Research Article/Araştırma Makalesi

An assessment of faculty of agriculture students' knowledge of sustainable nutrition and sustainable agriculture

Ziraat fakültesi öğrencilerinin sürdürülebilir beslenme ve sürdürülebilir tarım bilgi düzeylerinin değerlendirilmesi

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ABSTRACT

Sustainable agriculture and nutrition are key components of resilient food systems that support environmental sustainability, public health, and long-term food security. Students in the Faculties of Agriculture are among the most critical groups, as they are future professionals who will be making decisions about agricultural production systems and food. The aim of this study was to assess the knowledge of sustainable agriculture among Faculty of Agriculture students, evaluate their sustainable nutrition behaviors, and determine the relationship between them. A total of 145 students from the Faculty of Agriculture at Harran University, across various departments, were surveyed during the study. A questionnaire comprising a demographic form, the Sustainable Agriculture Knowledge Level (SAKL) survey, and the Sustainable Nutrition Behavior Scale (SNBS) was used to collect data. Chi-square tests, one-way variance analysis and descriptive statistics were employed to analyze the data. The mean total score on the Sustainable Agriculture Knowledge Level Survey was 34.43 ± 10.11 (theoretical range: 11–55). According to the findings, 95.1 percent of respondents reported awareness of sustainable agriculture, while 62.7 percent reported awareness of sustainable nutrition. The knowledge scores for sustainable agriculture significantly differed by academic department and year of study. On the other hand, no significant differences were observed regarding sustainable nutrition behavior scores. A significant correlation was observed among knowledge of sustainable agriculture and sustainable nutritional behaviors in the study, and the strongest correlation took place at the food preference subdimension of SNBS. The findings indicate that while there are domain-specific differences in sustainability-related knowledge, sustainable nutritional behaviors are relatively consistent. In this regard, sustainable agriculture and nutrition should be integrated into agriculture education to enable the development of sustainable food systems.

Key Words: Faculty of Agriculture students, Sustainable agriculture, Sustainable food systems, Sustainable nutrition

ÖZ

Sürdürülebilir tarım ve sürdürülebilir beslenme, çevresel sürdürülebilirlik, halk sağlığı ve uzun vadeli gıda güvencesini destekleyen dirençli gıda sistemlerinin temel bileşenleridir. Ziraat Fakültelerinde öğrenim gören öğrenciler, gelecekte tarımsal üretim sistemleri ve gı-

da ile ilgili karar süreçlerinde rol alacak profesyoneller olmaları nedeniyle en önemli gruplardan birini oluşturmaktadır. Bu çalışmada, Ziraat Fakültesi öğrencilerinin sürdürülebilir tarım konusundaki bilgi düzeylerinin değerlendirilmesi, sürdürülebilir beslenme davranışlarının incelenmesi ve bu iki alan arasındaki ilişkinin belirlenmesi amaçlanmıştır. Araştırma kapsamında Harran Üniversitesi Ziraat Fakültesinin farklı bölümlerinde öğrenim gören 145 öğrenciye anket uygulanmıştır. Veri toplama aracı olarak demografik bilgi formu, Sürdürülebilir Tarım Bilgi Düzeyi Anketi ve Sürdürülebilir Beslenme Davranışları Ölçeği (SBDÖ) kullanılmıştır. Verilerin analizinde ki-kare testi, tek yönlü varyans analizi ve tanımlayıcı istatistikler uygulanmıştır. Sürdürülebilir Tarım Bilgi Düzeyi Anketi toplam puan ortalaması 34.43 ± 10.11 (teorik aralık: 11–55) olarak saptanmıştır. Bulgulara göre katılımcıların %95,1'i sürdürülebilir tarım kavramından haberdar olduğunu, %62,7'si ise sürdürülebilir beslenme kavramından haberdar olduğunu belirtmiştir. Sürdürülebilir tarım bilgi puanlarının akademik bölüm ve sınıf düzeyine göre istatistiksel olarak anlamlı farklılık gösterdiği saptanırken, sürdürülebilir beslenme davranış puanlarında anlamlı bir farklılık belirlenmemiştir. Çalışmada sürdürülebilir tarım bilgisi ile sürdürülebilir beslenme davranışları arasında istatistiksel olarak anlamlı bir ilişki olduğu ve en güçlü ilişkinin SBSÖ'nün besin tercihi alt boyutunda olduğu belirlenmiştir. Elde edilen bulgular, sürdürülebilirlik ile ilişkili bilgi düzeylerinde alanlara özgü farklılıklar bulunduğunu, buna karşın sürdürülebilir beslenme davranışlarının görece tutarlı bir yapı sergilediğini göstermektedir. Bu doğrultuda, sürdürülebilir tarım ve beslenme konularının tarım eğitimi içerisine entegre edilmesi, sürdürülebilir gıda sistemlerinin geliştirilmesine katkı sağlayacaktır.

