EFFECTS OF AGRICULTURAL TRAINING ON THE ENVIRONMENTAL CONSCIOUSNESS LEVELS OF TURKISH CYPRIOT FARMERS

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Abstract: This study was conducted to determine the effects of agricultural trainings on the environmental consciousness levels of Turkish Cypriot (TC) farmers. For this reason, a survey was carried by interviewing stakeholders between February and June 2009. In total 200 stakeholders were interviewed where half of them got trained by the Agriculture Extension Service. The "New Environmental Paradigm", was revised according to the nature of the work and thus used in interviews to measure the environmental consciousness levels of TC farmers. Results indicated that 90% of the interviewed farmers were male, indicating the dominance of male farmers in TC agriculture sector. More than half of the farmers (69%) had at least a high school degree. An important result of this study is that, only 28% of the farmers are living with the income of farming and 44% works in another job. There was a significant difference between the trained and not-trained farmers' environmental consciousness levels. The average environmental consciousness percentages of the trained and not-trained TC farmers were determined 67.5% and 58.2%, respectively. The other important result of this study is that; the first preference of not-trained TC farmers in weed management is chemical methods where the first preference of trained farmers is mechanical methods. This clearly indicates the difference between the environmental consciousness levels of trained and not-trained TC farmers.

Keywords: Agriculture extension service; Turkish Cypriot farmers; environmental consciousness level; education

Introduction

Agriculture was the reason of transition from nomadic lifestyle to sedentary lifestyle around 9000 years ago. Since the beginning of agriculture, people started to produce their foods and the time leaved for hunting and gathering started to degrease and thus people use this remaining time for other things, such as: industry, social activities and etc. Therefore, it is clear that agriculture has a big influence on the development of civilization. On the other hand, faults in agricultural activities, caused collapsing in empires and states. Such as: the collapsing of Sumerian Empire in Mesopotamia was due to the decrease in the agricultural yield. The unconscious use of irrigation caused an increase in the water holding capacity and in turn, increase in the salinity caused a decrease in the yield and the Sumerian Empire was invaded by their neighbors: Acadian Empires (Hertsgaard, 2001). Therefore, environmental consciousness comes to the forefront of importance to ensure sustainability in agriculture and ecosystems.

Most benefits of the pesticides are based only on direct crop returns. However, excessive and continual use of agrochemicals has negatively affected agricultural production, reduced sustainability in agriculture, damaged the environment and caused human illness (Pimentel, Acquay, Biltonen, Rice, Silva, Nelson, et al., 1992). Although there are many pest control methods like cultural, physical, mechanical, thermal and biological, pesticides form the integral part of farmers' cultural programs because of agronomic/technical, sociologic and economic benefits. For example, numerous studies reported that satisfactory weed control can often be obtained when herbicides are used at doses below label recommendations (Steckel, Defelice & Sims, 1990; Vitta, Faccini & Nisensohn, 2000; Walker, Medd, Robinson & Cullis, 2002; Cheema, Jaffer & Khaliq, 2003; Barros, Basch & Carvalho, 2007;

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Kahramanoğlu & Uygur, 2010). However, most of the farmers still do not take these researches into consideration. Not only the use of pesticides, but the use of soil, water and other environmental resources in agricultural practices can also directly affect environmental sustainability.

Agriculture and environment has a close relationship and interacts with each other in such a way that the health of agriculture depends on the proper functioning of environmental process (Conway, 1990). It has been found in different countries of the world that in addition to beneficial effect, the improved agricultural practices have also negative effects on ecosystems (Sattar, 1994). Thus, in turn, environmental problems such as: water pollution affects agricultural production. Environment problems are possible not only with technology and laws but also with the change of individual behaviours. The change of behaviours requires the change of attitude, knowledge and value judgements. It is only possible with an effective environmental education to form positive attitude, consciousness and value judgements to environment (Özer, 1991; Altın, Bacanlı & Yıldız, 2002).

