

Full Length Research Paper

Needs assessment of senior agricultural students regarding sustainability knowledge

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Given the increasing desire for sustainable practices in our world today, graduates of agricultural higher education systems all around the world would be facing new challenges after their arrival into marketplace and dealing with their prospectus clientele. The purpose of this study was to identify and prioritize the educational needs of agricultural senior students towards sustainability. Population of the study was senior bachelor degree students of agricultural faculties, western part of Iran. The sample size was calculated using the Krejcie and Morgan (1970) sampling table ($n=285$). A factor analysis approach was implemented to categorize educational needs of respondents; and eventually five groups were ranked and finalized as the following: (1) participatory planning, (2) participatory techniques in rural development, (3) biodiversity protection methods, (4) sustainable soil protection methods, and (5) utilization of indigenous knowledge. Stepwise multiple regression revealed that four of agricultural learners' characteristics that is, previous experience in agriculture, commitment to sustainable rural development, gender, and finally teamwork interest explained 75% of the variance (R square = 0.75) which was statistically significant. A t-test that followed indicated that students living in rural settings as compared to those living in urban areas demonstrated different educational needs ($t = 5.99$, $p = 0.02$). It seems to us that a high priority should be given to planning and implementing complementary courses regarding sustainability issues.

Key words: Agricultural students, sustainability needs, participation, higher education.

INTRODUCTION

Much of mankind is still vulnerable to natural disasters, extreme poverty, infectious disease and a host of other challenges. One in six people on the planet subsist on less than \$1 a day. The world's population is expected to increase to nine billion by 2050. Human activity is straining the planet's resources, threatening the health of our environment and ability to thrive. In Iran, where majority of farmers are smallholders, average holding size is less than one hectare (Hosseini et al., 2011).

Unprecedented challenges in last decades including environmental degradation, annihilation of rural communities (caused by rapid migration of rural youth seeking

jobs in urban areas), elimination of small family farms, and inadequate conservation of fragile lands have made agricultural sustainability a significant concern nowadays (Chizari et al., 2006). Iranian government has recently introduced low input sustainable agriculture as a new approach while facing environmental increasing concerns (Hosseini et al., 2011).

Williams (2000) declared three widely advocated components of sustainable agriculture as economically sound, environmentally protective, and socially acceptable. The aim of sustainability in agriculture is largely recognized as a healthy and ample supply of food for both present future generations, through wise utilization of natural resources (Al-Subaiee et al., 2005).

Over the past 30 years, the concept of sustainability has evolved to reflect perspectives of both public and private sectors. A public policy perspective would define

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sustainability as the satisfaction of basic economic, social, and security needs now and in the future without undermining the natural resource base and environmental quality on which life depends. From a business perspective, the goal of sustainability is to increase long-term shareholder and social value, while decreasing industry's use of materials and reducing negative impacts on the environment. Common to both public policy and business perspectives is recognition of the need to support a growing economy, while reducing social and economic costs of economic growth. Sustainability can be facilitated by policies that integrate environmental, economic, and social values in decision making.

The sustainability movement has important implications for higher agricultural education, as well. Problem is how well to educate young agricultural learners so that they will adopt and practice sustainability issues as eagerly as possible. Marshall and Herring (1991) advocated that inclusion of sustainability in the curriculum of agricultural students is essential (Greening the curriculum). Of course it is not enough to be included as a separate course. Rather while other units in agriculture are taught, discussion of these issues must be integrated. In other words, traditional educational methods are not suitable while teaching environmental issues, students should think, discuss and find solutions themselves (Aydin et al., 2011). This will result in a generation of graduates knowledgeable of the critical issues facing sustainable rural development in the 21st century. Firebaugh (1990) advanced that higher agricultural education should take an open view of sustainable agriculture. Agricultural students are expected to know more, and meet the increasing demands of a diverse agricultural and rural population.