Anahtar Kelimeler: Ziraat Fakültesi öğrencileri, Sürdürülebilir tarım, Sürdürülebilir gıda sistemleri, Sürdürülebilir beslenme

Introduction

The concept of sustainability aims to create a way of life in which the basic needs of future generations can be met by using existing resources more efficiently (Ersoy, 2023). The concept of sustainability was first defined in the literature in 1987 in the United Nations Brundtland Commission report as meeting the needs of the present without compromising the ability of future generations to meet their own needs (Secretary-General & Development, 1987). and involves the long-term preservation of environmental, social, and economic systems (Pekcan, 2019).

The Food and Agriculture Organization (FAO) defines sustainable diets as dietary patterns that are health-protective, culturally acceptable, economically fair and accessible, nutritionally adequate, reliable, and environmentally sustainable (Burlingame & Dernini, 2012). Sustainable and healthy nutrition is a multifaceted concept. Sustainable nutrition aims not only to ensure adequate and balanced nutrition for society but also to protect environmental resources, making it increasingly important at the global level today (Pınarlı Falakacılar & Yücecan, 2024; Żakowska-Biemans et al., 2019). Although the concept of sustainable nutrition has gained increasing importance in recent years, the level of knowledge in society on this subject, the awareness of different age groups regarding sustainable nutrition, and individuals' behavior in considering environmental impacts in their food choices have not been sufficiently illuminated. Therefore, the need for scientific examination and evaluation of these areas continues (Şahin Bayram & Kızıltan, 2024). The sustainable diet models, in which one reduces intake of animal-based products, sugar, and saturated fats and maintains an adequate, balanced intake of nutrient-rich plant-based foods (such as fruits, vegetables, whole grains, legumes, nuts and seeds, and olive oil). In line with this approach, the Mediterranean diet, the DASH diet, the New Nordic Diet, vegetarian and vegan eating patterns, the double pyramid model, and the Planetary Health Diet are among the sustainable nutrition models (Peker & Günal, 2023). Ensuring that future generations have access to healthy and safe food is directly related to the food preferences and consumption habits embraced by today's society (Olgun et al., 2022).

Sustainable agriculture focuses on producing agricultural products today in a way that preserves some of the production for future generations. This method emphasizes the maintenance of our precious natural resources, such as soil, water, and biodiversity. This approach reduces environmental degradation, caused by the production of products and services. It considers the economic viability of producers and the social wellbeing of communities in rural areas. Sustainable

agriculture, therefore, is a whole system of production that integrates food security and ecosystem integrity (FAO, 2014). Food systems and agricultural production systems the world over are obstructed by rapid population growth, uncontrolled excessive use of natural resources, waste, and climate change (FAO et al., 2021). Moreover this, practices such as good agricultural practices and organic farming have come to the fore with the concept of sustainable agriculture (Akyüz & Atış, 2016). Good agricultural practices refer to the production approach, which aims at ensuring food safety and the quality of crops.

To ensure a livable world for future generations, it is essential for people to adopt sustainable, healthy eating habits, and for society to promote them. There are a limited number of studies in the literature on sustainable nutrition and sustainable agriculture among university students (Akay & Demir, 2022; Durán Gabela et al., 2022; Engin & Sevim, 2022; Küreç et al., 2020). This research was conducted to assess the level of knowledge among agricultural faculty students regarding sustainable nutrition and sustainable agriculture, raise awareness, develop policies on the subject, identify deficiencies in the educational process, and contribute to the scientific literature with the results obtained. Consistent with previous studies, this study also focuses on agricultural faculty students because they will be future leaders and decision-makers. The absence of studies examining sustainable nutrition among Faculty of Agriculture students in literature, and the limited number of studies investigating their knowledge and awareness levels regarding sustainable agriculture make this study valuable. The research is also important for revealing the current situation and contributing to the training of individuals who will be in policymaking and implementation positions in the field in the future.

In line with the objectives of the study, the following hypotheses were formulated:

H1: Sustainable agriculture knowledge levels differ significantly across academic departments and grade levels.

H2: Sustainable agriculture knowledge is significantly associated with sustainable nutrition behaviors.

These hypotheses were examined using the statistical procedures described in the Methods section.

