



# Farmers' risk perception, vulnerability, and adaptation to climate change in rural Pakistan



Shah Fahad, Jianling Wang\*

School of Management, Xi'an Jiaotong University, Xi'an 710049, China

## ARTICLE INFO

### Keywords:

Climatic risks  
Climate variability  
Floods and droughts risks  
Adaptation  
Vulnerability  
Pakistan

## ABSTRACT

Pakistan is the world's most susceptible country to extreme climatic events, such as floods and droughts. This study aims to investigate the risks related to climate variability and the adaptation measures utilized by farm households in their farms to cope with the adverse shocks of climatic disasters. A dataset of 600 respondents was collected using structured questionnaire from four districts namely Charsadda, Mardan, Nowshera and Peshawar of Khyber Pakhtunkhwa province of Pakistan. Findings of the research showed that soil fertility loss, water scarcity, changes in crop yields and crop diseases were the main determinants of climate variability. Further study participants were also utilizing several adaptation techniques such as change in crop type and variety, change fertilizer, seed quality, pesticide, plant shade trees; water storage and farm diversification. Results of our study further showed that in the study area, study participants were facing various constraints in adoption of certain adaptation measures to deal with climate variability, such as shortage of labor, insecure land tenure system, lack of market access, poverty, lack of governmental support, lack of access to assets, lack of water sources, lack of credit sources and lack of knowledge and information were the main constraints faced by the farm households. Findings of this research provide useful insights to the responsible authorities for policy implementation. Our study further suggests that the government should provide proper support to the farmers in the shape of access to farm inputs, access to information and extension services on climate variability and adaptation.

## 1. Introduction

Climatic change effects all regions across the globe, which causes substantial agitations that can be expected to be natural systems that have foreseeable influences on the economic systems of upland regions (Kohler and Maseli, 2009) through both direct and indirect means (Fahad et al., 2018a). Poor and agricultural communities of the developing world are affected most by the climate change, because they have poor adaptive capacity and inadequate access to alternate means of production (Kurukulasuriya and Rosenthal, 2003; IPCC, 2007; Skoufias et al., 2011). Several studies have projected that variations in climatic conditions is more likely to rise the incidence and magnitude of some risky climatic events and disasters including, droughts, floods, cyclones and storms (Field, 2012). This is might be geographical positions and locations the most vulnerable areas of the world, limited assets, high exposure, and rapid population growth (Hay and Mamura, 2010).

Developing countries, especially south Asian countries including Pakistan are the most affected regions that are related to the risks of

climate change, in the form of increase in temperature and fluctuation in precipitation; however, the worst is yet to be expected (Ali and Erenstein, 2016; IPCC, 2014; Mirza, 2003). Among different natural hazards to which humans are exposed and give rise to fatalities, floods are the most common and leading cause of economic and social risks for people. In particular rural populations in developing countries are always vulnerable to flood events owing to low adaptive capacity and resources (Fahad and Jing, 2018). The intensity and severity of flooding incidents in developing countries are mainly associated with environmental and climatic changes. If the effects of climate change on agricultural systems are not identified efficiently, it could extremely affect the production of food, food security and also could be an obstacle in poverty reduction efforts and sustainable development. Low-income countries, that are located at lower latitudes are more vulnerable to climate change and increase in temperature in the near future may push these low-income regions further away from optimal temperatures for climate sensitive economic sectors (Mendelsohn and Dinar, 2009), that may affect more than 170 million people to the risk of hunger around the globe by 2080 (Schmidhuber and Tubiello, 2007). Climate change

\* Corresponding author.

E-mail addresses: [shah.fahad@mail.xjtu.edu.cn](mailto:shah.fahad@mail.xjtu.edu.cn) (S. Fahad), [wangjl@mail.xjtu.edu.cn](mailto:wangjl@mail.xjtu.edu.cn) (J. Wang).