Wals and Bawden (2000) reported that dealing with complexity, uncertainty, and conflicting norms, values, and interests associated with sustainability requires a fundamental transformation in the competencies required by agricultural students. These learners are the potential facilitators of sustainability in rural society. Therefore, if agricultural students are to improve their effectiveness, they must receive education harmonized with sustainable ethos. As such, educational need assessment proves to be essential in identifying knowledge gaps towards training a more productive workforce. Once these needs are determined and prioritized, education resources can be utilized more efficiently. In other words, education courses are one way through which agricultural learners can be provided with the knowledge, abilities, and skills they highly need if they are to meet the demands of a changing environment successfully (Niven, 1993).

Literature review

Garton and Chung (1996) in a study of the needs of

agricultural learners in USA found that greatly needed professional competencies of the time were completing reports for local and state administrators. Motivating farmers to learn was identified as the second most needed area of training, which supported Veeman's (1984) conclusion who introduced it as being a problem frequently faced by agricultural graduates, regardless of subject matter discipline. Edwards and Briers (1999) found that agricultural educators in Texas should offer in-service training designed in a way to assist agricultural students in acquiring enough competence in the areas of "Facilitating Change in Curriculum and Technologies", "Facilitating Balance in Personal and Professional Roles," "Facilitating Positive Public Image," and "Facilitating Student Leadership and Personal Growth". Joerger (2002) found that students of agricultural education have mentioned needs on establishment, maintenance and use of advisory committees; student management, guidance and motivation; preparation of FFA degree and proficiency award applications; and establishment of support organizations.

Findings from a study by Menon (1999) indicated that the most significant educational needs of village level workers in Tamil Nadu, India were specialized agriculture, administration of extension programs, extension program planning, farmer training methods, understanding the farm as a social system, agricultural education planning, and methods of human resources development. Gamon et al. (1992) found that orientation courses for new extension professionals in Iowa should emphasize on meeting sessions with county, area, and state staff, time and resource management, motivation of clientele, and teaching methods. Chizari et al. (1999), in an analysis of rural development agents' educational needs regarding sustainable agriculture in Khorasan Province, Iran found that the highest rated topics were: integrated pest management, economics of sustainable agriculture, the role of agricultural extension, and natural resource conservation. Tladi (2004) in an assessment of training needs of extension agents in South-Central Botswana found that the agents needed training in 14 job skill areas including among others, interpersonal communication skills, practical farm skills, conducting needs assessment surveys and mobilizing people to form groups. Chizari et al. (2006) found that the most important training needs of multi-functional extension workers in Isfahan Province, Iran were in the areas of participatory extension, participatory techniques in rural development, biodiversity protection methods, sustainable fertilization methods, and improved utilization of indigenous knowledge of rural people.

As can be seen from the literature review, there is little information available on educational needs of senior agricultural students concerning sustainability issues. Hence, this study is considered to be a significant contribution toward filling this gap. However, the authors fully acknowledge that additional steps will also be

required. As in all educational programming efforts, education is only one component. Constant feedback will be required from the training participants. Stakeholder input would also be important.

Purpose and objectives

The purpose of this study was to identify and prioritize the educational needs of agricultural learners (senior BC students) studying in western universities of Iran, concerning sustainability issues. Specifically, the objectives of the study were:

1. To describe the demographic profile of the agricultural students;
2. To identify the educational needs of agricultural learners regarding sustainability; and
3. To determine the relationships amongst selected variables and educational needs of agricultural learners.

METHODOLOGY

Target population for this descriptive correlational enquiry was senior bachelor degree students from all agricultural faculties in the western part of Iran (N=1021). A stratified random sampling technique was employed with agricultural disciplines being the categorical variable in each faculty (n=285). The study followed methodological rules of a survey.

The study objectives were accomplished in two phases. The first phase involved an interview study and the second phase utilized a written survey questionnaire. The first phase was designed to obtain more insight into the research purpose and to sharpen the hypotheses for the survey portion.

