Impact of the ecological resettlement program on participating decision and poverty reduction in southern Shaanxi, China

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ABSTRACT

The government of Shaanxi launched an ecological resettlement program in the southern part of the province in 2011 to relocate 2.4 million people by 2020 in order to improve the local ecological conditions and people's livelihoods. Using multi-dimensional poverty index and deprivation score derived from a panel dataset of household surveys and appropriate econometric models, this paper evaluates the program impact on both participating decision and its intended targets. Our results show that the risks encountered by households have a push effect on the resettlement decision, while the opportunities households obtained have a pull effect. Also, farmers who are risk takers are more likely to take part, and the government supports for relocation and skill training have significant effect on the decision. Further, the program has significantly reduced the number of dimensions of households in poverty and the living condition of resettled households and the local environment have been much improved. However, reduction in the deprivation score is not so obvious yet, and the increase of household net income remains small. Important policy implications to and recommendations for this program and other similar policies in and outside of China can be drawn from this study.

1. Introduction

Over the past 40 years, China has brought over 700 million rural people out of poverty and achieved remarkable economic development. As many rural communities in China are endowed with precarious biophysical and socioeconomic conditions, however, there are still > 50 million people in extreme poverty (Department of Household Surveys National Bureau of Statistics of China, 2016). Therefore, the central and provincial governments have initiated a series of ecological resettlement programs (or eco-resettlement) to move rural households from ecologically fragile and destitute areas to areas where they can make a decent livelihood (Yin and Yin, 2010). The essence of these programs is to enable highly vulnerable and impoverished farmers and herders to have better access to resources and build stronger capabilities to develop in a more economically viable and ecologically sustainable manner (Li et al., 2017). Indeed, many developing countries regard various types of eco-resettlement as an important pathway to reduce poverty and realize sustainable development (Lopezfeldman, 2010; Cuong and Mont, 2012; Li and Wang, 2016).

As part of the upstream watersheds of the Yangtze River and the primary habitants of panda and other rare wildlife, the ecosystems of southern Shaanxi have played a significant role in erosion control, water-flow regulation, and biodiversity conservation (Li, 2017). However, they were heavily degraded because of farming, fuelwood collection, and timber production on the steep slopes of the mountainous and rough terrains (Li, 2016). Consequently, a majority of the local people was trapped in poverty, with limited work, education, and other opportunities, as well as low production and income levels (Yu and Ni, 2016). The government of Shaanxi launched an eco-resettlement program in the southern part of the province in 2011, with a target to relocate 2.4 million people by 2020—a target that is even larger than that of the population resettlement induced by the Three Gorges Project (He, 2016). The program's total investment in housing, infrastructure, and business development is expected to exceed 110 billion yuan (He and Dang, 2012).[1] By the end of 2016, over 1.1 million people have already been relocated (He et al., 2016). This paper evaluated the impact of the program thus far and explored how to improve the livelihoods of the remaining rural poor more effectively.

The program is mostly concentrated in the Ankang, Shangluo, and Hanzhong municipalities, where the ecological environment is fragile

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and vulnerable to frequent natural disasters. More than 2,000 geologic hazards happened between 2001 and 2010, causing the death of 590 people and an economic loss of 7.1 billion yuan in these places (Shaanxi Daily, 2016). Rural people living in this kind of harsh environment are more likely to be trapped in poverty when they encounter natural disasters (Carter et al., 2007). Arguing that the most fundamental cause of poverty among individuals is the lack of means of risk management, the World Bank (2014) promoted the incorporation of risk coping into the strategy of poverty alleviation. That is, to improve livelihoods, poor farmers need to be provided with more opportunities to reduce their vulnerability to risks as well as deprivation (World Bank, 2001). Thus, risk can be a huge push factor in the relocation decision as far as poverty-stricken farmers in ecologically fragile areas are concerned. Likewise, the availability of external opportunities can be a big pull factor in the resettlement decision. Unfortunately, much of the current academic thinking in China has neglected these factors (Wang et al., 2015; Mao et al., 2016).

Our research team conducted successive surveys on the implementation of the eco-resettlement program in southern Shaanxi and accumulated relevant data for 1032 households in four years (2011, 2013–2015). Using this unique panel dataset, we were able to compile such indices as the number of dimensions in poverty and the deprivation score to capture poverty in a more comprehensive manner (Alkire et al., 2017a, 2017b). Coupled with appropriate econometric models, these indices can in turn be used in assessing the impact of the eco-resettlement program properly, which is what we did in this paper.

2. Literature review

Since eco-resettlement is a relatively recent phenomenon in the quest for sustainable development, there has been limited literature on this subject. Instead, most scholars still draw upon the migration literature in their assessment of eco-resettlement. In modern economics, the exposition of migration is mainly derived from Lewis's theory of economic development (Lewis, 1954), which claims that due to the dual structure of the economy, the income gap between urban and rural areas is so large as to lead to the exodus of rural people. Later, Lewis's dual structure of economic development was expanded into the "push-pull paradigm" (Lee, 1966), on which the Ranis-Fei model (Ranis and Fei, 1961) and the Todaro model (Harris and Todaro, 1970) were built. These models posit that the income gap, coupled with other push and pull factors, drives migration from rural to urban areas. By considering such demographic factors as age and education, Mincer (1974) and Becker (1993) thus incorporated human capital into the study of migration.

