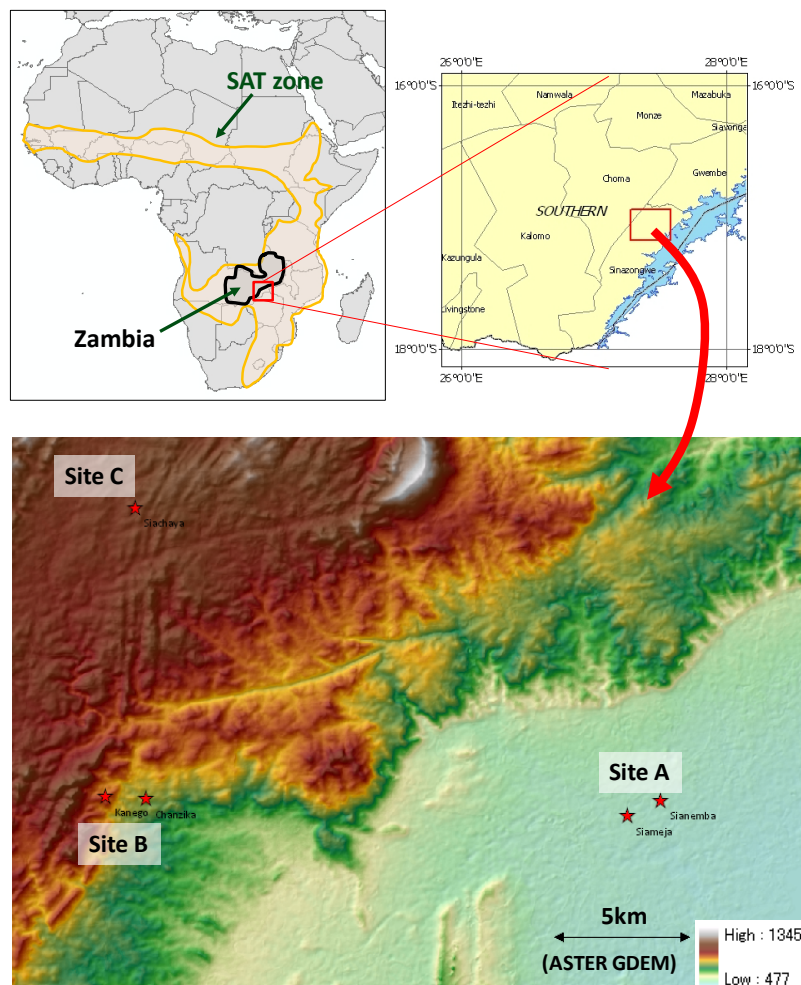


Figure 1-1. Our field sites in Southern province of Zambia

In this year, we conducted the field investigation data integration focus on understanding an agricultural vulnerability, human behavior and relief in Southern province in order to think the rural farmer's resilience. At the beginning of this year, we had discussed the concept of resilience in human activities and how to clarify the capacity at the household livelihood level. According to discussed approach which is illustrated in Figure 1-2 as the conceptual diagram of transition in

potential production and behaviors to the climate change effects. In this paper's the climate change effect was the extreme heavy rain.

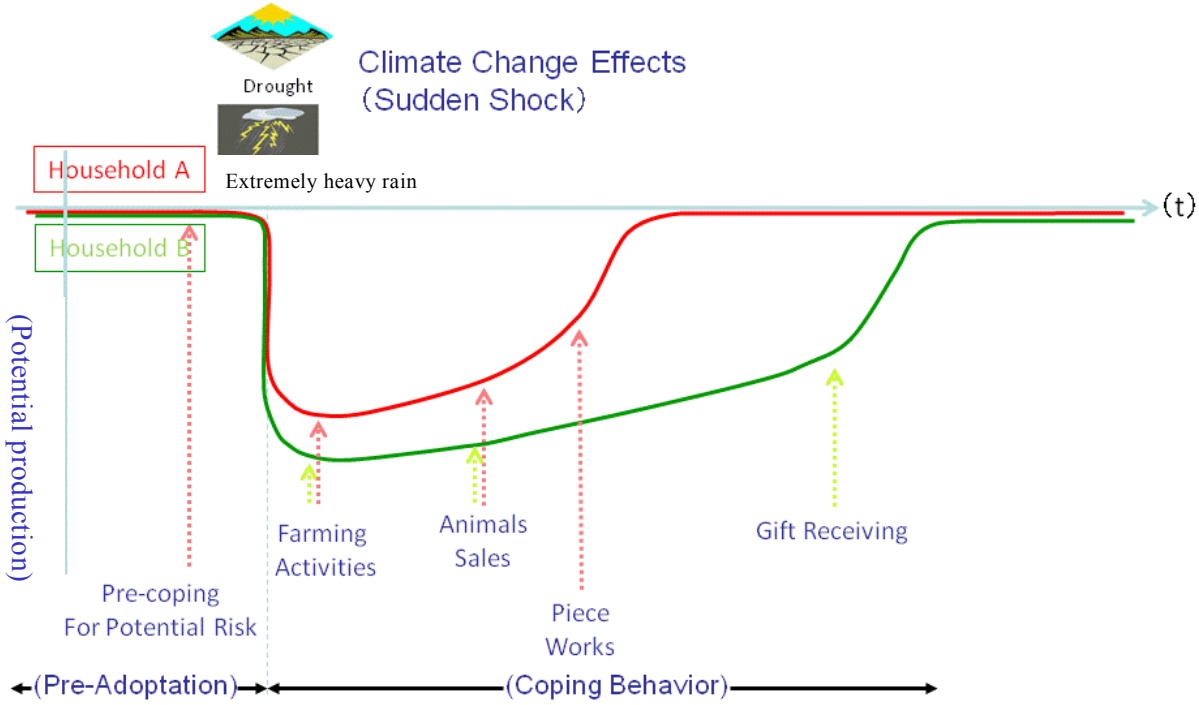


Figure 1-2. The Concept Diagram of Transition in Potential Production and Behaviors

In this figure, pre-adaptation for potential climate change risks and coping behavior of Household A and B are compared. Household A has much asset and labor, and Household B does not have. The horizontal axis corresponds to the time and the vertical axis corresponds to the potential production of all livelihoods activities. Detailed considerations are discussed in Chapter 2. The subsequent chapters discuss the various behaviors depicted in Figure 1-2. In Chapter 3, the multi-spatial and temporal data integration is discussed as the potential risk, an adaptation in land use and coping behavior in pre- and post shocks periods in farm activities is discussed in Chapter 4, and supports and requests for receiving gifts through mobile phone as social networks coping behavior is discussed in Chapter 5 respectively. In Chapter 6, we focused on the social institution and resilience for food shortage risk. In final Chapter 7, we conclude the results of understanding agricultural vulnerability, human behavior and relief as Postface.