In the sector of agriculture, universities and research facilities are generally engaged in research and teaching, but there is a gap between these facilities and farmers, which is an important reason of agriculture related problems. In developed countries, there are "agriculture extension services" which are aiming to provide consultancy service to farmers to improve their productivity, to increase income, and etc. These types of extension services are also under the control and protection of governments and thus these services help governments to control agricultural activities. In northern part of Cyprus, there have not been such services until 2008. In 2008, a project started by the EDGE "Economic Development and Growth for Enterprises" project (which is being implemented by BearingPoint Inc. and funded by USAID) which aimed to form an "agriculture extension service" in northern part of Cyprus. This service, taken up the responsibility of distributing agricultural knowledge, and put the emphasis on the synthesis of theory and practice and on promoting interactions between practical experiences and academic efforts in the field of agriculture. Main trainings of the Agriculture Extension Service are: integrated pest management, effective irrigation and fertilization, alternative crops, demands of international markets and GlobalGAP certification. This study aimed to measure the environmental consciousness levels of Turkish Cypriot farmers and evaluate the efficiency of the efforts of the Agriculture Extension Service (AES) by comparing the consciousness levels of farmers both trained and not-trained by the extension service.

Methodology

This study was conducted in northern part of Cyprus. Questionnaires were used to measure environmental consciousness levels of Turkish Cypriot (TC) farmers and the surveys conducted between February and June 2009. The surveys carried by interviewing with stakeholders. Interviewees indicated their response in 5-point scale where 1 represented strongly disagrees and 5 strongly agree or 1 represents the first preference and 5 represents the last preference. To be able to measure the environmental consciousness levels of farmers, the "New Environmental Paradigm (Dunlap, Van Liere, Merting & Jones, 2000), was also revised according to the nature of the work and thus used. First of all, 7 demographic (independent variable) and 35 deterministic questions (dependent variable) were prepared and practiced with 50 farmers. The Crobanch's Alpha of the items were determined as 0.689. The Kaiser-Mayer-Olkin (KMO) tests with the value of 0.81 revealed that the factor analysis is suitable for the questionnaire. All of the demographic factors got eigenvalues greater than 1.00 which makes them suitable for the universe of this study. 33 of the 35 deterministic items' eigenvalues were found to be more than 0.300. Two of the items which's eigenvalues were smaller than 0.300 were taken out from the questionnaires. Thus surveys were conducted with 200 stakeholders by interviewing. Half of the stakeholders got trained by the Agriculture Extension Service (AES). This allowed evaluating the environmental consciousness levels of professionally trained and not-trained farmers. Crobanch's Alpha of the items were determined as 0.753. Survey data were analyzed using descriptive statistics. The scores for all the items were summed and averaged. SPSS for Windows was used for data analysis. The independent variables of this study were: age, sex, level of education, region, income, share of farming, and level of professional training (by AES). All these variables were

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measured by computing appropriate score and variance statistical measures such as mean, percentage, standard deviation. The data of this study was normally distributed and thus t-test was used in determining the relationship between level of professional training and their environmental consciousness levels. Five percent (0.05) level of probability was used to reject any null hypothesis.

Findings and Discussion

Results indicated that 90% of the interviewed farmers were male. This is one of the important results of this study where it indicates the dominance of male farmers in Turkish Cypriot's agriculture sector. The un-equality of distribution in the sex made it un-possible to compare the environmental consciousness levels of TC farmers in terms of difference in sex. Table 1 indicates that, more than half of the farmers had at least a high school degree. It is also clear in the Table 1 that, the farmers who got trained by the AES team are more educated than the others. This indicates that educated people are more aware of the importance of "information" and they are asking training to AES. This also indicates that AES team needs to give much attention on the training of less educated farmers. 6% of the farmers, who trained by AES, were also graduated agricultural engineers and only 2% of the not-trained farmers were agricultural engineers.

Table 1. Education levels of the Turkish Cypriot (TC) farmers

Level of Education	Percent (%) distribution		
	Trained by AES	Not-trained by AES	Overall
Illiterate	0%	4%	2%
Literate (non-graduate)	4%	8%	6%
Primary school	6%	8%	7%
Secondary school	12%	20%	16%
High School	40%	36%	38%
Undergraduate	30%	20%	25%
Post-graduate	8%	4%	6%

The other important result of this study is that, farming is not the only occupation for most of the farmers (Table 2). Because of the socio-economic structure of Turkish Cypriots, almost all of them (>18) have average 2-3 da agricultural areas. Some of these people do not want to loose these agricultural areas and rents to someone. Therefore, other people present themselves as a farmer. Actually, most of these people are not real farmers, but they use these areas and produce crops. Therefore, most of the people in northern part of Cyprus, who present themselves as farmers, are also need to have another occupation to survive. In this study, this ratio was determined as 44%.

