

Integration Of Safety, Health, Environment and Quality (SHEQ) Management System in Agri-Business Projects in Lusaka

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Abstract

This study aimed to investigate the integration of Safety, Health, Environment, and Quality (SHEQ) management systems within agribusiness projects in Lusaka, Zambia, with a focus on overcoming challenges that hinder effective implementation. Despite the well-documented benefits of SHEQ systems, various obstacles still pose risks to their successful adoption, which may have negative implications for food security, environmental sustainability, and public health. The study was grounded in two key theories: Systems Theory and the Triple Bottom Line Theory, which provided a framework for understanding the interconnectedness of SHEQ practices and their impact on social, environmental, and economic outcomes. A mixed-methods approach with a sequential exploratory research design was employed. Primary data was gathered through closed-ended questionnaires and semi-structured interview guides. Descriptive statistics were used to analyze the quantitative data, revealing a significant positive correlation between critical success factors (CSFs) and the successful integration of SHEQ management systems in agribusiness projects. Key factors identified through the quantitative data included top management commitment (1.81% of responses), training and awareness programs on SHEQ practices (7.2%), clear communication channels (9.5%), regular monitoring and evaluation (7.7%), and interdepartmental cooperation and collaboration (5.4%). These factors positively influenced the effectiveness of SHEQ integration. Qualitative data further highlighted leadership commitment, organizational culture, employee engagement, training, communication, and resource allocation as crucial elements for successful SHEQ implementation in agribusiness. Based on these findings, the study recommends that agribusiness management should integrate SHEQ goals into their strategic objectives, enhance communication strategies, and ensure adequate resources are allocated to SHEQ initiatives. The study contributes to the growing body of knowledge by identifying critical success factors necessary for integrating SHEQ management systems, offering valuable insights for improving sustainability and operational efficiency in agribusiness projects.

Keywords: Safety, Health, Environment, Quality Management system, Agri-business projects

1. Background of the study

Agribusiness plays a critical role in economic growth, food security, and employment globally and across Africa, with Zambia being no exception. In Africa, agribusiness contributes approximately 35% to the continent's GDP and supports over 50% of livelihoods, while in Zambia agriculture accounts for about 19% of GDP and employs the majority of the population, underscoring its socio-economic significance (Moyo, 2016; Krishnan & Peterburs, 2017). Despite this importance, the sector continues to face challenges related to food safety, occupational health, environmental protection, and product quality, which threaten sustainability and market competitiveness. The integration of Safety, Health, Environment, and Quality (SHEQ) management systems has emerged as a critical strategy for enhancing sustainable agribusiness operations (Nifa, 2023).

Globally, agribusiness is governed by increasingly stringent legal and regulatory frameworks, supported by international standards such as ISO 9001, ISO 14001, and ISO 45001, which have been shown to improve operational efficiency, reduce environmental impacts, and enhance product quality (Rondinelli & Berry, 2000; Biswas, 2020). Governments and international institutions, including the World Bank, play a central role in shaping conducive policy and legal environments that promote food security, employment creation, and agricultural competitiveness (Kelly et al., 2003; Alford & Phillips, 2018).

However, the adoption and integration of SHEQ management systems in African agribusiness projects remain limited. Studies indicate that challenges such as inadequate awareness, limited technical and financial capacity, weak regulatory enforcement, and resistance to change particularly among smallholder farmers continue to hinder effective implementation (Mengistu, 2018; Tomo, 2022; Farouk et al., 2024). These constraints expose agribusiness operations to risks including food contamination, environmental degradation, and occupational accidents, with negative implications for food security and public health.