Materials and Methods

This study is descriptive and cross-sectional research aimed at measuring the knowledge levels of Faculty of Agriculture students on sustainable nutrition and sustainable agriculture. The research data were obtained through an online survey from 145 students who agreed to participate in the study. The departments of Garden Plants, Plant Protection, Agricultural Structures and Irrigation, Agricultural Economics, Field Crops, and Soil Science and Plant Nutrition from the Faculty of Agriculture at Harran University were included in the study. The criteria for participation in the study include being a student of the Faculty of Agriculture and being over 18 and under 65 years of age. The study was conducted with the approval of the Harran University Non-Drug Clinical Research Ethics Committee (Ethics Committee Decision No: HRU/25.09.12/Date:12.05.2025).

A survey form was developed online which is divided into three sections to collect data for the study. The first section contains participants' demographic data (age, gender, class, department, body weight, height, etc.). In the second section, it was implemented the Sustainable Agriculture Knowledge Level (SAKL) Survey, which was prepared by the researchers by reviewing the literature (Küreç et al., 2020). The aim of this 11-item survey was to find out the knowledge of the participants about the sustainable agriculture practices. The survey items were prepared using a 5-point Likert scale (1 = I have no knowledge, 5 = I know very well). The lowest possible score on the survey is 11, and the highest possible score is 55. Higher scores indicate a higher level of knowledge about sustainable agriculture. The total mean score of

the questionnaire and the mean score of each item were calculated. To determine the reliability of the scale, an internal consistency analysis was performed, and Cronbach's α coefficient was found to be 0.95. This result indicates a high level of internal consistency among the items of the form. The third section used the Sustainable Nutrition Behavior Scale (SNBS) for measuring individuals' sustainable nutrition behaviors. This scale was developed and has undergone validity and reliability analyses in Turkish (Garipoglu et al., 2023). The scale consists of 29 items and 4 subscales and uses a 5-point Likert-type rating system (1=Never, 5=Always). The subscales are as follows: 1. Food preference (items 1-6), 2. Food waste reduction (items 7-15), 3. Seasonal and local food consumption (items 16-23), and 4. Food purchase behavior (items 24-29). All statements are positive, with the lowest possible score being 29 and the highest possible score being 145. Subscale scores are calculated by taking the average of the relevant questions. As participants' scores increase, it is seen that the individual's sustainable nutrition behavior is greater. The scale has high internal consistency, with a Cronbach's α coefficient of 0.92. Written permission for the use of the scale was obtained from Assoc. Prof. Dr. Gökçen Garipoğlu.

Body Mass Index (BMI) values (kg/m²) were calculated using body weight (kg) and height (cm) data obtained from participants' self-reported anthropometric measurements. BMI is calculated by dividing body weight (kg) by the square of height (m). The World Health Organization (WHO) obesity classification was used for BMI values. A BMI value <18.5 kg/m² is classified as underweight, 18.5-24.9 kg/m² as normal, 25.0-29.9 kg/m² as overweight, and ≥30 kg/m² as obese (Purnell, 2023).

Statistical analysis

The statistical analysis of the research data was performed using the SPSS 26.0 program. Prior to conducting parametric analyses, the normality of continuous variables was evaluated using the Kolmogorov–Smirnov test for both the overall sample and each subgroup. Descriptive statistics for variables showing a normal distribution were presented as mean±standard deviation (X±SD) and minimum–maximum (min-max). Categorical variables were expressed as counts and percentages. Relationships between categorical variables were assessed using the Chi-square test (χ²). For comparisons between three or more groups, One-Way Analysis of Variance (ANOVA) was applied for variables showing a normal distribution. When a significant difference was detected between groups, the Tukey post-hoc test was used to determine which groups contributed to the difference. The relationships between the SAKL scores and the SNBS and subscale scores were evaluated using Pearson correlation analysis. Table 1 was considered to evaluate the strength of the correlation. In all statistical analyses, the significance level was set at $p<0.05$.

Table 1. Relationship strength of correlation coefficient (r)* (Asuero et al., 2006; Kalaycı, 2010)

Correlation Coefficient (r) Value Range	Strength of Relationship
0.00 – 0.25	Very Weak (0 means None)
0.26 – 0.49	Weak
0.50 – 0.69	Medium
0.70 – 0.89	Strong
0.90 – 1.00	Very Strong (1 means Perfect)

* A negative correlation coefficient changes the direction of the relationship. For this reason, it is not included in the table.

