

# Adaptation of Iranian farmers to climate variability and change

Marzieh Keshavarz · Ezatollah Karami ·  
Mansoor Zibaei

Received: 9 June 2013 / Accepted: 1 November 2013  
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**Abstract** Climate change poses serious challenges for populations whose livelihoods depend principally on natural resources. Given the increases in extreme weather events projected to adversely affect the arid and semi-arid regions of Iran, adaptation of the agricultural sector is imperative. Few studies have addressed the farmers' adaptation in Iran, and little is known about ongoing adaptation strategies in use. Adopting principal component analysis/fuzzy logic-based method, this paper considers the agricultural adaptation to climate variability. A survey of 255 farmers of Fars Province, selected through a multistage stratified random sampling method, revealed different levels of adaptation, specifically the low, moderate and high, which are principally distinguished by various degrees of sensitivity and adaptive capacity. The study also identified the main adaptation strategies used by farmers in response to climate-related shocks. Results indicated that although a large percentage of farmers make some adjustments to their farming practices, there are significant

differences in choice of adaptation strategies by the adaptation categories. Some conclusions and recommendations are offered to increase the adaptive capacity of farmers and reduce negative impacts of climate variability and change.

**Keywords** Adaptation · Climate variability and change · Adaptation strategies · Farmers · Iran

## Introduction

Agricultural sector remains the main source of income for most rural communities. Furthermore, it is a mainstay of most developing countries' economy and highly contributes to their GDP. However, agriculture is inherently sensitive to the weather and climate conditions, and is among most vulnerable sectors to the risks and impacts of global climate change (Smit and Skinner 2002). Some impacts of climate change are already apparent throughout the world. For example, during the last decade, severe droughts have become more common in arid and semi-arid countries. Water availability reduction has been another impact of extreme weather conditions (Keshavarz et al. 2013). While there is increasing concern regarding the impact of climate change on water resources, it is expected that some arid countries like Iran will encounter reduced rainfall amounts of 20–25 % below the present mean value, by the 2050s (Ragab and Prudhomme 2002) and consequently experience more prolonged droughts (Faramarzi 2010). These mechanisms likely become more significant with rising temperatures. Based on the scenarios proposed by Intergovernmental Panel on Climate Change, it is estimated that if the CO<sub>2</sub> concentration doubles by the year 2100, the average temperature in Iran will increase by 1.5–4.5 °C (Amiri and Eslamian 2010) which will cause significant

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**Electronic supplementary material** The online version of this article (doi:10.1007/s10113-013-0558-8) contains supplementary material, which is available to authorized users.

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M. Keshavarz (✉) · E. Karami · M. Zibaei  
College of Agriculture, Shiraz University, Shiraz, Iran  
e-mail: keshavarzmarzieh@pnu.ac.ir;  
keshavarzmarzieh@gmail.com

E. Karami  
e-mail: ekarami@shirazu.ac.ir

M. Zibaei  
e-mail: zibaei@shirazu.ac.ir

*Present Address:*

M. Keshavarz  
Department of Agriculture, Payame Noor University, PO Box  
19395-3697, Tehran, Iran