Land Use Policy 47 (2015) 401–407

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

Predicting farmers' water conservation goals and behavior in Iran: A test of social cognitive theory

Masoud Yazdanpanah[a,b,*], Fatemeh Rahimi Feyzabad[a], Masoumeh Forouzani[a], Saeed Mohammadzadeh[a], Rob J.F. Burton[c]

[a] Department of Agricultural Extension and Education, Ramin Agriculture and Natural Resources University of Khuzestan, Mollasani, Ahwaz, Islamic Republic of Iran
[b] IIASA—International Institute for Applied Systems Analysis, Schlossplatz 1., Laxenburg, Austria
[c] Bygdeforskning (Centre for Rural Research), N-7491 Trondheim, Norway

ARTICLE INFO

Article history:
Received 24 July 2014
Received in revised form 9 April 2015
Accepted 22 April 2015

Keywords:
Water scarcity
Water conservation behavior
Social cognitive theory
Farmers
Iran

ABSTRACT

Lack of water constrains the economic development of all countries in arid and semi-arid areas and is forecast to become an even greater problem in the near future. Given the complexity of the water scarcity problem, an emerging drought in Iran (the worst in 30 years) has become an increasingly important issue, making more sustainable water management a necessity. Government bodies involved in water resource management mainly concentrate on increasing water supply, while approaches to decreasing water demand receive less attention. Iranian water users have been slow to implement voluntary water conservation. Encouraging voluntary action requires an understanding of existing behaviors, and of how behavioral changes can be made. In this context, a study was carried out to identify the most prominent drivers of, and impediments to, water conservation, using social cognitive theory. A sample of 360 farmers living in western parts of Iran was selected through a multi-stage, stratified, random sampling method. Findings revealed that farmers' intention to conserve water was predicted mainly by outcome expectancy and self-efficacy. Moreover, self-efficacy was the most important determinant of farmers' actual behavior in conserving water.

1. Introduction

There is evidence that by 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity and that two-thirds of the world's population could be living under water stress (FAO, 2007; Verma et al., 2004). Lack of water is a constraint to the economic development of all countries in arid and semi-arid regions with poor water access, especially those heavily reliant on agriculture. At the global scale, agriculture is by far the most important user of water and, as pressure on water resources increases, the need for new approaches to managing those resources is becoming more pressing (Sullivan, 2002). In the future the agricultural sector will be expected to use less water without a decrease in food production in order to feed the increasing global population (Forouzani et al., 2012). Accordingly, sustainable management of water has become an issue of major concern over the past decade.

Among the worst hit areas are the semi-arid regions of Asia, the Middle East, and sub-Saharan Africa (Verma et al., 2004). Of these regions the Middle East is expected to be particularly badly affected with a decline in precipitation of at least 40 mm over the comming century (FAO, 2007). This prediction, along with evidence of increasing drought, has made water scarcity a critical issue in many parts of Iran (Forouzani et al., 2012; Yazdanpanah et al., 2014a,b) which is currently experiencing its most prolonged, extensive, and severe drought in over 30 years (Yazdanpanah et al., 2013b; Hayati et al., 2010). Although Iran has always had cycles of drought, a major World Bank report (Balalii et al., 2009) confirms that the current drought is different. Iran faces not just a periodic dry spell, but a severe water crisis, made worse by recent high rates of population growth. Thus, the country is facing unprecedented water management challenges exacerbated by severe recurrent droughts, and the crisis is set to turn into a super-crisis (Yazdanpanah et al., 2013a, 2013c). It is inevitable, given the current trends of climate change and population growth, that water security will become an even more important issue over the coming decades. The prevalence

* Corresponding author at: Department of Agricultural Extension, Education and Rural Development, Ramin Agriculture and Natural Resources University of Khuzestan, Mollasani, Ahwaz, Islamic Republic of Iran. Tel./fax: +98 6136524348.
E-mail addresses: masoudyazdan@gmail.com, yazdanm@ramin.ac.ir (M. Yazdanpanah).

http://dx.doi.org/10.1016/j.landusepol.2015.04.022
0264-8377/

of drought during the last decade, combined with the political will to achieve self-sufficiency in certain crops, has led farmers to extract high levels of groundwater from wells and to make direct withdrawals from surface water. Although water conservation is a frequently discussed issue in Iran, many Iranian water sources are threatened by over-exploitation and contamination (Forouzani et al., 2013).

The growing water scarcity is one of the major threats to future agricultural sustainability, especially in rural areas. Within the wider framework of agricultural sustainability studies, sustainable agricultural water management is an issue of major importance that needs to be taken into account at a practical level (Forouzani et al., 2012). While access to water is an important factor in agriculture production and human development (Anand, 2007), many government projects to address these challenges are based on increasing the water supply (Foltz, 2002) in particular by moving from small-scale decentralised to large scale centralised water provision through the construction of dams (Hurlimann et al., 2009; Yazdanpanah et al., 2013c). In contrast, other approaches (e.g., decreasing demand) have received less attention.