The researchers developed a questionnaire consisting of two sections: (1) educational needs and (2) demographic data. A Likert-type scale was used to assess the respondents' level of agreement on the list of items dealing with sustainability educational needs. Respondents rated their levels of agreement using the following scale: 1=very low agreement; 2=low agreement; 3=medium agreement; 4=high agreement; 5=very high agreement. To establish content and face validity of the survey's instrument, panel of Razi University faculty members were asked to review the instrument. After incorporating comments and inputs offered by the panel into the questionnaire, it was also pilot tested to ascertain reliability using 25 similar agricultural students not participating in the main study. An internal consistency analysis on the pilot test data produced a Cronbach's alpha coefficient of 0.87.

A total of 265 readable responses were collected, resulting in a response rate of 93%. A comparison was made between early and late respondents to see if there was a bias on no response. A Chi-square analysis procedure was used to compare early and late respondents on the gender, place of birth, and the academic major of participants. No statistically significant differences were found between early and late respondents on any of so-called three variables.

Statistical data were coded and analyzed using the Statistical Package for the Social Sciences (SPSS 11.5) for windows. Descriptive statistics (frequencies, means, and standard deviations) were used to analyze the data. Factor analysis, by means of the principal component method was performed on the responses to the items in "part a" of the questionnaire. In this case, five factors were extracted. Items were grouped into then five factors based

upon their factor loading, using an orthogonal and varimax rotation. Stepwise multiple regression, Spearman correlation coefficient, and U-test were employed to analyze the relationships between and among the variables.

FINDINGS

Objective 1 was to describe the demographic profile of the respondents in the west part of Iran. The respondents' age ranged from 22 to 28 years old, with an average age of 25. Percentage of female students 58% was more than that of male students 42%. Over two third of respondents indicated that their parents' job was not related to agriculture and that they did not have any experience in agriculture. On average, the parents had received 12 years of education, though their fathers were more educated than their mothers. The majority of undergraduates (72%) fell in the middle social class, 16% came from upper class, while 12% ranked themselves to be in lower class. Students were asked to rate seven statements to measure their level of commitment to sustainable rural development, using the following scale: from 1=strongly disagree, to 5=strongly agree. With an aggregate mean of 3.5, students revealed a moderate level of commitment to sustainable rural development.

Objective 2 of the study was to identify the perceptions of agricultural undergraduates regarding sustainability. As indicated in Table 1, factor analysis grouped the educational need items into five factors. The factors were named and ranked as the follows: (1) participatory planning, (2) participatory techniques in rural development, (3) biodiversity protection methods, (4) sustainable soil protection methods, and (5) utilization of indigenous knowledge.

Objective 3 was to determine the relationships between and among selected variables and the training needs of extension workers. Stepwise multiple regression revealed that three extension workers' characteristics (years of residence in rural areas, educational level, and active participation in on-the-job training courses) explained a statistically significant portion of the variance (R square = 0.80) associated with the extent of training needs (Table 2).

Having experience in agriculture explained the greatest amount of variance for the extent of educational needs (50%). Level of commitment to sustainable rural development (10%), gender (8) and interest in teamwork (7%) explained 25% of the variance. A t-test indicated that educational needs were different for students living in rural settings as compared to those living in urban sittings (t = 5.99, p = 0.02).

CONCLUSIONS AND IMPLICATIONS

The most important educational needs of senior agricultural students under investigation were in the

Table 1. Means, standard deviations, and ranks of educational need items for each factor.

