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Cultivating Change: Perceptions and Attitudes of Agricultural Experts towards the Sustainable Development Goals

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Abstract: The agricultural sector is crucial to attaining the Sustainable Development Goals (SDGs) since it ensures food security, protects natural resources, and promotes rural livelihoods. However, the success of sustainable agricultural practices depends not only on effective policies and technologies but also on agricultural experts' perceptions and attitudes, as well as their willingness to embrace sustainable practices. Therefore, this study aims to: (i) investigate the perceptions and attitudes of agricultural experts in Guilan Province (Iran) towards the SDGs, and (ii) determine their educational needs regarding the SDGs and identify specific areas requiring more attention and targeted interventions. This research adopts a quantitative approach and relies on a survey with a random sample of 152 agricultural experts. The collected data were analyzed using SPSS 26 software and descriptive and inferential statistics. Agricultural experts perceived most SDGs as having high educational needs. Priority SDGs for education and training included SDG 14 (Life below water), whereas areas requiring increased knowledge among the employees relate, inter alia, to SDGs 1 (No poverty) and 2 (Zero hunger). The study contributes to the effective implementation of the SDGs by encouraging a more sustainable and resilient agricultural sector connected with broader goals of sustainable development.

Keywords: perception; attitude; sustainable agriculture; agriculture education; agriculture extension; SDGs; Iran; MENA



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1. Introduction

Addressing global concerns such as climate change, natural resource scarcity, and environmental degradation necessitates changes that may sustainably shift production and consumption systems [1]. Therefore, in recent years, sustainable development has gained significant traction as societies seek to balance economic development, social progress, and environmental protection [2]. At the vanguard of this global movement are the Sustainable Development Goals (SDGs) of the United Nations, a set of 17 aspirational objectives designed to harmonize national and international policies and agreements toward achieving an environmentally, socially, and economically sustainable world [3]. These objectives include various topics, such as poverty eradication, food security, gender equality, climate action, and sustainable agriculture [4]. The SDGs, which are more ambitious and broader than the original Millennium Development Goals (MDGs), represent the future of global development [5]. The concept of “sustainable development” has been expanded and diversely defined in the 2030 Agenda, with environmental preservation, social inclusion, and

economic growth now comprising five of the most critical aspects (5Ps: people, prosperity, planet, partnership, and peace) [4]. The 2030 Agenda and the SDGs consider various issues and resources across countries to find common ground for improved development [6].

The notion of sustainable agriculture has garnered growing attention and importance in policy and public debates, being acknowledged as a fundamental element in the pursuit of global sustainability. In addition to satisfying humanity's basic needs for food, feed, fiber, and fuel, agriculture employs more than one-third of the global labor force [7]. It promotes rural community cohesion and preserves cultural traditions and heritage [8]. However, it also faces numerous sustainability challenges since conventional agriculture practices have led to several issues, such as resource depletion, environmental degradation, the effects of climate change, and social inequalities [9]. Agriculture is a significant contributor to climate change. Crop and animal production, as well as forestry, mainly deforestation, are estimated to account for 25% of the total world's greenhouse gas emissions [10]. Accordingly, lowering agriculture's carbon footprint is critical to preventing global warming and achieving the 2030 goals [11,12]. Further, with the world's population expected to approach 9 billion by 2050, farming methods must be both productive and sustainable. It is necessary to balance expanding food production and preserving the ecological integrity on which future production relies. This is an essential challenge that sustainable agriculture seeks to overcome [13]. Further, consumers are becoming more environmentally concerned about food production. They want economical, healthy, environmentally friendly, and farmer-friendly products more than ever. Consumers now prioritize sustainable agriculture due to ethical consumption [14].

At the same time, since its activities directly rely on climatic conditions, agriculture is also negatively affected by climate change (e.g., rising temperatures, water stress, pest and disease pressures, reduced crop yields, etc.) [7]. Without immediate action to make agriculture more sustainable, productive, and resilient, climate change consequences will substantially jeopardize food production in already food-insecure countries and regions [15]. Sustainable agriculture is also a key subject among the myriad of challenges that these 17 interrelated objectives attempt to solve, given its direct connection to a broad range of SDGs [16]. The global objectives outlined seek to foster a future characterized by sustainability. Agriculture plays a significant role in numerous objectives, including but not limited to eradicating hunger, ensuring access to clean water, promoting biodiversity and land conservation, as well as encouraging responsible methods of consumption and production.

Considering the societal consequences of sustainable agriculture it is evident that interest in its development and promotion crosses academic borders. As a result, knowing the opinions and attitudes of individuals directly engaged in agriculture, such as agricultural experts, is crucial to advancing sustainable practices, guiding policy, and engaging the general public. Therefore, achieving sustainability remains one of the biggest challenges facing the agricultural sector, and various approaches have been developed to overcome these challenges. Sustainability is a multi-level concept that includes human, organizational, political-economic, social-cultural, and ecological dimensions [17]. Achieving sustainable development requires shifting human values, attitudes, and behaviors to meet human needs, alleviate poverty and hunger, and maintain the planet's life support systems. Sustainability values are often manifested through specific attitudes and behaviors [18]. Indeed, the success of sustainable agricultural development relies not only on implementing appropriate policies and strategies but also on understanding and integrating the perceptions and attitudes of individuals directly engaged in farming operations. Despite the significance of top-down strategic efforts, the involvement of individual workers in implementing environmental sustainability is just as crucial [19]. The awareness, knowledge, and attitudes of agricultural experts, employees, and workers are essential to successfully implementing sustainable agricultural practices. Their perspectives and attitudes towards sustainable practices may considerably impact the adoption and implementation of the SDGs in the agriculture sector.

Attitudes are defined as “favorable or unfavorable evaluations of and reactions to objects, people, situations, or any other aspects of the world” [20] (p. 606). According to Oppenheim [21], an attitude is a condition of preparedness to act, a willingness to act, or a typical reaction to a particular stimulus. He argues that attitudes are bolstered by opinions and beliefs (perception factors) and that they frequently absorb strong feelings (sense factors), which leads to specific types of behavior (motion factors). Environmental attitudes are defined by Milfont and Duckitt [22] as a psychological inclination manifested by judging the natural environment with some degree of favor or disfavor. Attitude is recognized as a crucial predictor in influencing an individual’s behavior. It precedes behavior and affects how a person acts. Therefore, attitude plays an essential role in shaping behavior [23].