Results and Discussions

A total of 145 students enrolled in the Faculty of Agriculture at Harran University participated in the study. The demographic and anthropometric characteristics of the participants are presented in Table 2. Of the participants, 48.3% were female (n=70) and 51.7% were male (n=75). In terms of student distribution by department, the highest

participation was in the Department of Agricultural Economics (34.5%), followed by the Department of Garden Plants (21.4%) and the Department of Agricultural Structures and Irrigation (15.9%). In terms of grade levels, the highest participation was among third-year students (41.4%), while the lowest was among first-year students (11.7%).

When examining the anthropometric characteristics of individuals, 61.4% were classified as normal, 26.9% as overweight, 7.6% as obese, and 4.1% as underweight according to BMI

classification. This distribution indicates that the majority of students fall within a healthy BMI range. The average age of the students was 25.60±7.60 years, the average body weight was 69.41±16.58 kg, and the average height was 170.02±8.70 cm. This may be explained by the fact that the high average age of the students is that middle-aged individuals working as technicians in public institutions prefer the Faculty of Agriculture over other engineering faculties in order to advance in their careers.

Table 2. Demographic and anthropometric characteristics of individuals

		n (%)
Gender	Female	70 (48.3)
	Male	75 (51.7)
	Total	145 (100)
Department	Garden Plants	31 (21.4)
	Plant Protection	13 (9.0)
	Agricultural Structures and Irrigation	23 (15.9)
	Agricultural Economics	50 (34.5)
	Field Crops	16 (11.0)
	Soil Science and Plant Nutrition	12 (8.3)
	Total	145 (100)
Class	1st year	17 (11.7)
	2nd year	33 (22.8)
	3rd year	60 (41.4)
	4th year	35 (24.1)
	Total	145 (100)
BMI Classification	Underweight (<18.5 kg/m^2)	6 (4.1)
	Normal (18.5-24.9 kg/m^2)	89 (61.4)
	Overweight (25.0-29.9 kg/m^2)	39 (26.9)
	Obese (≥30 kg/m^2)	11 (7.6)
	Total	145 (100)
		X±SD
Age (years)		25.60±7.60
Body weight (kg)		69.41±16.58
Height (cm)		170.02±8.70

Table 3 examines students' awareness of the concepts of sustainable agriculture and sustainable nutrition. Most participants (95.1%, n=138) reported having heard of the concept of sustainable agriculture before. In contrast, the percentage of those who had heard of the concept of sustainable nutrition was 62.7%

(n=91), indicating a lower level of awareness compared to sustainable agriculture. When evaluated by gender, the awareness rate of the concept of sustainable agriculture was 94.2% among female and 96% among men, with no statistically significant difference found between the groups (p>0.05). Similarly, the percentage of

those who have heard of the concept of sustainable nutrition is 65.7% among women and 60% among men, with no statistically significant difference between them (p>0.05). These results show that students are quite familiar with the concept of sustainable agriculture; however, awareness of sustainable nutrition remains relatively limited.

Table 3. Individuals' knowledge of sustainable agriculture and sustainable nutrition

		Female (n=70)	Male (n=75)	Total (n=145)	p
		n (%)	n (%)	n (%)	
Awareness of the concept of sustainable agriculture	Yes	66 (94.2)	72 (96.0)	138 (95.1)	0.71
	No	4 (5.71)	3 (4.0)	7 (4.83)	
Awareness of the concept of sustainable nutrition	Yes	46 (65.7)	45 (60.0)	91 (62.7)	0.49
	No	24 (34.2)	30 (40.0)	54 (37.2)	

Chi-Square test. p<0.05

Table 4 presents the average scores of students' responses to the SAKL survey items. The total scale score is 34.43±10.11 (min–max: 11–55). In the assessment of the items, the highest score "I have knowledge about water saving methods in sustainable agriculture (drip irrigation, etc.)" was received. The finding shows that students have relatively better knowledge, especially in water management and modern irrigation techniques. On the other hand, the item which has the lowest average score "I am aware of the contribution of compost or biofertilizer use to sustainable agriculture". This may reflect that the students have a rather limited knowledge level regarding organic matter management and the role of biofertilizers in agriculture sustainability. Average scores for other topics ranged from 3.01 to 3.34, indicating that students have a basic level of knowledge on topics such as soil health, crop rotation, pesticide use, and the environmental impacts of sustainable agriculture. Overall, the findings show that while the students are familiar with some sustainable agriculture practices, they have gaps in knowledge on more specific aspects, such as organic matter and biofertilizer.

