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RESEARCH ARTICLE

Effects of environmentally friendly agricultural land protection programs: Evidence from the Lake Seyfe area of Turkey



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Abstract

The primary purpose was to investigate the effect of the Environment Friendly Agricultural Land Protection (EFALP) program initiated in 2006. More specifically, the study objectives were to determine the adoption levels of environmentally friendly practices, the extension activities being performed in the region, and to analyse the factors influencing the adoption of the program. Respondents were selected by drawing two stratified samples based on farm size. Cross tabulation and chi-square tests of independence were used to achieve the first objective of the study. Focus-group interviews were conducted for the second objective, and finally, a binary logistic-regression model was applied for the third objective. The findings showed that the adopter farmers used land protection measures extensively relative to the non-adopters, and the Ministry of Food, Agriculture, and Livestock of Turkey, provides useful extension services in the region. Farm size, irrigated land, income level, specialization area, cooperative membership, and travel frequency to large cities influence the adoption of the EFALP program. The conclusion is that the promoted program significantly influenced the protection of the land and other natural resources, and therefore, the regions implementing programs of this type must be extended to other environmentally sensitive areas of the country.

Keywords: sustainable development, sustainable agriculture, environmental problems, diffusion of innovations, Lake Seyfe, Kirsehir, Turkey

1. Introduction

Agriculture is still considered one of the main sectors in Turkey in terms of meeting the basic needs of people and making a contribution to economic development. Current trends indicate that the population size will steadily increase,

and further increases in food demand will probably force either increased agricultural production or food imports. Meeting the increasing food demand with domestic production is, of course, a priority purpose of national agricultural policy, but it seems quite difficult to achieve, as there has been increasing pressure on agricultural land and other natural resource bases. Because of unplanned urbanization, industrialization, tourism, and the improper selection of railway and highway routes, highly productive agricultural lands are under pressure in every region of the country. Increasing food production to meet the needs of a growing population with the present agricultural sector will be more difficult without damaging the agricultural lands and environment. The pressure on farmers to increase productivity on present agricultural lands to some extent forces them to

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misuse pesticides, chemicals, water, and other inputs. In addition, in order to expand the cultivated area and increase the outputs of farm commodities, particularly small holders have a tendency to cultivate environmentally sensitive and marginal lands such as uphill and mountainous regions, non-forested timberlands, riverbanks, wetlands, and lake-shores. These issues, with different degrees of impact, have been voiced not only in Turkey, but also in many other countries (Barbier 2000; Lasanta *et al.* 2000; Altieri 2002; Nkonya 2002; Isabirye *et al.* 2007).

To create sustainable agricultural systems, many countries around the world have initiated natural resource conservation programs that aim for the sustainable use of land and other natural resources by promoting specific incentives. Their intents are to prevent erosion, promote the economical use of water resources, increase water quality, provide wildlife conservation, and prevent flood damage and other natural calamities. The most important common benefit provided by these programs is that they may ensure sustainable agricultural production whereby economic developments proceed in such a way that the production capacity of natural resources is not diminished in the long run.

One of the remarkable environmental programs around the world is the Environmental Quality Incentives Program of the United States. It is implemented by the Natural Resources Conservation Service of the United States Department of Agriculture (USDA), and the farmers' participation is on a voluntary basis (USDA 2014). In a study conducted in Costa Rica (Thacher *et al.* 1997), the participation of small and medium-sized agricultural enterprises in a state-run reforestation program was examined. The results showed that large farms employing few workers and in need of off-farm income had a positive tendency to participate in the program. Zbinden and Lee's (2005) study in the same country showed that participation in the Environmental Measures Payments Program was influenced by the size of the business, human resources, household economic factors, and information variables.

Wilma *et al.* (2004) found that environmental policy based on market-oriented incentives rather than the application of a system severely restricted by regulations tends to lead farmers to voluntarily adopt environmental management systems. Alberini and Segerson (2002) suggested that the success of voluntary environmental programs (VEP) depends on factors such as the nature of the voluntary approach, the baseline for measuring success, the incentives for participation, and governmental funds, among others. In contrast, Borck and Coglianese's (2009) study showed that the effectiveness of a VEP is a function of the number of participants and that these programs are less effective in comparison to mandatory regulations. Prakash and Protoski (2012) considered cost-benefit analysis to be a significant

indicator for joining voluntary programs and adhering to their obligations. However, the study of Darnall and Sides (2008) indicated that overall, VEP participants had less influence on improved environmental performance than did non-participants.

Research has been conducted to assess the effects of various sustainable agricultural practices covered by environmental programs. Among these are the adoption of soil and water conservation technologies (Mugonola *et al.* 2013), the promotion and adoption of conservation farming systems (Cramb and Culasero 2003), the adoption potential of nitrate mitigation practices (Christianson *et al.* 2014), the performance of low external-input technology in agricultural development (Tripp 2011), the adoption and continued use of long-term soil and water conservation measures (de Graff *et al.* 2008), and the adoption of legume technologies (Pircher *et al.* 2013).

One of the most comprehensive environmental protection programs in Turkey is the Environment Friendly Agricultural Land Protection (EFALP) program which was initiated in 2006. The program was initially implemented in environmentally sensitive areas, particularly to protect water and soil quality and native vegetation, prevent soil and wind erosion, reduce crop surpluses to effectively raise the value of agricultural commodities, apply alternative crop production models, and promote farming practices that can work to preserve and protect the environment (MFAL 2009).

In the reviewed literature, there was an obvious lack of research conducted in Turkey to evaluate the impact of environmental programs. Thus, it seems quite difficult to decide whether VEP or mandatory programs achieve more positive results. To some extent, this gap may be filled by this study, which had the following objectives:

- (1) Determine the level of adoption of each sustainable agricultural practice undertaken as part of the EFALP program.
- (2) Evaluate the agricultural extension and training activities implemented under the program.
- (3) Determine the factors influencing the adoption of the program. The independent variables were selected from the socioeconomic characteristics and communication behaviours of the farmers, structural characteristics, environmental protection attitudes and behaviours, and institutional constraints.
- (4) Determine the contributions of the program to agricultural land conservation and sustainability.

2. Material and methods

2.1. Description of research area

Lake Seyfe is located approximately 35 km east of Kirsehir

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