Changing human attitudes towards sustainability is a key priority for development organizations across all sectors, including agriculture. Indeed, motivating a group of people towards a specific goal requires creating a favorable attitude towards it. Examining attitudes in sustainable development is crucial because it helps managers and executives understand their thought processes regarding specific issues. This enables them to design programs to change attitudes where necessary. Education is the primary tool for forming a positive attitude; therefore, changing attitudes toward sustainability is only possible through education.

Guilan Province, located in northern Iran, has placed a greater emphasis on sustainable development in recent years. Efforts are being made to promote ecologically friendly agricultural methods, conserve natural resources, and raise awareness about the significance of living sustainably [24–26]. However, this transition to sustainability faces several hurdles and constraints [27]. Agricultural supervisors play a crucial role in the success or failure of sustainable agriculture, and the Jihad Agricultural Organization, a branch of the Iranian Ministry of Agriculture that is located in each province, as an education and extension institution, has the potential to improve and develop the knowledge, attitude, and skills of its workforce regarding sustainability. Analyzing the perspectives of the Guilan Agricultural Organization’s experts (the most influential executives in agriculture) enables the identification of the organization’s strengths and weaknesses and its empowerment [28].

Therefore, this study aims to: (i) investigate the perceptions and attitudes of agricultural experts in Guilan Province (Iran) towards the SDGs, and (ii) determine their educational needs regarding the SDGs and identify specific areas requiring more attention and targeted interventions. By exploring these dimensions, this study aims to contribute to the effective implementation of the SDGs and foster a more sustainable and resilient agricultural sector aligned with the broader SDGs in Iran and beyond.

The novelty and originality of this paper lie in several aspects. Firstly, the emphasis on Guilan Province, Iran, offers a unique environment for analyzing agricultural experts’ views and attitudes regarding the SDGs. While the significance of sustainable agriculture is widely acknowledged, there is a lack of research investigating the perspectives of agricultural experts in this province. By examining the perceptions and attitudes of agricultural experts in Guilan Province, this paper provides novel insights into the challenges and opportunities associated with implementing the SDGs in a particular geographical and sociocultural context. The second objective of this study is to determine the educational needs of agricultural experts concerning the SDGs. This aspect adds originality by highlighting the specific areas requiring attention and targeted interventions to improve employees’ sustainable development knowledge and skills. By identifying the educational gaps, this paper provides vital guidance for developing effective training programs and interventions tailored to the requirements of agricultural workers in Guilan Province. By addressing these issues, the study offers fresh insights into the current literature and contributes to building focused strategies for sustainable agricultural development in Guilan Province and other areas. We will discuss the research methodology in Section 2, followed by a presentation of the study results in Section 3. The results will then be examined (Section 4) and discussed before we present the main conclusions.

2. Literature Review: Perceptions and Attitudes of Agricultural Experts towards the SDGs

The successful implementation of the SDGs is contingent upon the perceptions and attitudes of key stakeholders involved in their realization. In the context of sustainable agriculture, agricultural experts play a crucial role as influential individuals whose beliefs and attitudes have the potential to significantly influence the acceptance and implementation of SDGs. A comprehensive analysis of the available scholarly literature reveals that agricultural experts have a nuanced comprehension of SDGs within diverse contexts. For instance, a study conducted in South Africa examined the level of awareness and perceptions regarding the SDGs among the adult population. Although this research is not particular to agricultural professionals, it provides an essential framework for understanding the general perception of SDGs. Results showed that more females than males had been educated about the SDGs and that more young people than old had an appropriate understanding. Results also showed that individuals with a master's degree were educated about SDGs, but those with a high school degree were not [29].

Riccioli et al. [30] investigated the impact of perceived transaction costs on farmers' attitudes toward participating in Agri-Environment-Climate Measures (AECMs) in the agricultural sector across seven European countries. The research emphasized the critical importance of economic considerations in influencing farmers' decisions to adopt sustainable practices. It recognized that while many farmers are aware of the environmental benefits of sustainable farming, economic constraints and incentives play a significant role in their willingness to implement these practices. According to the findings, financial factors, including incentives, subsidies, input and output prices, and the opportunity cost of transitioning to sustainable farming methods, significantly impact the adoption and effective implementation of sustainable farming practices. The study noted that farmers often weigh the economic benefits against the perceived transaction costs, including direct financial costs and factors such as time, effort, and complexity associated with adopting new methods. Omisor et al. [31] studied the awareness and knowledge of SDGs among an academic community in southwest Nigeria. This low awareness indicates a significant gap in education and understanding within the academic community about the global objectives set forth by the SDGs. The lack of knowledge in the academic community is not just a regional concern but also has broader implications. It emphasizes the necessity for enlightenment campaigns and educational reforms that incorporate the principles and goals of sustainable development. Curriculum changes, specifically, may be instrumental in fostering a deeper understanding and appreciation of the SDGs.

Khairul Bashar's [32] research on the attitude and awareness of university professors towards implementing SDGs in Malaysian public universities offers an enlightening perspective on the subject. The study indicates a contradictory situation in which academic staff have low knowledge yet a moderate attitude towards the SDGs. This lack of awareness is especially alarming, considering that university professors are often seen as the intellectual vanguard in charge of transferring information and molding attitudes among younger generations. While there may be a desire or a good attitude towards interacting with the SDGs, the results show that a lack of knowledge impedes effective integration and implementation within the educational framework.

Finally, Balakrishnan et al. [33] examined perceptions and attitudes towards sustainable development among Malaysian undergraduate students. They found a positive perception and attitude toward environmental sustainability but not towards economic and social issues. Teaching sustainable development in higher-education institutions was influential in fostering a sense of responsibility towards sustainability among the students. Veisi et al. [34] assessed the level of sustainable agricultural literacy among experts in the Tehran and Alborz Provinces (Iran). The study found that agricultural specialists in these provinces had a positive attitude, sensitivity, and concern for sustainability. Despite the experts' positive attitudes and concerns, the research discovered that their knowledge level was average. This discrepancy in attitude and knowledge highlights the need for targeted

education and training. While there is widespread support for sustainable behaviors, a lack of appropriate knowledge may impede their implementation. Shiri et al. [35] studied the attitude of agricultural researchers towards sustainable agriculture in Ilam Province (Iran) and found that most researchers had a moderate or negative attitude.