Table 4. Scores of the Sustainable Agriculture Knowledge Level Questionnaire of Individuals

	X±SD	Min-Max
I am knowledgeable about methods for maintaining soil health	2.99±0.99	1-5
I am aware of the differences between organic agriculture and sustainable agriculture	3.10±0.98	1-5
I have knowledge of water-saving practices used in sustainable agriculture (e.g., drip irrigation)	3.31±1.01	1-5
I am knowledgeable about crop rotation practices and their benefits	3.30±1.08	1-5
I am aware of the effects of fertilizer use on sustainable agriculture	3.13±1.13	1-5
I am knowledgeable about integrated pest management methods for agricultural pests	3.01±1.20	1-5
I have knowledge of the role of sustainable agriculture in addressing climate change.	3.04±1.08	1-5
I am aware of the contribution of compost or biofertilizer use to sustainable agriculture.	2.91±1.20	1-5
I have knowledge of the economic and social dimensions of sustainable agriculture.	3.05±1.11	1-5
I am aware of the environmental impacts of chemical pesticides.	3.33±1.13	1-5
I have knowledge of the role of conventional farming practices within sustainable agriculture.	3.21±1.09	1-5
Total	34.43±10.11	11-55

Table 5 shows the distribution of students' SAKL scores by department. A statistically significant difference was observed between departments (p=0.01). The highest knowledge level score was found among students in the Plant Protection Department. This result was followed by students from the Agricultural Structures and Irrigation, Field Crops, and Garden Plants Departments, respectively. The lowest score was determined among students in the Soil Science

and Plant Nutrition Department. The sustainable agriculture knowledge level of Plant Protection students is significantly higher than the scores of students in the Agricultural Economics, Soil Science and Plant Nutrition departments. This is thought to be due to the fact that the courses taught in the Plant Protection Department deal more intensively with topics directly related to sustainable agriculture (integrated pest management, pesticide management, plant

health, environmental impacts).

Overall, students studying in departments more closely related to agricultural production processes and environmental management practices tend to have a higher level of knowledge about sustainable agriculture. In contrast, their level of knowledge is relatively lower in socio-economically focused areas (e.g., Agricultural Economics) and areas focused on soil-nutrient relationships (Soil Science and Plant Nutrition).

Table 5. Individuals' Sustainable Agriculture Knowledge Level Survey Scores by Department

	X±SD	p
Garden Plants	34.58±10.91	
Plant Protection	42.38±10.14[a,b]	
Agricultural Structures and Irrigation	35.74±9.16	
Agricultural Economics	32.82±8.69[a]	**0.01**
Field Crops	35.63±10.99	
Soil Science and Plant Nutrition	28.00±10.23[b]	

ANOVA, post-hoc Tukey. p<0.05. (a) Agricultural Economics Department, (b) Soil Science and Plant Nutrition Department. Students in the Plant Protection Department had significantly higher sustainable agriculture knowledge scores compared to departments (a) and (b) (p < 0.05).

Table 6 shows the total and subscale scores of students on the SNBS. The total score of the scale is 99.30±20.87 (min–max: 35–145), and when the subdimensions are examined, the highest average is seen in the food waste reduction subdimension. This finding indicates that students' awareness and behaviors regarding food waste are relatively stronger. This was followed by the seasonal and food consumption, food purchasing behavior, and food preference sub-dimensions, respectively. The differences in scores between the sub-dimensions indicate that students' sustainable eating behaviors are more developed in certain

sub-areas, but that the behavior of adopting the principle of sustainability, particularly in food preferences, remains at a relatively lower level. This shows that students need more support for plant-based food choices, environmentally sustainable food consumption habits, and a preference for healthy environments. These results indicate that the students' sustainable eating behavior as positive in some of its sub-dimensions but not high in all sub-dimensions and there are some positive accesses in behaviours level open to improvement.

Table 6. Individuals' Sustainable Nutrition Behavior Scale scores

	X±SD	Min-Max
Food Preference	19.52±5.26	6 – 30
Food Waste Reduction	31.83±7.66	9 – 45
Seasonal and Local Food Consumption	27.93±6.77	9 – 40
Food Purchase	20.01±5.50	8 – 30
Total	99.30±20.87	35 – 145

Table 7 shows the distribution of students' SNBS by department. The analysis revealed no statistically significant difference in total scale

scores between departments (p>0.05). This finding indicates that sustainable nutrition behaviors are at similar levels regardless of

departmental differences. When examining the mean scores, the highest values were observed in the Plant Protection and Garden Plants departments. The lowest mean was found in the Soil Science and Plant Nutrition Department. However, since these differences are not statistically significant, it can be said that students' sustainable nutrition behaviors developed in a similar pattern, unaffected by the department curriculum. Behaviors related to sustainable nutrition may be influenced by more general factors such as individual awareness, lifestyle, and personal preferences rather than the field-specific content of agricultural education.