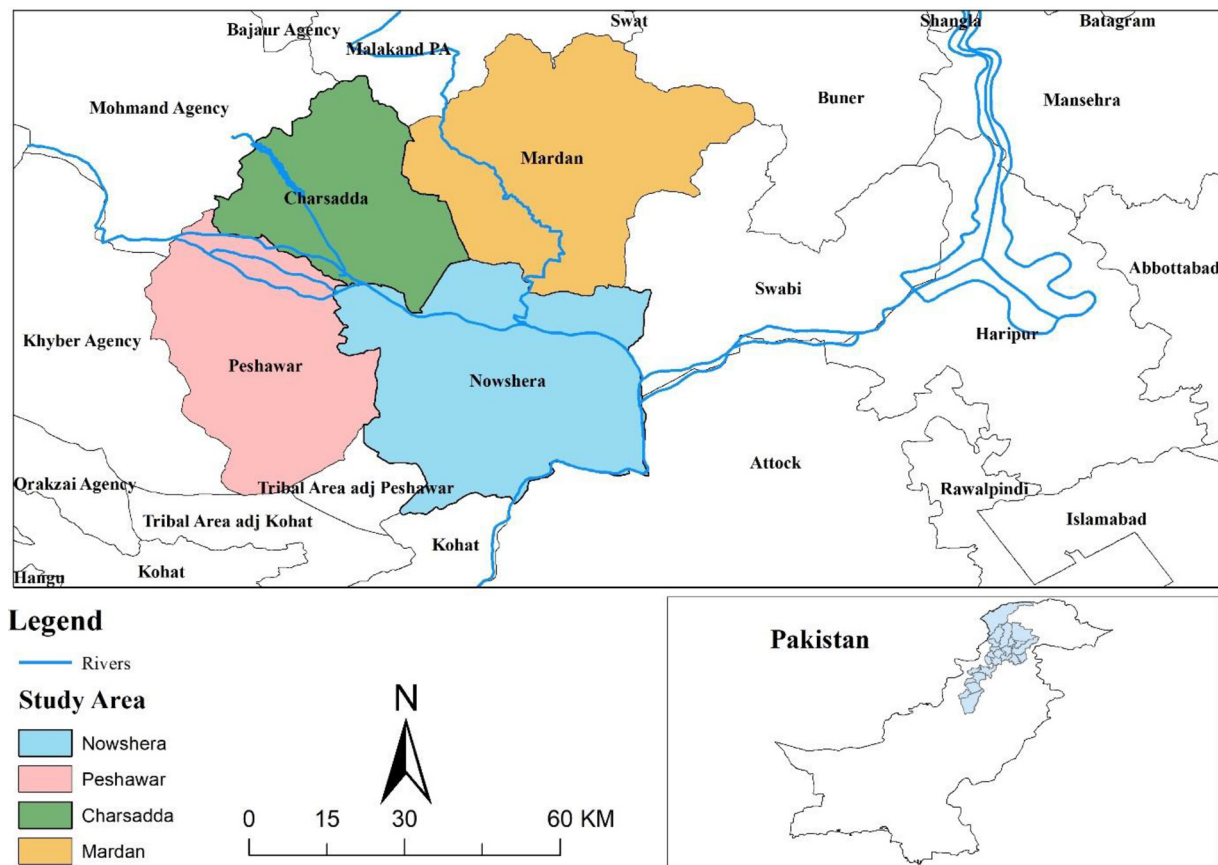


Fig. 1. Map of the study area.

will significantly affect the productivity of crops and lead to important changes in farming outcomes (IPCC, 2014). Moreover, extreme weather-related events, soil salinity in coastal areas and incidence of pests and diseases may result in additional negative effects on agriculture sector (IPCC, 2014). Despite the technological advancement, climate is still a fundamental determinant of agricultural productivity where temperature and rainfall act as main drivers in crop production and by consequence rural food security (Huong et al., 2018a; Wheeler and von Braun, 2013).

Pakistan's vulnerability to the impacts of climate change has been increasing with time despite its contribution to global warming being negligible. Pakistan was ranked 12th, 8th position in 2012, 2015, and ranked 7th among uppermost regions of the world exposed to the whims of climate change (Kreft and Eckstein, 2013). Recent floods and other climatic disasters such as droughts, storms and cyclones have hit Pakistan badly (Mueller et al., 2014; Tingju et al., 2014). These climatic disasters not only become more recurrent but also triggered more damage (Qasim et al., 2015). Even after having been consistently affected by climate exigencies year after year, the country's response to solve the issue has remained lackluster. The natural disasters in Pakistan such as 2010–2014 floods have badly devastated millions rural households. Besides this, according to (Cardona et al., 2003; Huong et al., 2018b) the growth in population, unmanaged infrastructure are also the common influencing factors that resulting in people more vulnerable to uncertain climatic risks. Several studies have reported that rural people of Pakistan are highly vulnerable to climate change (Deressa et al., 2009; Füssel and Klein, 2006), and these rural population are badly affected by climatic changes recognized by many research studies throughout the country (Qasim et al., 2015; Tingju et al., 2014). A consistent big problem for Pakistan's establishments is that climatic hazards arise regularly, but adequate use of recent developments in policies, strategies and cost-effective tools and sustainable interventions

are still missing in Pakistan (Qasim et al., 2015). In South Asia, wheat and rice are the two main food crops for 1.5 billion people, these both crops are subtle to heat-stress, though rice is not sensitive than wheat (Lobell and Gourdji, 2012). Lower rice and wheat yields are expected not only in South Asia but across the globe due to climate change (Asseng et al., 2011; Lobell and Gourdji, 2012; Naylor et al., 2007).

Various literature have identified that there is an urgent need of risk perceptions, climate change vulnerability and adaptation at household level in order to reduce the adverse effects of climate change on farming sector (Abid et al., 2016). Previous studies have shown that farmers always use several techniques for adaptation of agriculture to climate change vulnerability (Ali and Erenstein, 2016). The farmers use several techniques at their farm level such as changing in timing of operations, diversification in crop practices (Deressa et al., 2009, 2011); changing farm-management such as amount and type of farm inputs applied (Abid et al., 2016; Fahad et al., 2018a) institutional changes, mainly government responses, such as subsidies and improvement in farm marketplaces (Mendelsohn et al., 2001); livelihood diversification (Hussain and Mudasser, 2007) and technological advancements such as cultivation of new and heat tolerant crops and advancement in irrigation and water management methods (Deressa et al., 2009, 2011; Hussain and Mudasser, 2007).

Surprisingly, studies concerning the climate change vulnerability are with extreme climatic events are very limited, in Khyber Pakhtunkhwa (KP) province of Pakistan, which is one of the most vulnerable provinces of Pakistan. To fill the literature gap discussed above, this study is expected to provide valuable evidence regarding the climate change vulnerability based on farmers direct responses to various types of agriculture risks. This study further identifies the major factors associated with climate change vulnerability, adaption techniques using by farm households, and risk perception of farmers towards adverse effects of climate change.

Download English Version:

<https://daneshyari.com/en/article/11000071>

Download Persian Version:

<https://daneshyari.com/article/11000071>

[Daneshyari.com](https://daneshyari.com)