3. Materials and Methods

This research employed a quantitative survey methodology, utilizing a structured questionnaire as the primary research instrument (Figure 1). The survey was conducted online from March to May 2021. The questionnaire comprises 68 items distributed across 3 dimensions: importance, knowledge, and connection with agricultural sector activities. The questionnaire is divided into four sections to ensure comprehensive data collection. The initial section gauges respondents' perspectives on the significance of the SDGs. The subsequent section evaluates their knowledge and awareness of these goals. The third and fourth sections aim to assess respondents' perceptions of the relationship between SDGs and agricultural sector activities, as well as the importance and prioritization of these goals within the policies of the Agricultural Jihad Organization. By utilizing this comprehensive questionnaire, the study aims to gather detailed insights into the perceptions and attitudes of agricultural experts toward the SDGs, thereby contributing to a broader understanding of the subject matter.

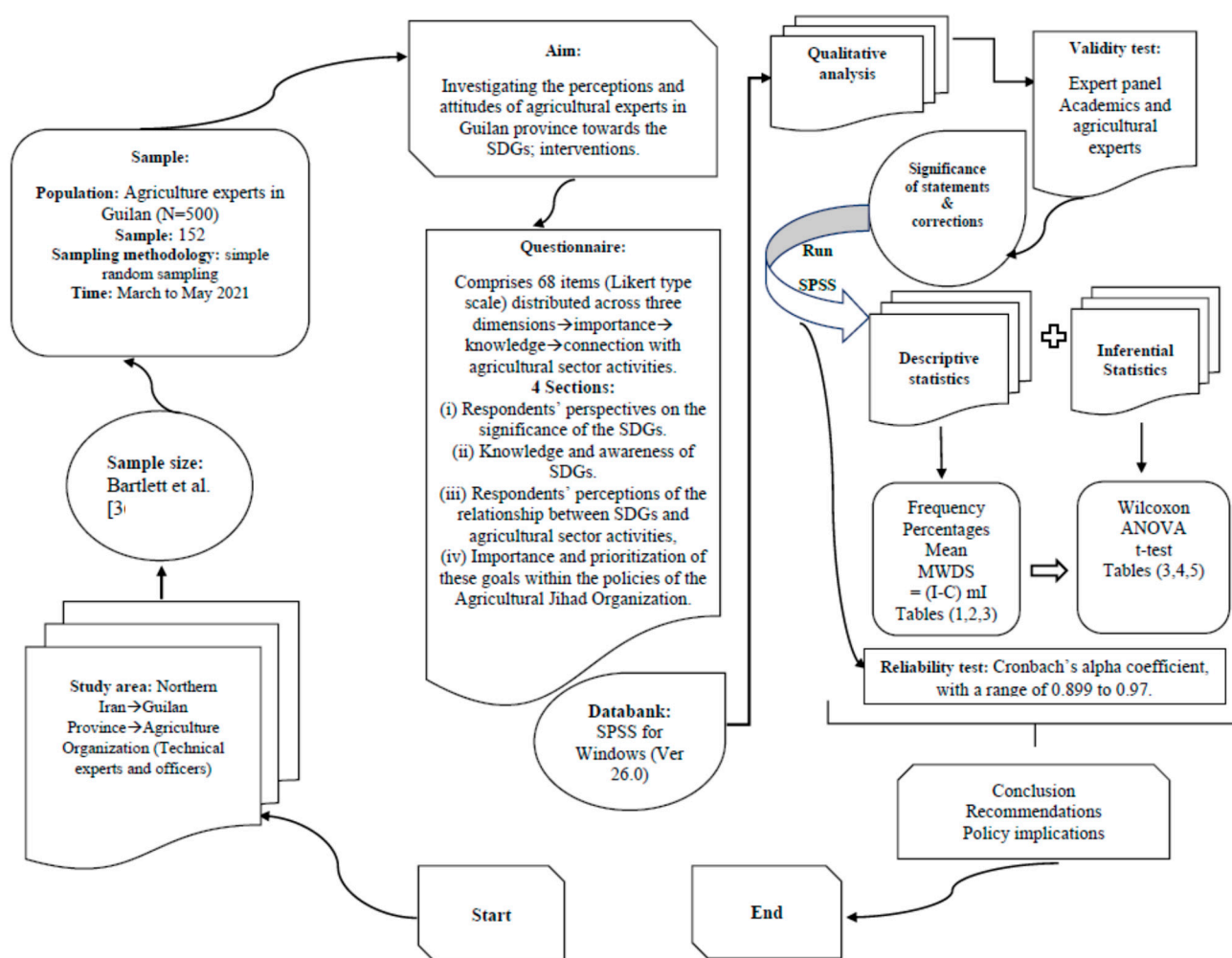


Figure 1. Flowchart of the research methodology. Sample size [36]. Source: Authors.

The questionnaire's validity was evaluated by seeking the expertise of university professors and subject matter experts in the field. This expertise allowed them to critically

assess the questionnaire's content and ensure that it effectively captures the intended constructs related to the perceptions and attitudes towards the SDGs in the agricultural sector. Moreover, the reliability of the questionnaire was assessed using Cronbach's alpha coefficient, with a range of 0.899 to 0.97. These high alpha values indicate strong internal consistency among the items in the questionnaire.

The statistical population comprises 500 experts from the Jihad Agricultural Organization of Guilan Province. This organization is the primary authority in charge of agricultural development and policy in the region, with professionals specialized in crop cultivation, livestock management, fisheries, rural development, and agricultural engineering, among others.

The minimum sample size of 152 was determined using Bartlett et al.'s [36] table. This table is a commonly utilized approach for determining the sample size in research design. The underlying principle of this approach is rooted in the notion of statistical power, which pertains to the likelihood of a statistical test successfully identifying an effect in the presence of an actual impact. The table suggested 152 samples for a population of 500. The level of confidence (or significance level) used was 95%. This level is commonly used in social science research because it balances the need for precision and the practical constraints of research. We chose a 50% rate for the predicted response distribution. This is often used in determining the sample size since it offers the most cautious estimate. Based on the specified parameters, Bartlett et al.'s table suggested that a minimum sample size of 152 was recommended for our study. To ensure a reasonable level of confidence in accurately representing the perspectives of the larger population of 500 agricultural experts, it was necessary to conduct a survey encompassing a minimum of 152 experts in the field. The sample was randomly chosen. We utilized simple random sampling for our study since it is one of the most straightforward randomization techniques and has been frequently used in numerous types of research.

Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were used for data analysis and inferential statistics (*t*-test, F-test, and Wilcoxon test) with the help of SPSS26 software. The Borich needs assessment model [37] was used to prioritize knowledge and importance indicators, and the average weighted difference score (Equation (1)) was calculated to determine the priority of each question:

$$\text{MWDS} = (I - C) \text{mI} \quad (1)$$

where:

MWDS: mean weighted discrepancy scores,
 I: perceived importance of each SDG,
 C: knowledge of each SDG,
 mI: mean score of each SDG.

The priority score in this model indicates the need for training, with a score of more than four indicating the greatest need. Scores between two and three indicate a need for improvement, but not necessarily additional training, while scores of less than two do not require any education [38]. This index was also utilized to assess the degree of alignment between Agricultural Jihad activities and the SDGs.

4. Results

4.1. Demographic and Professional Characteristics

The results provided some information regarding the demographic and professional characteristics of the respondent sample, such as age, gender, work experience, educational background, and organizational positions (Table 1).

The average age of the respondents in this study was 41.25 years. The age distribution indicated that the highest frequency of respondents, accounting for 46.70%, fell within the 36–40 age group. In addition, 57.20% of the respondents were male. On average, respondents reported work experience of approximately 9.50 years. Conversely, individuals with less than 5 years of experience constituted a minor proportion, at 3.90%.

Table 1. Sociodemographic features of the survey participants.

Variables	Frequency	Percentage
Age (Years)		
Mean = 41.25		
<35	9	5.9
35–45	118	77.6
>45	25	16.5
Gender		
Male	87	57.2
Female	65	42.8
Background (Years)		
Mean = 9.47		
<5	6	3.9
5–10	105	69.1
10–15	25	16.5
>15	16	10.5
Level of education		
Bachelor	51	33.5
Master	101	66.5
Field of study		
Agriculture	129	85
Others	23	15
Organization position		
Technical expert	133	88
Officer	19	12
In-service training		
Yes	23	15
No	129	85

Regarding educational qualifications, most respondents (66%) held a master's degree, while 33% possessed a bachelor's degree. Regarding academic background, 85% of the respondents had a specialization in agriculture, while the remaining 15% had experience in non-agricultural fields. Concerning organizational positions, a significant proportion (88%) occupied the role of technical experts, while approximately 12% held administrative positions.

Furthermore, the study revealed that most respondents (85%) had not participated in any training courses or conferences specifically focused on sustainable development. This indicates a potential gap in formal training and highlights the need for targeted educational interventions to enhance agricultural experts' knowledge and understanding of sustainable development.

4.2. Opinions of Agriculture Experts on the SDGs

According to the responses provided by the experts, an assessment was conducted to determine the relative importance of each Sustainable Development Goal (SDG). Among the SDGs, SDG 12 (Responsible production and consumption) was identified as the most significant goal, receiving an average rating of 4.41. In addition, SDG 3 (Good health and well-being) and SDG 6 (Clean water and sanitation) were considered the most important indicators of sustainable development, with average ratings of 4.28 and 4.27, respectively. Conversely, SDG 4 (Quality education) received a comparatively lower average rating of 3.64. Similarly, SDG 11 (Sustainable cities and communities) ($M = 3.77$) and SDG 13 (Climate action) ($M = 3.82$) were considered less important in comparison to other SDGs (Figure 2).

In the subsequent phase of the study, the seventeen SDGs were prioritized based on the respondents' perceived importance and awareness of their training needs. As presented in Figure 1, the research participants expressed the need for training across most objectives, encompassing 14 of the 17 SDGs. SDG 16 (Peace, justice, and strong intuitions), SDG 3

(Good health and well-being), and SDG 12 (Responsible production and consumption) emerged as the top three goals necessitating education and training. Moreover, the findings underscored the need for experts to enhance their knowledge concerning three specific goals: SDG 2 (Zero hunger), SDG 1 (No poverty), and SDG 4 (Quality education).