Table 7. Individuals' Sustainable Nutrition Behavior Scale scores by department

	X±SD	p
Garden Plants	104.65±23.21	
Plant Protection	104.69±12.38	
Agricultural Structures and Irrigation	98.30±20.25	
Agricultural Economics	96.52±20.67	0.47
Field Crops	98.38±25.72	
Soil Science and Plant Nutrition	94.33±16.14	

ANOVA. p<0.05

Table 8 shows the distribution of students' SAKL and SNBS scores according to their grade levels. According to the analysis results, there is a statistically significant difference between grades in terms of sustainable agriculture knowledge level (p=0.01). The average knowledge score of fourth-grade students (38.49±10.04) is significantly higher than that of first-grade students (29.76±11.02). This finding shows that students' knowledge levels regarding sustainable agriculture increase as the education process progresses. When examining the behavior scores related to sustainable nutrition, there was no statistically significant difference between classes (p>0.05). The fact that behavior scores were similar across all classes suggests that sustainable nutrition behaviors are shaped more by individual preferences and lifestyle factors than by academic class level.

Table 8. Individuals' Sustainable Agriculture Knowledge Level Survey and Sustainable Nutrition Behavior Scale scores by class

	SAKL X±SD	p	SNBS X ± SD	p
1st year	29.76±11.02[a]		106.71±23.80	
2nd year	32.91±8.65	0.01	97.12±18.86	0.32
3rd year	34.22±10.11		97.15±19.13	
4th year	38.49±10.04[a]		101.43±23.74	

ANOVA, post-hoc Tukey. p<0.05 SAKL: Sustainable Agriculture Knowledge Level, SNBS: Sustainable Nutrition Behavior Scale
Fourth-year students (a) had significantly higher SAKL scores compared to first-year students (a) (p < 0.05).

Table 9 shows the relationships between the SAKL and the subscales of the SNBS. The analysis revealed statistically significant positive correlations of weak intensity between SAKL and all subdimensions (p<0.001). The strongest relationship was observed with the food preference subdimension (r=0.47). This finding indicates that as knowledge about sustainable agriculture increases, students are more likely to make food choices with a lower environmental impact. This was followed by the total SNBS score (r=0.44), seasonal and local food consumption (r=0.37), and food waste reduction (r=0.35) subdimensions. The weakest but still significant relationship was observed with food purchase behavior (r=0.25). These results show that as

students' knowledge of sustainable agriculture increases, they adopt more sustainable eating behaviors, and the knowledge-behavior alignment is clearly evident in the scale.

Table 9. Correlation between the Sustainable Agriculture Knowledge Level Survey and Sustainable Nutrition Behavior Scale scores of individuals

Sustainable Agriculture Knowledge Level Survey		
	r	p
Food Preference	0.47	0,000
Food Waste Reduction	0.35	0,000
Seasonal and Local Food Consumption	0.37	0,000
Food Purchase	0.25	0,000
Total	0.44	0,000

Pearson correlation analysis p<0.05.

The knowledge and awareness levels of Faculty of Agriculture students regarding sustainable agriculture and sustainable nutrition were examined. In a similar study, 51.6% of participants reported having heard of the concept of sustainable nutrition before (Ulcay & Erbağcı, 2025). Similarly, in other studies, it has been noted that approximately half of the participants had heard of this concept before (Akay & Demir, 2022; Ulas Kadioglu, 2022). In our study, 62.7% of participants had previously of the concept of sustainable nutrition. A study conducted among students at the Faculty of Agriculture indicated that 95.4% of students had heard of the concept of sustainable agriculture (Küreç et al., 2020). A study conducted in the United States reported that the majority of Agricultural Faculty students had a high level of attitude toward sustainable agriculture (71.9%) and a moderate level of knowledge (62.1%) (Durán Gabela et al., 2022). Similarly, in our study, the awareness rate of the concept of sustainable agriculture is 95.1%. Since the study was conducted among students of the Faculty of Agriculture, it is expected that they are more aware of the concept of sustainable agriculture than of sustainable nutrition.

