



Farmers' decision-making process under drought



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ABSTRACT

Although a large body of research exists discussing the subject of drought management and the mechanisms that are employed by farmers to formulate decisions during such an event, the farmers' response to drought remains poorly understood due to the oversimplified assumptions about farmers' behavior in response to drought. Furthermore, little is known about the potential efficacy of the coping strategies that are adopted by farmers. To gather this knowledge, a mixed method, qualitative-quantitative study was conducted in Fars province, Iran. A survey of 255 farmers, selected through a multistage stratified random sampling method, revealed that farmers' decisions to manage a drought were the result of a complex web of natural, economic, structural, and cognitive factors. Additionally, an analysis of decision models revealed that there were different patterns of coping responses utilized in the different stages of drought that expanded from short-term adjustment to long-term adaptation. Furthermore, a decision tree analysis indicated that although a large percentage of farmers made some adjustments in response to drought, they were not able to overcome the increasing impacts of the drought. In this respect, it was recommended to consider various economic incentives, promote affordable coping strategies, and combine agricultural interventions with social support services.

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1. Introduction

Farmers frequently cope with risks due to the uncertainty of climatic conditions (Crane et al., 2011). Population growth (Le Gal et al., 2010), changes in agricultural policies, environmental regulations (Risbey et al., 1999) and the degradation of natural resources such as soil and water (Riebsame et al., 1991) also present farmers with numerous challenges. Although farmers have experience in coping with a certain degree of uncertainty, increased climate variability and changes may cause severe problems. Drought in particular is a climatic disaster that creates substantial costs for farmers and affects their agricultural systems extensively. Drought is the most complex of all natural hazards (Wilhite et al., 2007), making the arid and semi-arid regions of the world vulnerable. Although drought has not been well documented (Wilhite and Pulwarty, 2005), the resource-dependent sectors such as agriculture are the most vulnerable to the impact of this phenomenon.

A review of the long-term annual precipitation trends indicated that drought had a worldwide return frequency of every 20–30 years (Eskandari, 2001). However, in the last 50 years, some countries such as Iran and Bangladesh have experienced approximately 27 (Amirkhani and Chizari, 2010) and 19 (Habiba et al., 2011) drought events, respectively. Therefore, for arid and semi-arid regions, drought is a recurrent feature that could lead to the loss of crop production, food shortages and starvation (Paul, 1998) if not managed appropriately. According to Keshavarz et al. (2010), drought impacts could be managed at macro (national), meso (local) and micro (village and household) levels. However, the micro-level management (i.e., what the farmers do in response to drought) is of great importance (Keshavarz et al., 2010).

A review of the studies of farmers' decision-making in response to climate variability (e.g., Comoe and Siegrist, 2013; Comoe et al., 2012; Ingram et al., 2002) revealed that most research has focused on the decision event and not on the entire process (Orasanu and Connolly, 1993). Keshavarz et al. (2010) argued that the wrong assumption of farmers' homogeneity neglected different aspects of decision-making in response to drought. Studies by Gibbons and Ramsden (2008) and Keshavarz et al. (2010, 2011) also indicated that farmers made different decisions when utilizing the same data. Additionally, many studies have focused on single strategies that were used to mitigate drought (e.g., Easdale and

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