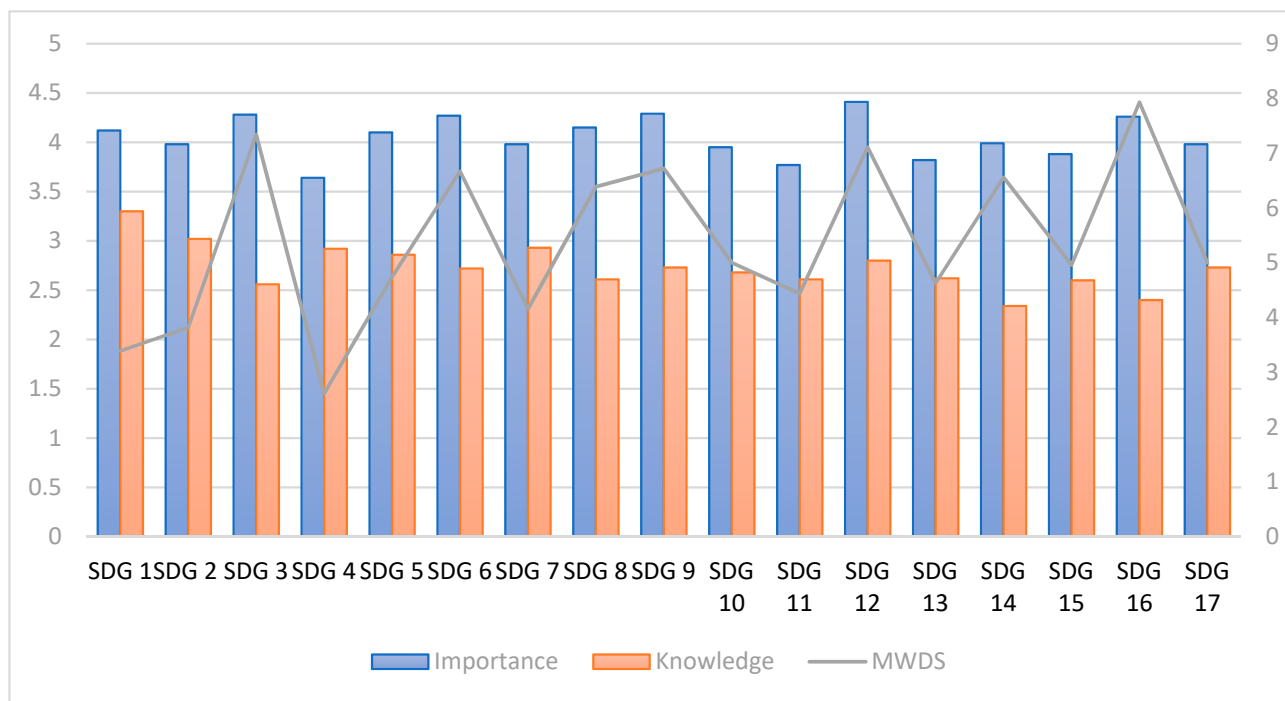


Figure 2. Importance ratings of SDGs and indicators as perceived by agricultural experts. MWDS: mean weighted discrepancy scores.

The results presented in Table 2 reveal that majority of the study participants recognized a strong correlation between the Sustainable Development Goals and agricultural activity, particularly concerning objectives such as SDG 1 (No poverty), SDG 2 (Zero hunger), SDG 4 (Quality education), SDG 13 (Climate action), and SDG 6 (Clean water and sanitation). Conversely, participants perceived a weaker connection between the SDGs and agricultural activity regarding gender equality (SDG 5), access to clean and affordable energy (SDG 7), fostering a healthy life and well-being (SDG 3), reducing inequality (SDG 10), and revitalizing global partnerships for sustainable development (SDG 17).

The experts in the study regarded certain SDGs as of utmost importance and priority within the existing policies and programs of the Agricultural Jihad Organization. These goals encompass SDG 3 (Good health and well-being), SDG 8 (Decent work and economic growth), SDG 13 (Climate action), and SDG 2 (Zero hunger). In contrast, the experts assigned relatively lower importance and priority to components such as gender equality (SDG 5), sustainable production and consumption patterns (SDG 12), the revitalization of global partnerships for sustainable development (SDG 17), the reduction of inequality (SDG 10), and the development of sustainable cities and communities (SDG 11). The examination of priority ratings in Table 2 demonstrates a need for extensive planning and attention to accomplish 12 particular goals within the Agricultural Jihad Organization's initiatives. Notably, SDG 12 (Responsible consumption and production) ($M = 6.19$), SDG 4 (Quality education) ($M = 6.19$), SDG 16 (Peace, justice, and strong institutions) ($M = 6.08$), and SDG 10 (Reduced inequalities) ($M = 6.01$) emerged as the most important goals needing concentrated efforts and attention.

Table 2. Perceived connection and priority ratings of SDGs and agricultural activity by agricultural experts.

SDGs	Perceived Importance of Paying Attention	Paying Attention to Current Programs and Policies	MWDS	Wilcoxon	Result
SDG 1: No poverty	4.03	2.52	6.07	8.66 **	NFP
SDG 2: Zero hunger	4.02	2.40	6.51	9.49 **	NFP
SDG 3: Good health and well-being	3.37	2.65	2.44	6.14 **	NFI
SDG 4: Quality education	3.95	2.24	6.76	9.07 **	NFP
SDG 5: Gender equality	3.14	1.96	3.70	6.39 **	NFI
SDG 6: Clean water and sanitation	3.64	2.42	4.41	7.89 **	NFP
SDG 7: Affordable and clean energy	3.21	2.38	2.68	6.37 **	NFI
SDG 8: Decent work and economic growth	3.53	2.78	2.60	5.65 **	NFI
SDG 9: Industry, innovation, and infrastructure	3.48	2.56	3.18	7.15 **	NFI
SDG 10: Reduced inequalities	3.55	2.01	4.46	8.34 **	NFP
SDG 11: Sustainable cities and communities	3.32	2.05	4.19	7.39 **	NFP
SDG 12: Responsible consumption and production	3.66	1.99	6.09	9.27 **	NFP
SDG 13: Climate action	3.63	1.46	4.23	8.01 **	NFP
SDG 14: Life below water	3.43	2.32	3.81	8.42 **	NFI
SDG 15: Life on land	3.57	2.71	3.05	5.85 **	NFI
SDG 16: Peace, justice, and strong institutions	3.92	2.30	6.34	9.57 **	NFP
SDG 17: Partnerships for the goals	3.28	2.31	3.75	7.25 **	NFI

MWDS: mean weighted discrepancy scores; NFP: need for planning; NFI: need for improvement; NNP: no need for planning; ** $p < 0.01$.

4.3. Comparison of Educational Needs and Personal Characteristics of Respondents

Table 3 shows the results of a t-test performed to measure respondents' educational requirements while looking at the impact of personal characteristics. According to the findings, there were no significant differences in educational requirements between the two groups of respondents based on their area of study, organizational position, or educational achievement. However, a substantial disparity in educational needs was observed among respondents when considering their gender, with a significance level of 0.01, and their participation in in-service training, at a significance level of 0.05.

Table 3. Effects of respondents' characteristics on perceived training needs for SDGs among agricultural experts.

Variable	M	SD	t-Value	p-Value
Gender			2.78 **	0.006
Male	4.39	4.15		
Female	6.68	5.58		
Field of study			1.03	0.69
Agriculture	5.14	4.58		
Others	6.61	6.53		
Organization position			0.29	0.775
Technical expert	5.31	4.71		
Officer	5.75	6.38		
In-service training			2.07 *	0.043
Yes	4.05	2.82		
No	5.60	5.18		
Education level			0.40	0.69
BSc.	5.61	5.73		
Master and Ph.D.	5.24	4.50		

M: mean; SD: standard deviation. * $p < 0.05$, ** $p < 0.01$.

The outcomes of the F-test, as presented in Table 4, demonstrated that both age and work experience significantly influenced the educational needs score of the respondents, reaching a level of significance of 0.01. These findings indicate that there were discernible variations in educational needs among individuals belonging to different age groups and possessing varying levels of work experience.

Table 4. Effect of age and work experience on educational needs score: results of the F-test.

