



The Effects of Migration on Collective Action in the Commons: Evidence from Rural China[☆]

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Summary. — Over the past three decades, scholars have studied the effects of more than three dozen factors on collective action in the commons but little is known about the effects of rural to urban migration. We examine this question with the case of China, which has the world's most extensive levels of rural to urban migration. Using OLS, Logit and Probit models and data from a survey of 1,780 households from 18 provinces, we find that migration has a statistically significant adverse effect on collective irrigation controlling for a large number of theoretically relevant variables. The effects of migration on collective action in the commons are possibly mediated by a number of factors frequently identified in the literature, including leadership, social capital, sense of community, economic heterogeneity, and dependence on resources. We speculate that massive out migration partly explains the significant drop in the use of collective canal irrigation and exacerbated the significant increase in groundwater irrigation since the start of reforms in 1980s. These findings have important policy implications for commons governance in China given that massive rural to urban migration will continue in the next decade. Because of the increasing rural to urban migration worldwide especially in developing countries, the findings could also partly explain the deteriorating state of rural village infrastructure, natural common pool resources and ecological systems in many developing countries.

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1. INTRODUCTION

A longstanding academic challenge for scholars is to identify the factors that influence collective action in the commons. Over the past three decades, a significant number of studies have been conducted to explore the effects of key factors on the performance of the commons, among which some early representative studies for example Wade (1987), Berkes (1989), Ostrom (1990), Tang (1992), and some recent works for example Fischer and Qaim (2012), Beitz (2014), Frey and Rusch (2014), Cox (2014). As a result, more than three dozen factors have been identified in the literature as summarized in Agrawal (2001) and Ostrom (2009). These factors can be broadly categorized in terms of the physical characteristics of the goods (e.g., excludability, rivalry in consumption, and scarcity), the attributes of the community (e.g., group size, heterogeneity, and social capital), the institutional context (e.g., communication, rules of use, monitoring and sanctioning), and the broader external environment (e.g., economic development, political stability, and technology), among others.

Despite this extensive literature, little is empirically known about the relationship between rural–urban migration and collective action in the commons. Does rural out-migration have an adverse effect on the ability of villagers to solve collective action problems in the commons? This question is important because rural–urban migration is an increasing global phenomenon especially among developing countries.

We examine this question using the case of irrigation systems in China. Irrigation systems represent a logical unit of analysis in studying collective action in a common pool resource. This is because an irrigation system gives rise to various potential collective action problems such as appropriation, assignment, provision, and monitoring (Ostrom, Gardner, & Walker, 1994; Suhardiman & Giordano, 2014).

Irrigation systems in China have played a vital role in feeding the country and reducing vulnerability to uncertain rainfall. Irrigated lands occupy half of China's farmland but produce three-quarters of its grain and more than 90% of its cash crops. Historically, surface irrigation systems were dominant, but their use declined during the modern era, and they were gradually replaced by the growth of groundwater-based, smallholder irrigation, especially in northern China (Calow, Howarth, & Wang, 2009).

In the 1950s, groundwater irrigation was virtually nonexistent in northern China. In the mid-1970s, groundwater likely provided approximately 10–15% of the irrigation supply to the water-short provinces of the north. By the mid-1990s, however, this figure had risen to approximately 40%, and in some downstream provinces, such as Hebei, Shanxi, Henan and Shandong, the share of groundwater-irrigated areas increased to approximately 70% (Wang, Huang, Rozelle, Huang, & Blanke, 2007; Wang, Huang, Rozelle, Huang, & Zhang, 2009).

As a result, the prevalence of groundwater water pumps dramatically increased over the past half-century. According to official estimates, the number of wells in China was 138,300

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in 1964, 2.7 million in 1980, 4.45 million in 2000, and by 2011, the number had risen to approximately 5.08 million. In contrast, according to the Chinese Rural Survey conducted by the China Institute for Rural Studies (CIRS) in 2012, the proportion of households relying on canal irrigation has declined to one-third.

In the past three decades, China has experienced a rapid expansion of urbanization. In 1982, 21.13% of the population lived in urban areas; by 2015 this percentage had increased to 56.1%. This urbanization process was accompanied by massive migration. According to data provided by the Chinese National Bureau of Statistics, in 2014, the number of labor migrants from rural areas exceeded 278 million, which is nearly one-fifth of the total population in China and equivalent to three-quarters of the total population of the United States. Because the majority of rural-urban migrants are younger and more skilled workers, this massive migration has led to a major transformation in rural China, including, we speculate, the rapid decline of collective irrigation and a dramatic increase in the use of groundwater irrigation.

