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Farmers' perception of effective drought policy implementation: A case study of 2009–2010 drought in Yunnan province, China

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ABSTRACT

Using a qualitative social research method at the local administrative level, this paper provides insight into the policy process in China and farmers' perceptions of the effectiveness of policies implemented to deal with drought. Two villages in rural South-West Yunnan were purposefully selected for the study. The research started with the general assumption that China has a strong top-down hierarchal approach to policy processes and that funding dispersal is prioritised by the central government. However, the study found that funding proposals are prioritised for selection in a bottom-up, participatory manner from the local level. The study also found that farmers' perceptions of the effectiveness of policy implementation were directly related to their past experience. Among the nine indicators used to measure the effectiveness of policy implementation at the local level, the farmers in the study area perceived access to roads as highly effective; water use efficiency projects, market demand, human mobility for jobs, and government funds as moderately effective; drought knowledge, community participation in planning, and governance structures as least effective; and the role of leadership as not effective. The study found that farmers' adaptation at the local level is oriented towards short-term market rewards and income diversification. Farmers' local-level adaptation is guided by government priorities and driven by their perception of tangible benefits. To ensure the effectiveness of policy implementation, long-term adaptation strategies, such as awareness raising, capacity building, watershed management, and source conservation need to be strengthened at the local level.

1. Introduction

The decade 2001–2010 experienced extreme droughts in most of the parts of the world: in Australia from 2002 to 2010 (Grafton et al., 2014); in East Africa from 2004 to 2005 (Sivakumar, 2013); and in the Amazon Basin in 2010 (Sivakumar, 2013). Since the founding of the People's Republic of China, a three-year-long drought during 1999–2001 ranked the highest with an area of impact, duration, and induced losses rarely seen in its history. Again, in 2009–2010, a large-scale drought disaster affected five provinces in China, threatening more than 70 million people with drinking water shortages and barren farmlands. Over 20 million people and 30 million livestock suffered from temporary water shortages during the drought's peak period (Zou and Yuan, 2010).

The International Panel on Climate Change (IPCC) 2012 defines drought as "a period of abnormally dry weather long enough to cause a serious hydrological imbalance". It goes on to say that "A period with an abnormal precipitation deficit is defined as a meteorological drought" and "A mega drought is a very lengthy and pervasive drought, lasting much longer than normal, usually a decade or more" (IPCC, 2012). Droughts can differ from one another in terms of intensity, duration, and spatial coverage (Wilhite, 2000). Although precipitation is the main driver of drought severity, in the context of global warming, the influence of atmospheric evaporative demand cannot be overlooked (Vicente-Serrano et al., 2012).

Drought can have a major social impact, especially on farmers and their agricultural land; however, most of the research is focused on economic impact, with very few studies on the social impact of drought (Keshavarz et al., 2013). Most drought impact studies have been done at the national and regional level, with fewer at the community and household level. The insufficient information and low recognition of drought impact at the local level make it challenging to obtain adequate

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knowledge about how to cope with and adapt to these changes, making it difficult to advise decision makers on appropriate policy implementation (Wilhite et al., 2007). In the case of the 2009–2010 drought in Yunnan, several studies have been conducted on the cause of the drought (Yang et al., 2012), but few deal with the social aspects and policy implementation (Sawhney and Perkins, 2015).

China has formulated a number of policies for drought relief, mitigation and adaption, and to enhance adaptive capacity (Li et al., 2013, 2012). These policies can be classified into three categories: (1) policies for water resources conservation and management, (2) policies for economic and social development, and (3) policies for drought relief and salvation. New policies are emerging to address climate change and adaptation. As most of the local level policies are in response to directives from higher levels of government, there is an opportunity to integrate these into sectoral policies and action plans at the local level (Su et al., 2012).

In China, policies are implemented through the government's five-tier hierarchical structure. The central government in Beijing is responsible for making policies and programmes, whereas the four tiers of local government (provincial, city, county and township) implement programmes and have the power to hire and fire departmental employees (Teng and Gu, 2007). The system for the promotion and evaluation of government employees provides a strong incentive for local development; thus, policy implementation is focused on economic growth and local development, often at the expense of environmental sustainability. Discussions are ongoing as to how empirical research focusing on governance and policymaking can inform adaptation, as well as what happens when the best laid plans meet the real world, which can crucially affect policy outcomes (Eakin and Lemos, 2006). As part of this discussion, this study looked at the following questions: What is the policy implementation process at the local level in China? How do local farmers perceive the effectiveness of drought policy implementation at the local level?

