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Sensitivity of livelihood strategy to livelihood capital in mountain areas: Empirical analysis based on different settlements in the upper reaches of the Minjiang River, China

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ABSTRACT

Livelihood strategies denote the range and combination of activities and choices made by households. Some research has focused on the potential impacts of sustainable livelihood, and only a few studies have begun considering sensitivity of livelihood strategies. Based on the gradient altitude and resettlement project, mountain settlements are classified into four types: the high-mountain settlement, the semi-mountain settlement, the river valley settlement and the resettlement area. Using semi-structured interviews, we have defined the farm and non-farm livelihood strategies as dependent variables, while the natural, human, physical, financial, and social capitals are considered as independent variables in order to model the relationship between livelihood strategies and livelihood capitals. In term of different settlements, we estimate the sensitivity of farm and non-farm livelihood strategies to livelihood capitals. The results indicate that natural and human capitals exhibited a positive correlation with the farm livelihood strategy, although the effect varies with the four types of settlements. Financial and social capitals are the catalyst for driving non-farm activities. Our findings suggest that no size fits all solutions to the livelihood strategy issues, and only livelihood capitals will be helpful in the long term if they are complemented by relative policies that enhance capital capacity as well as increase access to capitals.

1. Introduction

1.1. Three core concepts

The term "livelihood" has been defined in a variety of ways by various authors. Considering the most common definition, a livelihood can be defined as people's capacity to maintain a living (Chambers and Conway, 1991). In the last few decades, several institutions (e.g. FAO, UNDP, DFID etc.) have developed frameworks to analyze sustainability of livelihoods. Most of these frameworks are similar. DFID's (the UK Department for International Development) conceptual framework, however, draws attention to the measured changes in different factors that contribute to livelihoods: five capitals, institutional process and organizational structure, vulnerability of livelihoods, livelihood strategies, and outcomes (DFID, 1999).

"Livelihood capitals" refer to the resource base of a community and of different categories of households (FAO, 2005). They are grouped into human, natural, financial, physical, and social capitals (DFID, 1999; FAO, 2005). The capitals available constitute a stock of asset which can be stored, accumulated, exchanged, and put to work to generate a flow of income (Rakodi, 1999; Ellis, 2000; Babulo et al., 2008).

Using the available five capital assets, people engage in various livelihood strategies to achieve livelihood objectives. Therefore, "livelihood strategies" are the range and combination of activities and choices that people make in order to achieve their livelihood goals (DFID, 1999; FAO, 2005). These livelihood activities are subject to the endowment of livelihood capital because they determine the possibilities for rural household to achieve goals related to revenue, safety, and welfare (Van den Berg, 2010). In other words, livelihood strategies can also be understood as the means to cope with external disturbance and maintain livelihood capabilities (Chambers and Conway, 1991; Ellis, 1998, 2000; DFID, 1999; Adato and Meinzen-Dick, 2002).

Due to spatial variations of capital assets in settlements and agro-climatic zones, the differential access to, or endowment of, livelihood assets determines the choice of a household's livelihood strategies (Babulo et al., 2008). It means that livelihood outcomes become critical to rational use and improve efficiency of livelihood

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capitals at the household level subject to the goal of maximizing these outcomes (Brown et al., 2006).

1.2. Literature review

The livelihood strategy has been increasingly studied over the past years in the world, and the significant progress has been made in classification of livelihood strategies, impact elements of livelihood strategies, and role of livelihood strategies in poverty alleviation.

1.2.1. Classification of livelihood strategies

According to the definition of a livelihood strategy, many scholars have conducted the classification study of livelihood strategies (Pichón, 1997; Browder et al., 2004; Jansen et al., 2006; Brown et al., 2006; Alemu, 2012). For example, in Alemu's (2012) study, livelihood strategies have been classified into four categories: only farm, farm and non-farm, only non-farm, and non-labor. Different from Ansoms' study, Soltani et al. (2012) emphasized the classification of livelihood strategies and highlighted the dynamic natures of a livelihood strategy. In the case of Zagros from Iran, they classified livelihood strategies into three types as follows: forest/livestock strategy, crop farming/livestock strategy, and non-farm strategy. Their study revealed that a number of households have shifted from a strategy based on forest and livestock to a strategy of mixed practices since the end of 1980s.