Variable	F-Value	p-Value
Age	12.94 **	0.000
Work Experience	21.89 **	0.000

** $p < 0.01$.

5. Discussion

The findings of this study provide valuable insights into the perceptions, attitudes, and educational needs of agricultural experts in Guilan Province (Iran) regarding the Sustainable Development Goals (SDGs).

Firstly, the results revealed that most respondents recognized the importance of the SDGs and acknowledged their high educational needs concerning these goals. This finding underscores the significance of raising awareness and providing education and training opportunities to enhance the understanding and implementation of sustainable practices in the agricultural sector. It indicates a positive attitude among agricultural experts towards embracing sustainability and aligning their work with the SDGs.

This optimistic attitude among agricultural professionals in Guilan Province is an encouraging indicator for the area and maybe for other comparable scenarios. However, it raises concerns about how these educational demands will be satisfied and what particular tactics and resources would be necessary. It demands comprehensive planning, including governmental entities, educational institutions, industry players, and communities, to guarantee that essential training and assistance are accessible.

Further, the study identified specific SDGs deemed highly important, such as SDG 12 (Responsible production and consumption), followed closely by SDG 3 (Good health and well-being) and SDG 6 (Clean water and sanitation). In contrast, goals such as SDG 4 (Quality education), SDG 11 (Sustainable cities and communities), and SDG 13 (Climate action) were deemed less significant. This observation suggests the need for targeted efforts to enhance knowledge and awareness in these areas among agricultural experts. Strengthening education and training programs in these domains can contribute to fostering sustainable agricultural practices, building resilient communities, and mitigating the impacts of climate change.

Secondly, besides assessing the SDGs' importance, the study examined the connection between sustainable development goals and agricultural activities. Participants acknowledged a strong relationship between the SDGs and agricultural activity in areas such as eradicating hunger (SDG 2) and providing access to clean water and sanitation (SDG 6). This observation illustrates the general recognition among agricultural experts that sustainable agricultural practices are essential for addressing critical development issues such as poverty and food security. Nevertheless, the study revealed a relatively low perception of connection in areas such as gender equality (SDG 5), access to clean and affordable energy (SDG 7), and promoting a healthy life and well-being (SDG 3). These findings suggest that targeted interventions are required to bridge the gap between these objectives and agricultural practices, fostering a more comprehensive approach to sustainable development in the agricultural sector. In addition, the study investigated the relative importance of various SDGs in the policies and programs of the Agricultural Jihad Organization.

Additionally, the study examined the influence of personal characteristics (viz. gender, field of study, organizational position, education level, age, and work experience) on the educational needs of respondents. The results indicated that gender and participation in in-service training significantly affected the educational needs score. This finding emphasizes

the importance of gender-responsive educational programs and the continuous professional development of agricultural experts to bridge knowledge gaps and promote gender equality in the sector.

Furthermore, the analysis revealed that age and work experience significantly impacted the educational needs score. Differences in educational needs among different age groups and levels of work experience highlight the necessity of tailored educational interventions to cater to the specific requirements and perspectives of individuals at various stages of their careers. Lifelong learning and continuous professional development initiatives should be designed to address the evolving challenges and priorities agricultural professionals face throughout their professional journeys.

These findings can be interpreted within the broader framework of systems thinking, which acknowledges the intricate interplay between the agricultural sector and ecological, social, and economic systems [39]. Systems thinking is a theoretical framework emphasizing the interconnectedness and interdependence of diverse constituents within a broader organizational framework. In agriculture, an in-depth understanding of the interplay between farming practices and their reciprocal relationship with natural ecosystems, societal demands, and economic forces is imperative [40].

Incorporating the SDGs demonstrates a comprehensive perspective that recognizes the multifaceted aspects of sustainability. This statement implies the necessity of moving beyond individualized farming methods and acknowledging the broader significance of agriculture in attaining a sustainable future. This approach aligns with the global focus on achieving the triple-bottom-line of sustainability, which encompasses protecting the environment, promoting social equity, and maintaining economic viability. The focus on transdisciplinary education and cooperation underscores the issue's systemic aspect. Furthermore, this finding underlines the need for continuous learning and adaptation in the agricultural industry. Systems thinking is not a static notion but rather a dynamic process that requires constant appraisal and adaptation to changing situations [41]. Recognizing the need for interdisciplinary education is consistent with the concept of adaptive management, in which learning, flexibility, and responsiveness are essential for navigating the complexity of contemporary agriculture. Finally, the study suggests the possibility of a more participatory approach to agricultural decision-making. By adopting systems thinking and encouraging cross-disciplinary cooperation, there is a chance to involve a broader range of stakeholders, including farmers, policymakers, academics, and community people.

6. Conclusions

This study aimed to: (i) investigate the perceptions and attitudes of agricultural experts in Guilan Province (Iran) towards the SDGs, and (ii) determine their educational needs regarding the SDGs and identify specific areas requiring more attention and targeted interventions.

The findings underscore the critical role of sustainable practices in the agricultural sector and the need for educational interventions to promote the achievement of the SDGs, particularly in a country such as Iran that faces significant challenges in agriculture. The study identified specific goals that require increased attention and highlighted the connection between agriculture and the numerous SDGs. In addition, the influence of personal characteristics on educational requirements was investigated, highlighting the significance of tailoring programs to meet the diverse needs of agricultural professionals.

However, this research has some limitations. Firstly, the study was carried out in Guilan Province, which may restrict the generalizability of the results to other Iranian provinces or countries. Future studies should include a more varied sample to obtain a more thorough knowledge of agricultural specialists' perspectives and educational requirements across different contexts. Secondly, the study used a quantitative approach, which reduced the depth of understanding of the underlying causes impacting agricultural experts' opinions and attitudes. Future research might also use mixed, qualitative–quantitative

methodologies to investigate the underlying motives, attitudes, and impediments to sustainable agriculture practices.

Despite these limitations, the research has significant implications for agricultural policymakers and organizations. The results underscore the need for educational initiatives that promote sustainable agriculture practices and integrate them with the SDGs. Policymakers should prioritize the listed objectives and invest resources to improve agricultural education and training opportunities in Iran. To meet the individual requirements of diverse groups, tailored programs that consider personal characteristics such as gender, age, and job experience should be established. Policymakers should also evaluate the weak link between agriculture and specific SDGs, such as gender equality (SDG 5) and sustainable production and consumption patterns (SDG 12), and devise measures to include these objectives in agricultural policies and programs.