To answer these questions, this research analysed farmers' perceptions of the effectiveness of policy implementation. Based on a literature review and field survey, nine indicators were selected to measure the effectiveness of policy implementation at the local level (see methodology). With focus groups as the unit of analysis, the research was conducted using data from secondary literature and policy documents, as well as primary information. Qualitative data analysis was conducted following the five stages of the framework approach (Ritchie and Spencer, 1994).

2. The case study context

China has experienced frequent and serious drought disasters throughout its history. Recently, three intensive meteorological droughts occurred in China between 2009 and 2010. These droughts impacted on crops, people and livestock, with implications for people's socioeconomic status (Ye et al., 2012). Between 1961 and 2004 in Yunnan, the linear trend analyses revealed that the annual temperature increased at a rate of 0.3 °C per decade, while a warming trend of 0.33 °C per decade and 0.26 °C per decade was observed for winter and summer temperatures, respectively (Fan et al., 2011). Between 1960 and 2012, precipitation showed large regional differences reflecting non-uniform changes.

The in-depth study by Ye et al. (2012) provided an insight into two major observed impacts of the 2009–2010 drought. First, a water shortage resulted in drinking water security problems, vegetation failure, reduced electricity generation, and livestock losses. The second was an increase in insects and disease resulting in vegetation failure. Among the different impacts, this study deals with the direct impact of drought on water shortages and related policy effectiveness in Qujing city, Yunnan.

In order to address drought, an opinion was promulgated by the Yunnan Provincial Government in 2011 to guide water efficiency development, encompassing large-scale water efficiency projects and micro-water efficiency projects for development on farmland. This order encouraged the private sector to invest and established market-based water price systems. The government also cooperated with tobacco companies on policy support for irrigation development, farmland improvement, and water-saving technologies, as tobacco production is one of the pillar industries in Yunnan. To promote water saving and increase water use efficiency, Yunnan People's Congress published the Ordinance of Water-Saving in 2012. As a result, all levels of government in Yunnan were legally bound to incorporate water saving in their social-economic development plans; professional technology standards were identified in industry to save water; rewards were given to individuals and organisations that make great contributions to water-saving technology research or that make a model in saving water; and subsidies and loans were provided for farmers to construct water efficiency projects and use water-saving technology.

3. Methodology

3.1. Study area

Situated in the southwest frontier, Yunnan province covers almost 4.1% of the total area of China and is the eighth largest province. In Yunnan, over 70% of water resources are located in remote mountain areas, which are difficult to access. The mainly karst topography means that water retention is low, resulting in precipitation runoff on the ground and frequent drought disasters. This creates a huge gap between water supply and demand, resulting in water shortages.

Qujing, which is located in eastern Yunnan (Fig. 1) and one of the most populated cities, was one of the most drought-impacted areas in 2009–2010 (Wang and Meng, 2013). It was reported that almost 135 million people and 97 million livestock experienced serious water shortages. About 36.93 million hectares of cropland were affected with 0.69 million USD in direct economic loss in agriculture. Qujing has a mild, subtropical highland climate, with short, mild, dry winters and warm, rainy summers. Luliang County was purposively selected for this research due to its history of drought (the great famine during Mao's period and other extreme events, such as the 2009–2010 drought) (Xinhua, 2010). Two administrative village groups, Fa-e-sha and Ayoupu, in the county were selected based on drought severity, economical status, geological conditions, and the number of projects implemented by the government after the 2009–2010 drought (Table 1). During the key informant interviews and the focus group discussions, it was confirmed that Fa-e-sha and Ayoupu are the most drought prone areas in Luliang.

In Luliang, the farmers have changed their water management practice due to drought. According to the former governor, these changes were highly influenced by government policy. Earlier natural water tanks were sufficient in most villages, but now, locals have to pump water and depend on government facilities such as pipes, water tanks and wells for drinking water. For agriculture, the government and tobacco companies have introduced new technologies to save water, such as plastic covers, drip irrigation, sprinklers and dry nurseries. The government has also introduced crops that use less water, like maize and corn.

3.2. Sample selection

Four levels of key informant interviews provided an understanding of the policy implementation process at the lowest administrative level and the involvement of communities in decision making for project implementation (Table 2). Focus group discussions (with participants of mixed ethnicity, age, and household responsibilities) were conducted with 11 women's groups (total of 91 participants) and 11 men's groups (total of 95 participants) separately (Table 3). The key informants were not included in the focus group discussions to avoid duplication. A