1.2.2. Impact factors of livelihood strategies

Since 1990s, livelihood analysis has become the dominant approach to understanding how rural residents make a living (DFID, 2007; Ellis, 2000; Scoones, 2009). An increasing recognition that the ability to pursue different livelihood strategies is dependent on the basic material and social, tangible and intangible assets that people have in their possession (Scoones, 2009). For this reason, some recent studies give more emphasis to factors determining a livelihood strategy. These factors include the biodiversity protection (Salafsky and Wollenberg, 2000), soil fertility (Tittonell et al., 2010), policies (Barrett et al., 2001a), market liberalization, agricultural intensification (Orr and Wmale, 2001), tourism (Wall and Methiesion, 2006; Tao and Wall, 2009; Iorio and Corsale, 2010; Mbaiwa, 2011), cropping, forestry and livestock products (Stoian, 2005; Babulo et al., 2008; Kamanga et al., 2009; Tesfaye et al., 2011; Adam et al., 2013; Diniz et al., 2013; Zenteno et al., 2013), and natural capital (Fang, 2013a), as shown in Table 1. In addition, Alwang et al. (2005), Van den Berg (2010) discussed the dynamics of livelihood strategies in Nicaragua using a multidimensional manner. By identifying determinants of livelihood strategy, they suggested that the approach motivation would be associated with increasing the family welfare of farmers. Through the literature review, the quantitative livelihood approach has become an increasingly popular way of understanding the inter-relationship between livelihood strategies and impact factors. Based on the regression analysis, the relationship between livelihood strategies and consumption is already being observed (Alwang et al., 2005). The impact of labor force and land on livelihood strategies is examined in the study conducted by Jansen et al. (2006). Ulrich et al. (2012) descried the causal relationship between livelihood strategies of rural families in Kenya and livelihood capitals portfolio, by employing welfare indexes as a means of quantifying analysis. They concluded that the portfolio of agricultural and husbandry production, stable non-farm activities, and flexible and diversified livelihood capita, might become considerable importance to livelihood strategy. Adam et al. (2013) identified the key factors that influenced rural livelihood strategies and quantified their effects on livelihood strategy. They argued that regulatory, technical and financial support related to non-timber forest products greatly improved the effect of a livelihood strategy. Similarly, the importance of viewing livelihood capitals as a driving force of livelihood strategy practices is emphasized in the paper prepared by Zenteno et al. (2013). Regarding livelihood strategy, we have seen that insights about the interaction between livelihood strategies and livelihood capitals are crucial to improving our understanding of sustainable livelihood in rural areas.

1.2.3. The role of livelihood strategies in poverty alleviation

There continues to be much debate about how poverty should be defined, but it is increasingly accepted that poverty is understood as deficiency in individual's capabilities of obtaining materials necessities and social services (Coudouel et al., 2002), and such deficiency is characterized by a lack of livelihood assets (Sen, 1993). Of course, the increased inequality for welfare indicators (e.g., income) will almost be associated with a higher level of poverty (Ellis, 2000). Livelihoods analysis can serve a wide variety of applications, such as explanation of the root cause of rural poverty, and development of effective methods for alleviating poverty. Consequently, the link between livelihood strategies and poverty is of fundamental importance to the long-term poverty reduction (Table 2). Indeed, it is generally believed that non-farm activities play an enormous role in breaking the vicious cycle of poverty (Lanjouw and Feder, 2001; Haggblade et al., 2002; De Janvry et al., 2005; World Bank, 2009; Haggblade et al., 2010). Ansoms and McKay (2010) and Alemu (2012) have done a similar exercise in alleviating poverty although they did not explicitly refer to non-farm livelihood strategies. Their studies point to the important role of poor household's access to non-farm income activities. They founded that rural poverty could be alleviated by non-farm activities rather than local development in agriculture. Similarly, scholar such as Soltani et al. (2012) also claimed the positive correlation between off-farm livelihood strategies and poverty reduction. Van den Berg (2010) provided unique perspective on the relationship between natural disasters and household's income. He also addressed the necessity for the poor in rural areas to participate in non-farm strategies. On the contrary, studies (Reardon et al., 2000; Shackleton et al., 2007; Alary et al., 2011; Christiaensen et al., 2011; Hogarth et al., 2013; Soltani et al., 2012) also pointed to the important role of conventional farming strategies (e.g. agriculture, forestry, and animal husbandry) in poverty reduction. They argued that the increasing area of farmland, developing high value-added farming products, adjusting the structure of agricultural production, improving productivity of land, and fulfilling the basic requirements for agricultural activities, would produce less poverty. Furthermore, the fishery livelihood strategy was considered as one of the most approaches to alleviation poverty in rural areas (Thorpe et al., 2006; Weinberger and Lumpkin, 2007; Walmsley et al., 2006). In addition to insights inherent in perceptual processes, the impacts of climate change are increasingly recognized as significant factors of livelihood strategies, particularly, effective linkages to livelihood vulnerability, poverty alleviation (Fang et al., 2011, 2012; Gentle and Maraseni, 2012; Fang, 2013a,b).

1.3. Objects of the study

Based on existing literatures, livelihood strategies contribute to poverty alleviation and identify the determinants for livelihood strategies although there is a growing body of research on quantifying the relationship between livelihood strategies and capital. There is a lack of empirical information and research on the sensitivity of livelihood strategies to livelihood capital. In particular, there are few analytical studies on the differences between rural settlements in mountainous areas, site-specific characteristics of livelihood strategy processes, and sensitivity of livelihood strategies. Although 60% of rural households still depend on agriculture, the non-farm activity has been playing an active role in increasing