Further, while the research offers valuable insights into agricultural experts' and employees' general perceptions and attitudes, it falls short of investigating how these views and attitudes directly impact the adoption and implementation of the SDGs. The study's framework has not extensively examined the complex interplay among individual beliefs, cultural contexts, economic incentives, and the practical implementation of sustainable principles. These relationships can potentially provide valuable insights into the obstacles and facilitators of implementing SDGs. Additionally, they can enhance our comprehension of the intricate nature of translating sustainability principles into practical actions. Acknowledging this limitation presents opportunities for future research, with a specific emphasis on the behavioral dimensions of sustainability and the underlying mechanisms that facilitate the translation of attitudes into tangible actions.

Future research should also assess the efficacy of educational interventions and training programs in promoting sustainable agricultural practices. Longitudinal studies may shed light on the long-term influence of education and training on agricultural specialists' adoption of sustainable practices. Furthermore, research should dive further into the hurdles and facilitators to adopting sustainable agricultural methods in Iran, considering the social, economic, and cultural factors that impact decision-making processes.

Furthermore, a significant area for future studies revealed by our research is the disparities in educational requirements and personal qualities of the respondents and how these differences may impact their attitudes and perceptions regarding sustainable activities. While our research provided some early insight into these variations, a more detailed understanding requires further investigation. Future studies should endeavor to scrutinize the precise ramifications of these variations on the fundamental aspects of sustainable agriculture. This may encompass examining the variability in attitudes and perceptions across various demographic groups, providing insights into how personal differences can impact the broader adoption and implementation of the SDGs within agriculture.

Overall, this research adds to our knowledge of agricultural specialists' perceptions, attitudes, and educational requirements about the SDGs. Addressing these demands may help governments and organizations build a more sustainable and resilient agricultural sector, contributing to the larger aims of sustainable development. Finally, Iran's agricultural sector faces many challenges, including water shortages, soil degradation, the effects of climate change, and the need for higher productivity to satisfy the expanding needs of a fast-growing population. Achieving the SDGs in Iran's agricultural context requires a paradigm change toward sustainable methods that provide food security, safeguard natural resources, and improve rural lives.

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References

- Papadopoulou, C.-I.; Loizou, E.; Melfou, K.; Chatzitheodoridis, F. The Knowledge Based Agricultural Bioeconomy: A Bibliometric Network Analysis. *Energies* **2021**, *14*, 6823. [CrossRef]
- Hajian, M.; Jangchi Kashani, S. Evolution of the Concept of Sustainability. From Brundtland Report to Sustainable Development Goals. In *Sustainable Resource Management*; Elsevier: Amsterdam, The Netherlands, 2021; pp. 1–24.
- Bain, P.G.; Kroonenberg, P.M.; Johansson, L.-O.; Milfont, T.L.; Crimston, C.R.; Kurz, T.; Bushina, E.; Calligaro, C.; Demarque, C.; Guan, Y.; et al. Public Views of the Sustainable Development Goals across Countries. *Nat. Sustain.* **2019**, *2*, 819–825. [CrossRef]
- United Nations Transforming Our World: The 2030 Agenda for Sustainable Development. Available online: <https://sdgs.un.org/2030agenda> (accessed on 24 October 2021).
- Allen, C.; Metternicht, G.; Wiedmann, T. Prioritising SDG Targets: Assessing Baselines, Gaps and Interlinkages. *Sustain. Sci.* **2019**, *14*, 421–438. [CrossRef]
- Fukuda-Parr, S.; Bruckner, M.; Hegstad, T.; Kuehner, M.; Tavares, M. *Voluntary National Review Reports—What Do They Report?* CDP Background Paper No. 46, ST/ESA/2018/CDP/46; United Nations: New York, NY, USA, 2018.
- FAO. *Building a Common Vision for Sustainable Food and Agriculture—Principles and Approaches*; FAO: Rome, Italy, 2014.
- Van Huylenbroeck, G.; Vandermeulen, V.; Mettepenningen, E.; Verspecht, A. Multifunctionality of Agriculture: A Review of Definitions, Evidence and Instruments. *Living Rev. Landsc. Res.* **2007**, *1*, 3. [CrossRef]
- El Bilali, H.; Strassner, C.; Ben Hassen, T. Sustainable Agri-Food Systems: Environment, Economy, Society, and Policy. *Sustainability* **2021**, *13*, 6260. [CrossRef]
- IPCC AR5 Synthesis Report: Climate Change 2014. Available online: <https://www.ipcc.ch/report/ar5/syr/> (accessed on 10 June 2023).
- Shahzad, U.; Fareed, Z.; Shahzad, F.; Shahzad, K. Investigating the Nexus between Economic Complexity, Energy Consumption and Ecological Footprint for the United States: New Insights from Quantile Methods. *J. Clean. Prod.* **2021**, *279*, 123806. [CrossRef]
- Sharma, G.D.; Shah, M.I.; Shahzad, U.; Jain, M.; Chopra, R. Exploring the Nexus between Agriculture and Greenhouse Gas Emissions in BIMSTEC Region: The Role of Renewable Energy and Human Capital as Moderators. *J. Environ. Manag.* **2021**, *297*, 113316. [CrossRef]
- Schreefel, L.; Schulte, R.P.O.; de Boer, I.J.M.; Schrijver, A.P.; van Zanten, H.H.E. Regenerative Agriculture—The Soil Is the Base. *Glob. Food Sec.* **2020**, *26*, 100404. [CrossRef]
- van Bussel, L.M.; Kuijsten, A.; Mars, M.; van 't Veer, P. Consumers' Perceptions on Food-Related Sustainability: A Systematic Review. *J. Clean. Prod.* **2022**, *341*, 130904. [CrossRef]
- FAO The State of Food and Agriculture: Climate Change, Agriculture and Food Security. Available online: <https://www.fao.org/publications/sofa/2016/en/> (accessed on 17 November 2021).
- Shahmohammadloo, R.S.; Febria, C.M.; Fraser, E.D.G.; Sibley, P.K. The Sustainable Agriculture Imperative: A Perspective on the Need for an Agrosystem Approach to Meet the United Nations Sustainable Development Goals by 2030. *Integr. Environ. Assess Manag* **2022**, *18*, 1199–1205. [CrossRef]
- Starik, M.; Rands, G.P. Weaving an Integrated Web: Multilevel and Multisystem Perspectives of Ecologically Sustainable Organizations. *Acad. Manag. Rev.* **1995**, *20*, 908. [CrossRef]
- Leiserowitz, A.A.; Kates, R.W.; Parris, T.M. Sustainability Values, Attitudes, and Behaviors: A Review of Multinational and Global Trends. *Annu. Rev. Environ. Resour.* **2006**, *31*, 413–444. [CrossRef]
- Lamm, E.; Tosti-Kharas, J.; King, C.E. Empowering Employee Sustainability: Perceived Organizational Support toward the Environment. *J. Bus. Ethics* **2015**, *128*, 207–220. [CrossRef]
- Hilgard, E.; Atkinson, R.C.; Atkinson, R.L. *Introduction to Psychology*, 15th ed.; Wadsworth Pub. Co.: Belmont, CA, USA, 2009.
- Oppenheim, A.N. *Designing Attitude Statements & Attitude Scaling*; Pinter Publishers: London, UK, 1992.
- Milfont, T.L.; Duckitt, J. The Environmental Attitudes Inventory: A Valid and Reliable Measure to Assess the Structure of Environmental Attitudes. *J. Environ. Psychol.* **2010**, *30*, 80–94. [CrossRef]
- Ajzen, I. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process* **1991**, *50*, 179–211. [CrossRef]
- Nejadrezaei, N.; Allahyari, M.S.; Sadeghzadeh, M.; Michailidis, A.; El Bilali, H. Factors Affecting Adoption of Pressurized Irrigation Technology among Olive Farmers in Northern Iran. *Appl. Water Sci.* **2018**, *8*, 190–198. [CrossRef]
- Firouzi, S.; Nikkhah, A.; Aminpanah, H. Resource Use Efficiency of Rice Production upon Single Cropping and Ratooning Agro-Systems in Terms of Bioethanol Feedstock Production. *Energy* **2018**, *150*, 694–701. [CrossRef]