Factor/Item	M	SD	Factor loading
Participatory planning	4.43	0.57	
Participatory design	4.45	0.60	0.85
Participatory budgeting	4.40	0.55	0.82
Participatory evaluation	4.39	0.52	0.84
Participatory need assessment	4.32	0.51	0.81
Participatory techniques in rural development	4.00	0.54	
PRA tools	3.99	0.91	0.66
Participatory technology development	4.03	0.56	0.67
Participatory poverty assessment	3.98	0.99	0.61
Sustainable rural livelihood	4.00	0.78	0.61
Biodiversity protection methods	4.11	0.54	
Biodiversity measurement	4.22	0.61	0.72
Integrated weed management	4.32	0.94	0.73
Agro forestry	4.22	0.87	0.71
Integrated pest management	4.01	0.99	0.74
Sustainable soil protection methods	3.67	0.87	
Contour farming	3.99	0.87	0.65
Conservation tillage	3.50	1.02	0.64
Preventing soil erosion methods	3.76	0.79	0.65
Low-input sustainable agriculture	3.70	0.67	0.63
Integrated crop/livestock systems	3.53	0.98	0.64
Utilization of indigenous knowledge	3.56	0.81	
Process of exchanging indigenous knowledge	3.61	0.81	0.74
Indigenous irrigation methods	3.60	0.83	0.72
Women's roles in processing of animal products	3.56	0.81	0.69
Integrating indigenous knowledge with technical knowledge	3.51	0.79	0.70

Table 2. Stepwise regression of extension workers' characteristics on extent of training needs regarding sustainability.

Variable	B	Std. error	Beta	t	Sig.
Having experience in agriculture*	-5.4	0.05	-0.16	-7.7	.01
Level of commitment to sustainable rural development	-12.2	2.3	-0.75	-40.20	.01
Gender**	3.4	0.05	0.41	9.40	.01
Interest in teamwork	-5.2	0.03	-0.21	-3.40	0.01
(Constant)	-102.6		295	-5.48	.001

*Coded as 1 = having experience in agriculture; 0 = lack of agricultural experience; ** coded as 1 = male; 0 = female.

areas of participatory planning, participatory techniques in rural development, biodiversity protection methods, sustainable soil protection methods, and utilization of indigenous knowledge. This is in harmony with Hosseini et al. (2011) that while working on greenhouse owners discovered that participatory approaches could play a very crucial role in convincing farmers towards sustainable agriculture. Learners who had longer experience in agriculture, who are more committed to sustainable rural development and who had more interest in teamwork were less likely to indicate a need for additional education. On the other hand, it should be

noted that male learners indicated a desire for further training. In opposite to this Aydin et al. (2011) reported that female students demonstrated higher environmental sensitivities. At the same time, rural students had different educational needs than their urban classmates.

Achieving sustainability in agricultural operations requires appropriate training programs and encouragement of agricultural students to collaborate for planning and implementing those programs. Based upon the results of this study, the implication clearly exists that a high priority should be given to planning, developing, and implementing education programs for agricultural undergraduates

regarding sustainability issues. The planning and development of such education should take into consideration learners' experience in agriculture, and life and work experience with rural people. Since the urgency to address sustainability issues in agriculture is not just a regional challenge, the implications of such study in advocating sustainability-oriented educational programs amongst agricultural communities extends beyond the scope of this study. The Organization of Agricultural Research and Education can cooperate with Higher Agricultural Education institutes in developing these education programs.

Based upon the conclusions and implications several recommendations need to be considered. First of all, while getting input from participating students is important, it is recommended that other stakeholders such as faculty members also be contacted to assess their view of the findings. A participatory approach has been advanced at the core of this study and therefore would benefit from additional input and/or confirmation by other stakeholders. It is further recommended that overt benchmarks be established to facilitate the measurement of any progress after execution of suggested educational programs towards meeting previously mentioned goal of the plan as "increasing agricultural graduates' effectiveness in accordance with sustainability issues". Although senior students with or without rural background indicated different educational needs, this study did not delve into exactly what the differences were. Therefore, it is recommended that additional inquiry to be planned aimed at determining what the differences are. It is also recommended that since sustainability issues might differ across regional boundaries, it is appropriate to replicate similar studies in other parts of Iran as well. Finally, it is recommended that a study of senior agricultural students' attitudes towards sustainability practices must also be conducted.

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