Studies have found that women are more familiar with the concept of sustainable nutrition than men (Çelik et al., 2023; Engin & Sevim, 2022; Özüpek & Arslan, 2021; Schulz et al., 2024). A similar study conducted in Italy also found that women place greater importance on healthy, plant-based diets than men (Feraco et al., 2024). Similarly, our study found that women were more likely than men to adhere to the concept of sustainable nutrition. In light of these findings, it appears that gender is a significant factor in determining dietary habits.

Our study found that students' level of knowledge about sustainable agriculture was average. This result suggests that, while agricultural students are theoretically familiar with the theme of sustainability, they have more limited knowledge regarding its practical components. Similarly, studies in the literature report that agricultural students have an intermediate level of knowledge about sustainable agriculture (Durán Gabela et al., 2022). The highest level of knowledge about water-saving methods, such as drip irrigation, can be attributed to the fact that water scarcity is a significant problem in agricultural production in Türkiye, leading to greater emphasis on this topic in educational curricula. Water management is central to sustainable agricultural policies, particularly in semi-arid regions, and it is known that students have developed a relatively higher awareness in this area. The lowest scores were observed in the use of compost and biofertilizers, indicating that students have more limited knowledge about organic matter management and the contribution of biological fertilizers to sustainability. This situation may be related to composting not being widespread in Türkiye and little course content being allocated to such issues in educational programs. In the light of this finding, it is suggested that the applied education on the sub-components of sustainable agriculture

should be increased in agriculture faculty curricula, especially by strengthening course content on bio-fertilizers and organic matter management.

The study identified a significant statistical difference in the levels of recognition of sustainable agriculture across departments, so the type and extent of educational curricula that they receive has a direct influence on students' sustainability knowledge. Students in the Plant Protection Department had the highest knowledge score. This is due to the students being taught within their subject area about integrated pest management, pesticide use, environmental impact, biological and cultural control method which are the major components of sustainable agriculture. In contrast, relatively lower knowledge scores in Agricultural Economics and Soil Science and Plant Nutrition departments may be due to the limited coverage of technical and application-related aspects of sustainable agriculture in the respective departments. Agricultural Economics students are more involved with economic decisions, policy making, market mechanisms than with production processes. Soil Science students mostly talk about sustainability as it relates to soil health (e.g., erosion control, salinity management) and nutrient management. Therefore, it is expected that the level of mastery of the holistic components of sustainable agriculture would be higher in application-based departments. These findings indicate that faculty curricula should address sustainable agriculture topics using an interdisciplinary approach. Especially in departments where the level of knowledge is low, increasing practical training on sustainable agriculture practices and environment-focused course content can significantly contribute to students' environmental awareness and knowledge of sustainability. Considering that agricultural education requires a holistic approach and that sustainability is at the heart of all agricultural production processes, the importance of such curriculum development efforts becomes even more apparent.

Previously in the literature, SNBS has been applied to different groups, and it has been observed that the total scores of the scale are similar to the results of our study (Deli, 2024; Koçak, 2025). Our study found that differences in students' behaviors toward sustainable nutrition were particularly pronounced in certain subdimensions. The highest score was observed in the subdimension of food waste reducing, indicating that students have a strong attitude toward preventing waste. The literature also indicates that food waste is one of the first areas in which young adults develop awareness within the scope of sustainability (Attiq et al., 2021). Similar studies conducted on different groups in the literature have also shown that the sub-dimension score for reducing food waste is higher (Ayer, 2024; Sülün Terzi, 2024). However, the fact that the food choice sub-dimension received one of the lowest scores suggests that behavioral development is more limited in areas of sustainable nutrition that require individual choice. Similarly, some studies have reported that university students' knowledge of sustainable nutrition is not fully reflected in their behavior and that they struggle particularly with food choices that have a low environmental impact (Feraco et al., 2024; Özüpek & Arslan, 2021). The difference between the sub-dimensions indicates that sustainable nutrition is considered a multidimensional behavioral model and while the students show a higher level of assessment in some areas, they need support in other areas which affects day-to-day life decisions that is purchasing and selection. As a result, practical training at universities, recommendations of local and seasonal products, and visualization of the environmental consequences of food choices can support these behaviors.

In this study, the fact that SNBS scores did not show significant differences across departments (p>0.05) indicates that students' sustainable eating behaviors developed at similar levels regardless of their academic fields. The literature also indicates that sustainable nutrition behaviors are largely determined by personal preferences,

lifestyle, socio-cultural influences, and individual awareness levels; they are not strongly influenced by academic department or professional orientation (Engin & Sevim, 2022; Ulcay & Erbağcı, 2025). Sustainable nutrition involves more than simply being knowledgeable; it is a multidimensional structure defined by an individual's habits, access, and financial capacity. Meanwhile, sustainable nutrition behaviors show no difference between departments; which suggests that implementation of sustainability themed behaviors within university students is due to social awareness campaigns, social media posts and pro-environment strategies becoming common these days. As such, it is important that the interventions for developing sustainable eating behaviour go beyond the academic curriculum to include students' daily living environment, campus facilities and social interaction areas.