26. Allahyari, M.; Ghavami, S.; Daghighi Masuleh, Z.; Michailidis, A.; Nastis, S. Understanding Farmers' Perceptions and Adaptations to Precipitation and Temperature Variability: Evidence from Northern Iran. *Climate* **2016**, *4*, 58. [[CrossRef](#)]
27. Sadeghzadeh, M.; Alahyari, M.S.; Ansari, M.H.; Nejadrezaei, N. Analysis of Paddy Fields Sustainability in Rasht Township Using Sustainable Livelihood Approach. *J. Agric. Econ. Res.* **2015**, *6*, 55–69.
28. Allahyari, M.S.; Mohammadzadeh, M.; Nastis, S.A. Agricultural Experts' Attitude towards Precision Agriculture: Evidence from Guilan Agricultural Organization, Northern Iran. *Inf. Process. Agric.* **2016**, *3*, 183–189. [[CrossRef](#)]
29. Dlamini, S.; Block, E.K.; Mathibela, N. Knowledge of and Attitudes towards Sustainable Development Goals among Adults in South Africa. *S. Afr. Geogr. J.* **2023**, *105*, 384–401. [[CrossRef](#)]
30. Riccioli, F.; Espinosa Diaz, S.; Di Iacovo, F.; Moruzzo, R. Exploring the Effect of Perceived Transaction Costs on Farmers' Attitudes toward Participation in Agri-Environment-Climate Measures (AECMs). *Soc. Sci.* **2023**, *12*, 136. [[CrossRef](#)]
31. Omisore, A.G.; Babarinde, G.M.; Bakare, D.P.; Asekun-Olarinmoye, E.O. Awareness and Knowledge of the Sustainable Development Goals in a University Community in Southwestern Nigeria. *Ethiop. J. Health Sci.* **2017**, *27*, 669. [[CrossRef](#)] [[PubMed](#)]
32. Khairul Bashar, M. Attitude and Awareness of University Teachers towards Implementing Sustainable Development Goals in Public Universities in Malaysia. Master's Thesis, Tallinn University of Technology, Tallinn, Estonia, 2021.
33. Balakrishnan, B.; Tochinai, F.; Kanemitsu, H. Perceptions and Attitudes towards Sustainable Development among Malaysian Undergraduates. *Int. J. High. Educ.* **2019**, *9*, 44. [[CrossRef](#)]
34. Veisi, H.; Ghorbani, S.; Askarifard, S.; Liaghati, H.; Falsafi, P. Assessing the Status of Literacy of Sustainable Agriculture among Agricultural Experts: A Case Study of Tehran and Alborz Provinces. *Environ. Educ. Sustain. Dev.* **2017**, *5*, 23–37.
35. Shiri, N.; Hashemi, S.M.K.; Asadi, A.; Motamedinia, Z. Agricultural Researchers' Attitudes toward Sustainable Agriculture and Its Determinants in ILAM Province, Iran. *Int. J. Agric. Sci. Res.* **2012**, *3*, 17–30.
36. Bartlett, J.E.; Kotrlik, J.W.; Higgins, C.C. Organizational Research: Determining Appropriate Sample Size in Survey Research. *Inf. Technol. Learn. Perform. J.* **2001**, *19*, 43–50.
37. Borich, G.D. A Needs Assessment Model for Conducting Follow-Up Studies. *J. Teach. Educ.* **1980**, *31*, 39–42. [[CrossRef](#)]
38. Ahmadvand, M.; Ahmadi Kish, A. Need Assessment of Rainbow Trout Fish Farmers of Boyer-Ahmad County. *J. Agric. Educ. Adm. Res.* **2016**, *8*, 119–130.
39. Checkland, P. *Systems Thinking, Systems Practice*; Wiley: Chichester, UK, 1981.
40. Jagustović, R.; Zougmore, R.B.; Kessler, A.; Ritsema, C.J.; Keesstra, S.; Reynolds, M. Contribution of Systems Thinking and Complex Adaptive System Attributes to Sustainable Food Production: Example from a Climate-Smart Village. *Agric. Syst.* **2019**, *171*, 65–75. [[CrossRef](#)]
41. UNEP; FAO. *UNDP Rethinking Our Food Systems: A Guide for Multi-Stakeholder Collaboration*; UNEP: Nairobi, Kenya; FAO: Rome, Italy; New York, NY, USA, 2023.

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