Turkish Cypriot farmers were asked to respond 8 different scenarios about environmental problems.

Table 2. Share of farming of the farmers in their job occupation

Share of Farming	Percent (%) distribution		
	Trained by AES	Not-trained by AES	Overall
Only farmer	32%	24%	28%
Farmer with another job	48%	40%	44%
Helping family in farming	0%	16%	8%
Farming as hobby	12%	0%	6%
Other	8%	20%	14%

The scenarios, listed in Table 3, were expected to have a high score by the farmers. The results are little satisfied where all had an average more than 3. However, surprisingly, such scenarios about poverty, hunger and petroleum had the lowest scores. In most of the developing and

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underdeveloped countries, farmers are among the poor citizens and they put more attention on the prevention of poverty and hunger. This could be because of: farming is not the only occupations of the farmers in northern part of Cyprus. When comparing the trained and not-trained TC farmers, it is clear in Table 7 that trained farmers give much score to all scenarios than not-trained farmers and in 5 out of 8 scenarios there are significant differences.

Table 3. Responses of the Turkish Cypriot (TC) farmers on some environmental scenarios on 5-point likert scale (1: strongly disagree.. 5: strongly agree)

If human activities continue as it is?	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Climate will change and global warming will occur	4.60	3.68	0.001*	4.14
Poverty and hunger will increase	3.56	3.12	0.137	3.34
Petroleum products will decrease	3.08	3.04	0.906	3.06
Water quality will decrease and become expensive	4.48	3.40	0.004*	3.94
The importance of "Good Agricultural Practices" will increase	4.48	3.16	0.001*	3.82
Desertification will increase	4.56	3.68	0.001*	4.12
Disagreements (like war) will happen for natural resources	4.04	3.16	0.015*	3.60
Coast towns will be destroyed by the water from glacier melting	4.20	4.08	0.166	4.02

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

The responses of the TC farmers on the modified "New environmental Paradigm" scenarios were given in Table 4. There are 9 scenarios where score "1" expected and 5 scenarios where score "5" expected. It is clear in the Table 4 that the TC farmers who trained by Agriculture Extension Service had a high environmental conscious level than the others. The responses of the TC farmers on the scenario of "agricultural areas are natural heritages and human beings can not use them according to their wishes" where score "5" was expected, the overall mean score was 3.40, which is slightly above "3". Some other scenarios also had not got the expected score. For the scenarios, where score "5" was expected, the score of trained and not-trained TC farmers were determined as 3.95 and 3.60, respectively. Günden and Miran (2008) reported that the environmental consciousness levels of the farmers in Torbalı district, Izmir/Turkey is 3.62. The not-trained TC farmers' score is close to the score of farmers in Torbalı/Turkey. For rest of the scenarios, where score "1" was expected, the score of trained and not-trained TC farmers were determined as 2.20 and 2.78, respectively. When the scores of scenarios where "1" was expected, were extracted from "5" to obtain all scores in same way, average scores for environmental consciousness levels of trained and not-trained TC farmers were determined as 3.38 and 2.91 respectively. By translating these scores into percentages, it can be concluded that the environmental consciousness levels of the trained and not-trained TC farmers were 67.5% and 58.2%, respectively.

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Table 4: Responses of the Turkish Cypriot (TC) farmers on modified "New Environmental Paradigm" scenarios on 5-point likert scale (1: strongly disagree.. 5: strongly agree)