The results show a statistically significant difference in knowledge level about sustainable agriculture through grades and this means that the educational process significantly contributes to accumulating knowledge about sustainability. In particular, the score showing that the knowledge of fourth-grade students is higher than that of first-grade students suggests that the course content, application and field experience related to sustainable agriculture are increasing students' knowledge levels over time. A possibility regarding the intensive nature of late-vocational education courses could be responsible. Recent research also shows that students' knowledge and awareness levels have positively impacted after being exposed to courses in sustainable agriculture and the environment (Durán Gabela et al., 2022). Conversely, the finding that there is no statistically significant difference in the scores for sustainable eating behavior in classes (p>0.05) illustrates that eating behavior does not depend on academic progress. The results support the view that sustainable eating behaviour is mainly connected with personal preferences, habits, social-economic conditions, and lifestyle. The two

findings suggest that while awareness of sustainable agriculture noticeably improves throughout university education, behaviors about sustainable nutrition are determined by non-cognitive factors to a larger extent.

This study found significant and positive correlations between SAKL and behaviors related to sustainable nutrition, indicating that as agricultural knowledge increases, individuals develop more environmentally responsible eating behaviors. In particular, the strongest relationship (r=0.47) was observed with the food preference sub-dimension suggests that knowledge of sustainable agriculture directly reflects on students' food choices. The literature also reports that individuals with high sustainability knowledge and environmental awareness tend to prefer plant-based, environmentally friendly foods with a lower carbon footprint (Feraco et al., 2024). Food waste reducing and finding meaningful relationships in other behavioral such as, seasonal and local nutrition, demonstrates that sustainable agriculture knowledge is not limited to the cognitive level but has a multifaceted impact at the behavioral level. On the other hand, the lowest correlation observed with food purchasing behavior suggests that purchasing decisions are influenced more by structural factors such as economic conditions, accessibility, price perception, and shopping habits than by the level of knowledge. Therefore, while increasing an individual's knowledge of agricultural sustainability strengthens certain behavioral components, it is understood that environmental and economic factors affecting the purchasing process must also be taken into account. Overall, these findings indicate that sustainable agriculture knowledge is positively associated with sustainable eating behaviors. However, due to the cross-sectional nature of the study, these associations should not be interpreted as evidence of causality.

Conclusions

In conclusion, this study revealed the level of

knowledge of agricultural faculty students regarding sustainable agriculture and sustainable nutrition. Scientific literature in Türkiye indicates that there are very few studies conducted among agricultural faculty students on sustainable agriculture and sustainable nutrition. Achieving an optimal and sustainable health life cycle is possible through the adoption of sustainable nutrition and sustainable agriculture patterns. As future agricultural professionals, agricultural faculty students play a critical role in promoting sustainable agriculture practices and nutrition habits. Receiving more comprehensive education on sustainable agriculture and sustainable nutrition during their studies and ensuring that sustainability is given greater prominence in the faculty's curriculum, will enable them to play a more effective role in future applications. In particular, interdisciplinary courses combining sustainable agriculture and sustainable nutrition, as well as practice-based training modules (e.g., composting systems, water management applications, and sustainable food production workshops), could enhance experiential learning. Additionally, universities may support sustainable nutrition behaviors through campus-level initiatives such as local food procurement policies, food waste reduction programs, and sustainability awareness campaigns. In this way, they may contribute more effectively to sustainable food systems and societal well-being.

There were some limitations to this study, including the fact that the participants were asked to self-report their body weight and height as well as that the sample of participants used was made up of students of a particular university. Although the SAKL questionnaire showed high internal consistency, its construct validity was not tested and should be examined in future research. Another limitation of this study is the unequal and relatively small subgroup sizes across departments. Although the overall sample size was sufficient, limited representation in some departments may have reduced statistical power in interdepartmental comparisons. Therefore, these findings should be interpreted with caution.

Future research with larger and more balanced multi-center samples is recommended to enhance generalizability and robustness.

Conflict of Interest

The authors declare that they have no conflict of interest

Author's Contributions:

All authors contributed equally to the manuscript. The final version of the manuscript was reviewed and approved by all authors

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