Water demand management initiatives can be used to help shift consumers toward sustainable water consumption (Willis et al., 2011). In fact, demand management measures provide generally the most sustainable solutions in environmental, social, and economic terms across the range of options for water supply security (White et al., 2007). Such demand-lead solutions include initiatives such as increasing the efficiency of equipment, price controls, and water use restrictions, including promoting water conservation. Even though, throughout Iran, water supplies are scarce, water conservation has not been a major policy issue until recently. Now, concerns over impending water scarcity have prompted Iranian policymakers to develop strategies and policies to effect behavioral changes in water use, for instance, by promoting water conservation. Some policies have been implemented based on regulatory intervention; for example, the government has directly implemented policies to increase the price of water. Other policies such as promoting water conservation practices cannot, however, be introduced by any political or planning power, but rely on the voluntary acceptance of users. Pearce et al. (2007) believe that enhancing the capacity of communities and individuals to manage their own water resources is likely to have greater conservation benefits than introducing a user-pays system. Moreover, if behavioral change occurs through voluntary action over time, it is more likely to be sustainable (Ayer, 1997).

Although the government has initiated a serious campaign to inform the public about water conservation through posters, speeches, and educational materials distributed through schools (Foltz, 2002), Iranian water users have been slow to actively embrace voluntary conservation (Yazdanpanah et al., 2014a,b). In this regard, Allon and Sofoulis (2006) believe that understanding the part water plays in everyday life is an integral part of water management challenges. One way of achieving this is by exploring the value attached to water and its daily usage, how this relates to consumption patterns, and how/where water consumption behavior could be changed (Browne et al., 2007). Willis et al. (2011) argue that the demand management approach relies heavily on consumers understanding how to reduce their water consumption and on applying their understanding to everyday activities so that they consume sustainably. However, if water conservation is to be implemented effectively, the full dimensions of the water problem need to be understood (Boland and Whittington, 2000). Furthermore, if attempts are to be made to encourage voluntary actions, an understanding is first needed not only of existing behaviors but also of the guidance needed to help influence behavioral change. What factors govern the water consumption behavior of farmers and how can we influence positive behavioral change?

Despite the growing importance of these issues, very little research into these questions has been undertaken in Iran. To address this gap, this paper aims to identify the most important drivers of and impediments to water conservation in the agricultural setting as a first step to designing effective intervention programs for reducing water consumption. Through an empirical study of farmers' water conservation behavior it provides a knowledge base for the development of public policy measures aimed at increasing water conservation among Iranian farmers. In particular, given the key role of voluntary behavioural change, the paper examines the psychological constructions of water usage behaviour through an innovative application of social cognitive theory.

2. Theoretical perspectives of behavioral change—Social cognitive theory

Many theories and models from different domains (sociological, psychological, economic) have been used to understand behavior. Cary (2008) believes that changes in behavior related to water consumption are affected by both internal and external factors and, consequently, that research into behaviural change needs to consider the interconnections between psychological, social, and structural antecedents to action. Others (e.g. Russell and Fielding, 2010; Jorgensen et al., 2009; Saurí, 2013; Corral-Verdugo et al., 2003) believe that the determinants of water conservation behaviors can be categorized into different domains: attitudinal factors, beliefs, habits or routines, personal capabilities, and contextual forces. In other words, a wide variety of factors, such as physiological and contextual as well as cognitive factors appear to determine whether farmers positively engage in water conservation or not. Thus water management is seen as a complex and sophisticated behavior resulting form the interaction of multiple influences. In this study we wanted to examine the relationships between psychological, social, and socio-structural factors within a coherent theoretical framework. To identify the factors influencing farmers' decisions to engage in water conservation, we borrowed a theory from the healthcare domain: the social cognitive model of Bandura (1986), which has been applied to various behaviors (Kanekar and Sharma, 2009). Social Cognitive Theory (SCT) explains how people acquire and maintain certain behavioral patterns (Van Zundert et al., 2009).

Research has placed emphasis on SCT in order to understand the relationships between personal, behavioral, and environmental influences (Bandura, 1986; Bandura, 1997). According to SCT, a variety of personal, environmental and behavioral variables influence the individual behavior and it is a result of the interaction between a person's beliefs – which include outcome expectations, self-efficacy beliefs, and a sense of volitional control – and the social and physical environment in which behavior occurs (Bandura, 2004; Zimmerman et al., 2012). In essence, SCT challenges researchers to probe how behavior can influence both personal and environmental factors in a recursive fashion (Phipps et al., 2013). While SCT has a number of overlaps with other widely used predictive models of behavior, its key advantage lies in its use of grounded theoretical principles which can be targeted through interventions in order to increase habits (Bandura, 1997) and it is, in addition, able to capture the complexity of factors underlying sustainable consumption behaviors (Phipps et al., 2013).

Social cognitive theory has been proven a successful model for a range of behaviors with respect to the health domain; exercise, dietary behaviors, stress management/coping, medication regimens, condom use (Young et al., 2005), and energy conservation (Thøgersen and Grønhøj, 2010). While, to our knowledge, no study