Scenarios	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Natural heritage are the common heritage of humanity. Therefore, one can use, if pays (1)	1.60	2.68	0.004*	2.14
There is no desertification problem in Mediterranean basin (1)	2.20	2.24	0.891	2.22
Agricultural areas are natural heritages and human beings can not use them according to their wishes (5)	3.68	3.12	0.058*	3.40
Human beings can do changes in natural environments to meet their needs (1)	2.52	2.96	0.265	2.74
Interference of human beings on the nature produces disasters (5)	4.32	3.68	0.015*	4.00
Earth provides everything people need (5)	2.52	3.24	0.015*	2.88
Nature is strong enough to overcome problems developed by industries (1)	2.48	3.08	0.103	2.78
When economic benefit from natural resources are concerned priority, protection of the resources is the second phase (1)	1.84	2.40	0.071*	2.12
Countries may have socio-economic problems more crucial than environmental problems. And, solving socio-economic problems must be given priority (1)	2.64	3.64	0.005*	3.14
There must be equality between generations regarding to sustainable development principles and an unspoilt and protected environment must be hand on to future generations (5)	4.68	3.96	0.008*	4.32
The use and protection of natural resources can not be together (1)	1.88	2.56	0.026*	2.22
Plants and animals have the rights to live as human beings (5)	4.64	4.08	0.022*	4.36
Environmental problems are exaggerated (1)	2.36	3.08	0.034*	2.72
If human activities continue as it is, human beings will be faced with an ecological disaster (5)	3.84	3.52	0.195	3.68
Agro-chemicals have no negative effects on the environment (1)	2.24	2.36	0.731	2.30

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means). Score in paranthesis () refers to the expectation of the responses

Weed management strategies are important elements for measuring environmental consciousness levels. Table 5 shows the sequence of preferences of TC farmers about weed management. Trained TC farmers mentioned that they firstly prefer mechanical control strategies, followed by preventing weeds and chemical controls. Since Pimentel et al. (1992) reported that excessive and continuous use of agrochemicals has damaged the environment, the not-trained TC farmers need to be trained to reduce the use of agrochemicals. It is clear that trained TC farmers have a high environmental consciousness level than the not-trained farmers. On the other hand, Zoschke (1994) reported that; although there are many weed control methods like cultural, physical,

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mechanical, thermal and biological, herbicides form the integral part of farmers' cultural programs because of agronomic/technical, sociologic and economic benefits. Herbicides forcefully assist to maintain and secure yield (Kudsk & Streibig, 2003) and this is the reason of using chemical methods in agriculture. However, to be able to ensure the herbicides to remain an effective tool to farmers in the future, farmers need to optimize the use of chemical methods by incorporating with other methods, such as mechanical. From an environmental perspective, chemical control methods would be the last method for weed management but unfortunately not-trained TC farmers mentioned chemical control as the first method.

Table 5. Sequence of preferences of Turkish Cypriot (TC) farmers about weed management (1: first preference.. 5: last preference)

Weed management methods	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Mechanical control	1.72	2.24	0.071	1.98
Chemical control	3.08	1.76	0.001*	2.42
Physical control	3.52	2.84	0.009*	3.18
Preventing weeds	2.96	3.88	0.032*	3.42
Biological control	3.72	4.28	0.054	4.00

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

Last but not least observation of this study is the consultation preferences of TC farmers (Table 6). The farmers, who got trained by AES, are firstly asking consultation to agricultural engineers, followed by pesticide shops and neighbor producers and the not-trained TC farmers are firstly asking consultation to pesticide shops and followed by neighbor producers and agricultural engineers. In developed countries, pesticide shops are not allowed to consult farmers, where farmers can only buy pesticides or chemical fertilizers with a recipe given by authorized consulting services. In this case, these results, where consultants and providers are same, are so serious. The other important result is the condition of Ministry of Agriculture and it needs to be studied carefully and evaluated by the responsible authorities.

Table 6. Sequence of consultation preferences of Turkish Cypriot (TC) farmers about agricultural problems (pest management, irrigation schedule, fertilization programme and etc.) (1: first preference.. 5: last preference)

Weed management methods	Mean		Sig. (2-tailed) value	Overall Mean
	Trained by AES	Not-trained by AES		
Pesticide shops	2.48	2.08	0.090	2.28
Agricultural engineers	1.84	3.00	0.003*	2.42
Neighbor producers	2.68	2.52	0.614	2.60
Ministry of Agriculture	3.88	3.12	0.073	3.50
Friends and acquaintances	4.12	4.28	0.620	4.20

Values followed by * indicates significantly difference between trained and not-trained farmers' responses at a 5% level (t-test for equality of means)

Conclusion and Recommendation

The findings revealed that Turkish Cypriot farmers who trained by the Agriculture Extension Service had high environmental conscious level than the not-trained TC farmers, determined as 3.38 and 2.91 respectively. The results concluded that the environmental consciousness levels of the trained and not-trained TC farmers were 67.5% and 58.2%, respectively. According to the results of this study,

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"education" and "extension services" came to the forefront of importance and stakeholders need to re-think about them.

