

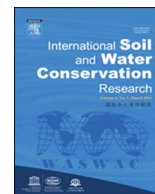
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Original Research Article

Understanding the attitudes and practices of paddy farmers for enhancing soil and water conservation in Northern Iran[☆]Dariush Ashoori^a, Asghar Bagheri^a, Mohammad Sadegh Allahyari^{b,*,1}, Anastasios Michailidis^c^a Department of Water Engineering and Agricultural Management, Faculty of Agricultural Technologies and Natural Resources, University of Mohaghegh Ardabili, Ardabil, Iran^b Department of Agricultural Management, Rasht Branch, Islamic Azad University, Rasht, Iran^c Aristotle University of Thessaloniki, School of Agriculture, Forestry and Environmental Sciences, Faculty of Agriculture, Department of Agricultural Economics, Laboratory of Agricultural Extension and Rural Sociology, 54124, Thessaloniki, Greece

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ABSTRACT

The objective of this paper was to identify the factors affecting rice growers' attitudes and practices towards water and soil conservation in the Fumanat Plain of Guilan Province, Iran. Data were collected through a survey questionnaire addressing a cross section of 400 rice growers of the Fumanat Plain in four districts. Data were analyzed using both summary statistics and multivariate statistical procedures while content validity of the statements was first determined by a group of experts of water and soil conservation. It was found that more than 23% of the variance of attitudes towards water and soil conservation could be determined by a linear combination of variables included in a regression equation. Identifying the factors affecting rice growers' attitudes is suggested as a way of integrating rice cultivation into rural development. From a practical point of view, the above mentioned implications are of great importance generally for society, policy makers and related economic sectors.

1. Introduction

Economic growth of developing countries mainly depends on the performance of the agricultural sector and its role in the management of natural resources (Gylfason, 2001). However, most developing countries gradually are losing their natural resources (both quality and quantity) due to severe droughts, floods and human intervention (Mengstie, 2009). The success of conservation programs of natural resources and their optimum use requires the understanding of various aspects of human behavior because human behavior is the result of individuals' attitudes about the conservation of these resources.

Farmers' positive or negative attitudes about soil conservation practices can affect their behaviors about the adoption of water and soil conservation (WSC) practices (Fishbein & Ajzen, 1975; Shafiee, Rezvanfar, Hossini & Sarmadian, 2008).

Water and soil are two major issues in changing attitudes from ultra-sector to intra-sector parameters for keeping the sustainability. Despite its important role in improving the performance of agriculture and food security, irrigation water is becoming a scarce resource (Bruinsma, 2009; FAO, 1992). Overall, soil erosion is initiated when

human activities disrupt the equilibrium of nature. So, the programs of conserving natural resources and their optimum use can succeed if different aspects of human behavior are understood because these behaviors are the result of their attitudes. Farmers' positive or negative attitudes about soil conservation practices can affect their behavior towards the adoption of these practices. Therefore, attitude can be regarded as a desire to respond to an idea/situation in a special manner. The study of individuals' attitudes about different issues is important because it can help managers and executives understand people's mentalities about certain issues (Shafiee et al., 2008).

Unfortunately, because of over exploitation of agricultural water resources, Iran faces serious constraints in its water supply which challenges the achievement of agricultural water management objectives. Today, a lack of technical knowledge, farmers' attitudes and skills and farmers' training about the application of sound practices of agricultural water management can be blamed for the low efficiency of irrigation water use (Shahroudi & Chizari, 2006). Regionally, programs for conserving natural resources and their optimum use can succeed if various aspects of human behaviors are understood because these behaviors are the result of their attitudes about the

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conservation of these resources.

Factors affecting farm-level adoption of water and soil conservation practices include such variables as job training and farmers' perception of soil erosion (Sidibé, 2005). Farmers who are inclined to adopt technologies and practices for the conservation of basic resources (water and soil) fulfill them when they obtain their expected profitability (De Graaff et al., 2008; Ellis, 1993; Feder, Just & Zilberman, 1985). In a study on key factors affecting investment on water and soil conservation practices, Kessler (2006) concluded that these practices were fully adopted only when farmers used them continually and integrated them with their farming system. Sain and Barreto (1996) revealed that most farmers had positive attitudes towards soil conservation and that their awareness of soil erosion was high, but they did not adopt soil conservation technologies because these technologies were mostly very complex and expensive and had no direct, short-term profit.

Pannell (1999) related the low level of adoption of conservation technologies to their high implementation costs, the need for long-term investment, lack of visible and direct final results, lack of conservation morality and sustainability culture among farmers, and farmers' inappropriate attitude about protection and sustainability. In a study on barriers to irrigation water conservation in the Rio Grande Basin and the challenges and opportunities for its extension, Ward, Michelsen, and DeMouche (2007) identified various barriers to water conservation among which the most important ones were limitations of water transfer, virtual water storage, incorrect water conservation, attitude towards conservation, land-owning type, and unclear function of water. They revealed that water price was the main factor affecting water conservation. Low water price hinders water conservation even if other institutions develop water conservation. In contrast, high water price encourages water conservation even in the presence of other discouraging factors.