We make several contributions to the literature. First, China is an attractive case study because it has the world's most extensive levels of rural to urban migration, but little is known about how migration affects collective action in the commons. Based on econometric analysis employing data from rural China, we find that out-migration has a statistically significant adverse effect on collective action. Based on the literature, we explain the mechanisms through which out-migration affects collective action in the commons, i.e., out-migration has negative effects on village leadership, social capital and sense of community, economic heterogeneity, and dependency on a resource and how these factors in turn decrease the likelihood of collective action in the commons.

Second, our study is based on a survey of 1780 irrigation households in 74 villages from 18 provinces throughout China. In contrast, the empirical literature on China is limited to specific provincial/regional data, i.e., Inner Mongolia (Qiao, Zhao, & Klein, 2009), Yunnan (Ito, 2012), and Northern China (Wang, Otto, & Yu, 2013). Much of the literature on collective action in China examines environmental governance (Yee, Lo, & Tang, 2013) and collective action among migrant workers in cities (Chan & Ngai, 2009). Furthermore, much of the empirical literature on rural-urban migration in China has focused on patterns of migration (Wu, 1994), impediments to migration (Scott, Guo, Shen, Hughart, & Giles, 1999) and the consequences of the Hukou system (Chan & Zhang, 1999; Cheng & Selden, 1994), among other topics. To the best of our knowledge, this is the first study on collective action in the commons in China using large-N survey data.

Third, we also control for a variety of theoretically relevant factors that the literature cites as influencing collective action, namely, community attributes (household size, inequality, education of household head), physical attributes (proximity of villages to urban areas), geography (hilly areas, flood plains), and water scarcity, among other factors. We speculate that these factors associated with out-migration jointly explain the significant drop in the use of collective canal irrigation and exacerbated the significant increase in groundwater irrigation since the start of reforms in 1980s.

The remainder of the paper is structured as follows. In the next section, we discuss the literature about migration and collective action, and the conceptual framework of the influence of out-migration on collective action in the commons. In Section 3, our survey methods and data, the

construction and measurement of our dependent and independent variables, the descriptive statistics analysis, are discussed. In Section 4, the econometric analysis results are presented and discussed, while conclusions and implications follow in Section 5.

2. MIGRATION AND COLLECTIVE ACTION IN THE COMMONS

Rudel (2011) suggests three possible mechanisms through which out-migration affects collective action in the commons and the development of durable common pool institutions (CPIs). First, the prospect of higher wages elsewhere would raise the discount rates of participants in CPIs and reduce the salience of the commons with respect to their livelihoods. Alternatively, individuals considering long distance migration, such as unattached young men or women, might be reluctant to join a CPI because they will feel the opportunity cost of joining a local CPI. Second, accelerated rates of labor migration, by increasing the mobility of capital and labor, present challenges to CPI participants committed to the long-term sustainability of the commons. Third, labor migration creates social pressures that shape organizations, preventing the creation of new CPIs and undermining or destroying existing CPIs.

Although Rudel's explanation of the effect of labor migration on CPIs provides valuable clues, we believe that the actual mechanisms operative in the real world are more complicated. According to the previous studies about migration and collective action, we speculate that out-migration affects collective action in the commons through five mechanisms, namely, leadership, social capital, sense of community, economic heterogeneity and resource dependency.

The first mechanism is leadership. It is widely believed that leadership exerts a considerable influence on the results of collective action (Meinzen-Dick, Raju, & Gulati, 2002). The involvement of a charismatic or trusted individual reduces the transaction costs of organizing and provides assurance that makes individuals more willing to participate in collective action (Baland & Platteau, 1999; Kolavalli, 1995). For instance, the presence of college graduates and influential elders had a strong positive effect on the establishment of irrigation organizations in a stratified sample of 48 irrigation systems in India (Meinzen-Dick, 2007). The increased rate of rural-urban migration causes a massive brain drain, leading to decreased rural human capital and a lack of rural elite talents. The loss of leadership resources thus reduces the likelihood of organizing successful collective action.

The second is social capital. In situations in which the social capital of formalized groups is high, individuals have the confidence to invest in collective activities, knowing that others will also do so (Pretty, 2003). Similarly, in communities characterized by close social proximity (with low transaction costs and frequent communication), where community members place a greater premium on the importance of social norms, collective action in common property resource management is likely to succeed (Runge, 1986). Studies also show that a larger number of exit options reduces cooperative capacity, as it weakens social cohesion (Bardhan, 1993) and increases the costs of enforcing rules, thereby exerting further negative impacts on collective resource management (Stern, Dietz, & Ostrom, 2002). Labor migration weakens local social connections and attenuates social capital in rural villages, which

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