References

ALTIN, M., BACANLI, H. & YILDIZ, K. (2002, Sept 16-18). Biyoloji Öğretmeni Adaylarının Çevreye Yönelik Tutumları. Paper presented at the V. Ulusal Fen Bilimleri ve Mat. Eğitimi Kongresi, Ankara, Turkey.

BARROS, J. F. C., BASCH, G. & CARVALHO, M. (2007). Effect of reduced doses of a post-emergence herbicide to control grass and broad-leaved weeds in no-till wheat under Mediterranean conditions. Crop Protection, 26(6), 1538-1545.

CHEEMA, Z. A., JAFFER, I. & KHALIQ, A. (2003). Reducing isoproturon dose in combination with *sorgaab* for weed control in wheat. Pakistan Journal Weed Science and Research, 9(3&4), 153-160.

CONWAY, G. R. (1990). Agro-ecosystems In: Jones J G W & P R Street (Eds.), *Systems Theory Applied to Agriculture and the Food chain*, (pp. 205-233). Elsevier Applied Science, London, United Kingdom.
DUNLAP, R. E., VAN LIERE, K. D., MERTING, A. G. & JONES, R. E. (2000). Measuring endorsement of the new ecological paradigm: a revised scale. Journal of Social Issues, 56, 425-442.

GÜNDEN, C. & MİRAN, B. (2008). Yeni Çevresel Paradigma Ölçeğiyle Çiftçilerin Çevre Tutumunun Belirlenmesi: İzmir İli Torbalı İlçesi Örneği. Ekoloji, 18(69), 41-50.

HERTSGAARD, M. (2001). Earth Odyssey: Around the world in search of our environmental furute (Translation by Emel Anıl). Publications of TEMA, No: 34, İstanbul / Türkiye.

KAHRAMANOĞLU, İ. & UYGUR, F. N. (2010). The Effects of Reduced Doses and Application Timing of Metribuzin on the Redroot Pigweed (*Amaranthus retroflexus* L.) and Wild Mustard (*Sinapis arvensis* L.). Turkish Journal of Agriculture and Forestry, 34(6), 467-474.

KUDSK, P. & STREIBIG, J. C. (2003). Herbicides – a two-edged sword. Weed Research 43(1), 90-102.

ÖZER, U. (1991, May 21-22). Çevre Eğitimi. Proceedings of the Environmental Pollutions Symposium of Turkey, (pp. 457-469). İstanbul / Turkey.
PIMENTEL, D., ACQUAY, H., BILTONEN, M., RICE, P., SILVA, M., NELSON, J. ET AL. (1992). Environmental and human costs of pesticide use. Bioscience, 42, 750-760.

SATTAR, M. A. (1994). Impacts of Agro-chemicals. In: Ali M H (Ed), *Proceeding of Workshop on Environmental Issues*. (pp. 5-23). Graduate Training Institute, Pub. No. 99, Bangladesh Agricultural University, Mymensingh.

STECKEL, L. E., DEFELICE, M. S. & SIMS, B. D. (1990). Integrating reduced doses of post emergence herbicides and cultivation for broadleaf weed control in soybeans (*Glycine max*). Weed Science, 38, 541-545.

VITTA, J. I., FACCINI, D. E. & NISENSOHN, L. A. (2000). Control of *Amaranthus quitensis* in soybean crops in Argentina: An Alternative to Reduce Herbicide Use. Crop Protection, 19, 511-513.

WALKER, S. R., MEDD, R. W., ROBINSON, G. R. & CULLIS, B. R. (2002). Improved management of *Avena ludoviciana* and *Phalaris paradoxa* with more densely sown wheat and less herbicide. Weed Research, 42, 257-270.

ZOSCHKE, A. (1994). Toward Reduced Herbicide Rates and Adapted Weed Management. Weed Technology, 8, 376-386.

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