Building on the earlier theoretical and empirical developments, however, an emerging body of research has started to examine the determinants of eco-resettlement decision over the last decade. Many scholars consider the role of family characteristics in affecting their resettlement decisions (Azam and Gubert, 2006; Yntiso and Pasche, 2006). It is shown that families tend to have a greater likelihood to get resettled if they have better financial resources (Nguyen et al., 2015; Loc et al., 2017), possess more accessible social networks (Imran et al., 2016; Abdulai, 2016), and/or have a school-age child (Zhang, 2017). On the other hand, a higher proportion of young children and a greater ratio of elderly dependency can have negative effects on farmers' resettlement decision (Li and Qin, 2015).

In addition, the prospect theory and expected utility theory have illustrated that the farmers who are risk taking tend to be more likely to participate in a public policy, such as the adoption of new technologies (Liu, 2013) and the enrollment in an ecological restoration program (Mao et al., 2016), as well as the participation in an eco-resettlement initiative (Dustmann et al., 2017). A risk-taker is thus more likely to invest in uncertain production activities, possibly leading to a higher income or better livelihood (Rosenzweig and Binswanger, 1992; Tanaka et al., 2016).

Early on, the policy target of eco-resettlement is to improve the ecological environment. Safa (2004) showed that an eco-resettlement program could attain the sustainability of the forest and accelerate the standard of settlers' livelihood in Bangladesh. Tan and Yao (2006) revealed that the land inundation and demand for land in resettling rural residents is a critical environmental issue in the Three Gorges Project. With the progress made in protecting the environment by eco-resettlement, poverty reduction has become a more important target. Most of the studies have used level of income and incidence of poverty as proxies for poverty, finding that eco-resettlement can help farmers move from an ecologically fragile environment, explore an alternative livelihood, earn more off-farm income, and eliminate of poverty (Adams and Page, 2005; Azam et al., 2015; Nguyen et al., 2017).

However, some analysts have cautioned that households in deep poverty may not be able to take part in eco-resettlement and thus will suffer from social exclusion and discrimination, decreasing their well-being and even falling into new temporary poverty (Jackson and Sleigh, 2000; Curran, 2002; Abdelmoneim and Litchfield, 2016; Zhong et al., 2017; Mulcahy and Kollamparambil, 2016). Hu et al. (2016) evaluated the effects on farmers' income and durability of the resettlement project in Guangxi, Rogers and Wang (2006) examined the impoverishment risk of social disarticulation as it is experienced by resettlers in an Inner Mongolian environmental resettlement village.

In summary, our review of the existing literature has indicated that external risks and opportunities have not been adequately included in the investigation of eco-resettlement decision, even though they are important factors influencing that decision. In addition, few efforts have been made to elicit farmers' risk attitudes toward the adoption of ecological resettlement. Meanwhile, household income, consumption, and the macro-level incidence of deprivation are used as indicators of poverty in measuring the livelihood improvement of eco-resettlement. However, none of these indicators can reflect the multi-dimensionality of poverty status, as proposed by UNDP (1997), Alkire and Foster (2012) and adopted by academics (e.g., Du et al., 2005; Nguyen et al., 2015).

In this paper, we incorporated external risks (Morten, 2016), opportunities (Bae et al., 2012), and internal risk preferences (Loc et al., 2017) into our evaluation of the impact on farmers' resettlement decision. Moreover, we developed a multi-dimensional poverty index in assessing the effect of eco-resettlement on livelihood improvement. It is hoped that these steps will allow us to derive more rigorous findings and draw more constructive conclusions.

3. Sites and data

Since 2011, our research team has conducted successive surveys on the rural households in areas implementing the eco-resettlement program in the Shangluo, Ankang, and Hanzhong municipalities of southern Shaanxi. Specifically, our study sites include Liuba County, Lueyang County, Xixiang County of Hanzhong; Zhen'an County, Shangnan County, Danfeng County of Shangluo; and Hanyin County, Baihe County and Hanbin District of Ankang. The household interviews were carried out by randomly selecting 2–5 villages from each county and 20–50 households from each village through stratified sampling to ensure the representativeness of survey data. Because the main purpose of our work is to measure the poverty reduction effect, the farmers from the village households roster whose income below the average village income were selected for interviewees. The selection of surveyed areas is shown in Fig. 1.

Following initial field visits and group training, graduate students from the Northwest A&F University and local professionals carried out the surveys and interviews, spending about 1.5 h on each questionnaire. The questionnaire elicited information about family demographics, on- or off-farm economic activities and employment statuses, land endowment and other resource characteristics. Excluding households without complete information over time due to attrition or lacking accurate