In a comparison of soil conservation adoption models in Khuzestan Province, Iran, Noorollah-noorivandi, Ajili, Chizari, and Bijani (2012) concluded that from a demographic perspective, knowledge and attitude, ownership, technology and income resulted in significant differences among three soil conservation practice adopter groups. In their attempts to develop an integrated model, they included the variables of land area, income, crop yield, mechanization level, loads and total owned land, age, literacy level, attitudes about soil conservation technologies, social status, social participation, the use of information sources, and technical knowledge about soil conservation technologies as effective constructs for predicting high-adopting farmers in their model. In an opinion poll about soil conservation operations from farmers' perspective in Karkheh and Dez watersheds, Shafiee et al. (2008) found that most farmers had positive attitudes towards soil conservation. Their analysis of correlation showed a positive, significant relationship of attitude toward soil conservation practices with the extent of using communication channels and information sources and cosmopolitan features. Karimi and Chizari (2007) reported positive, significant relationship between farmers' attitudes towards soil conservation. In addition, most farmers had positive attitudes to soil conservation.

The main purpose of the present study was to examine small-scale farmers' attitudes towards water and soil conservation in the Fumanat Plain of Guilan Province, Iran and to determine factors shaping these attitudes in order to recognize factors affecting farmers' decision-making about adoption of water and soil conservation practices in this plain for policy-makers, farmers, researchers and those involved in the agriculture sector. The following research objectives guided the study:

1. Describing demographic, economic and technical characteristics of paddy farmers,
2. Identifying the main sources of information seeking about soil and water conservation practices among paddy farmers,
3. Identifying determinants of paddy farmers attitude towards soil and

water conservation.

In the next section we describe the methodological framework including the description of the study area, the data collection and the employed statistical modeling. In the third section we present the summary statistics, the multiple regression analysis scores and generally the results.

2. Materials and methods

The study area was composed of the irrigation and drainage network of the Sefid-Rūd River in the Fumanat Plain of Guilan Province, Iran. The Fumanat Plain is located in the central part of Guilan Province which is fed by the Anzali lagoon watershed. Its total geographical area is over 84,310 ha out of which 56,774 ha is under rice cultivation. The region is inhabited by over 56,908 households with a population of 255,199 out of which 52,086 households are rice growers. The present study was carried out as a survey. Its statistical population was composed of rice growers living in the Fumanat Plain (N=52,086) out of which 400 small-scale farmers were selected as the study sample by the table of minimum sample size proposed by Bartlett, Kotrlik, and Higgins (2001).

Questionnaire was used as the main research tool for studying rice growers' attitudes towards water and soil conservation practices. The dependent variable was respondents' mean total attitudes towards water and soil conservation practices. Dependent sector of the questionnaire related to rice growers' attitudes about water and soil conservation practices was composed of 13 5-point Likert items for which respondents showed their level of agreement. Since the responses were expressed in a range from 1 (strongly disagree) to 5 (strongly agree), attitudes were categorized in the four following groups by Interval of Standard Deviation from the Mean (ISDM) formula in order to describe the distribution of participants' attitudes (Pezeshkirad & Naeemi, 2010):

A=weak attitude, $A < \text{Mean}-SD$

B=moderate attitude, $\text{Mean}-SD < B < \text{Mean}$

C=good attitude, $\text{Mean} < C < \text{Mean}+SD$

D=excellent attitude, $\text{Mean}+SD < D$

In addition, the independent variables were respondents' demographic attributes including age, educational level, farming and non-farming income, and land area. Content validity was determined by a panel of experts of water and soil conservation including academics, policy makers and staff members of relative companies and local authorities. After a preliminary test, the reliability coefficient of Cronbach alpha of the dependent multi-item statement was estimated and found equal to 0.901 (> 0.700) showing acceptable reliability of the questionnaire and significant homogeneity of its items.

The main variables of the study were estimated and described using frequencies, percentages, mean scores and standard deviations (SD). The relationships among dependent and independent variables were firstly examined in the inferential analysis and afterwards the contribution of each variable in predicting farmers' attitudes towards water and soil conservation were estimated employing multiple regression analysis (MRA). In this paper MRA (Stolzenberg, 2004) was used to optimally handle the categorical variables in order to find out possible relations between a dependent variable and a set of selected independent ones. All data analyses were carried out by using SPSS v.21 for windows.

3. Results

According to the summary statistics (Table 1), mean respondent of the study was a married male, 49 years old who lives in a family with 4.82 members. Additionally, his mean work experience was 30.80 years

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