In Zambia, the integration of SHEQ management systems is supported by national legislative frameworks such as the Agricultural Act (Cap 22:01) and the Environmental Management Act of 2011, which regulate agricultural practices, environmental protection, and sustainable resource use (AllAfrica, 2015; Mambwe et al., 2019). While SHEQ principles have been more extensively examined in sectors such as construction where studies highlight their positive impact on safety, cost management, quality, and environmental performance their application within agribusiness remains under-researched (Mambwe et al., 2019; Mambwe et al., 2021). Existing global and regional studies, including those by the International Labour Organization and other scholars, emphasize the importance of integrated SHEQ systems in improving occupational safety, environmental sustainability, and quality assurance in agriculture (Giovannucci et al., 2001; ILO, 2016; Asah-Kissiedu et al., 2023; Hamid et al., 2024). Nevertheless, empirical evidence on the extent, effectiveness, and contextual suitability of SHEQ integration in Zambian agribusiness projects remains limited. This gap highlights the need for focused research to inform policy, strengthen institutional capacity, and develop practical SHEQ frameworks that support sustainable agribusiness development, food security, and economic resilience in Zambia. This Research aims to address the gap by offering insights into factors influencing awareness and understanding of SHEQ management systems in different regions, identifying reasons for resistance to change in agribusiness projects, and providing evidence-based strategies to successfully integrate and sustain SHEQ management systems in agricultural operations.

2. Methodology

In this study, a mixed-methods approach was employed, mixed methods, as defined by Rahman (2016), involve integrating both qualitative and quantitative methodologies within a single study to comprehensively address research problems. The mixed methods approach utilized in this study aimed to gather and analyze data, incorporating both statistical data and detailed narrative explanations. A sequential exploratory research design was chosen to thoroughly investigate the relationship between Critical Success Factors and the Safety, Health, Environment, and Quality (SHEQ) Management system both quantitatively and qualitatively. The study used a descriptive survey research approach.

2.1 Target Population and Sample size

The target population included employees in Agric business in Lusaka from Zambia Seed Company (ZAMSEED). This company was chosen using purposive sampling as it is one of the top 7 seven agribusinesses in Lusaka Zambia. The use of purposive sampling allowed for the selection of participants based on their relevance to the research topic, ensuring that the study obtained valuable insights from individuals with direct experience and knowledge on SHEQ management system. Although the method relies on the researcher's judgment, efforts were made to approach the selection process in a systematic and unbiased manner. According to the Zambia Seed Company report (2022), the company approximately has 500 employees. Therefore, the study utilized a population of 500 employees from Zambia seed companies in Lusaka. Employees from the agribusiness of Zambia seed company were selected as strategic informants due to their expertise and direct involvement in matters related SHEQ management system in dealing with agribusinesses.

Sample Size Calculation:

The sample size was determined using the Rao soft Calculator given by;

$$n = \frac{N}{1} + N(e)^2,$$

Where n is the sample size, N is the population, and e is the margin of error (0.05).

$$n = \frac{500}{1 + 500(0.05)^2}$$

$$n = 222$$

For this research, a sample of 10 qualitative interviews was done while closed ended questionnaires of 222 were

administered to employees in Zambia seed agri-business in Lusaka, Zambia.

2.2 Data Collection Methods

The study used a combination of secondary and primary data sources. Secondary data were gathered from a variety of accessible and reliable sources, such as libraries, archived records from the agricultural industry's SHEQ (Safety, Health, Environment, and Quality) management system, government publications, online databases, textbooks and newspapers. These sites supplied a lot of thoroughly researched material that was both easily accessible and understandable. For primary data collection, the study used two different methodologies. The first step entailed distributing a closed-ended questionnaire to gather quantitative data. The second way was using an interview guide to obtain qualitative feedback from personnel working in the farm industry's SHEQ management system.

2.3 Data Analysis

This study employed a mixed-methods approach, integrating both quantitative and qualitative data analysis techniques. The process began with the collection and examination of qualitative data, followed by the acquisition and analysis of quantitative data. Finally, the results from both analyses were integrated to provide a holistic view of the research topic. In the quantitative segment, inferential statistics were used, including measures of central tendency and frequency tables. The analysis also employed correlation and regression techniques to explore relationships between variables and determine the impact of independent variables on the dependent variable.

Qualitative data obtained from in-depth interviews was thematically organized, similar themes identified based on objectives and information addressing that particular theme collected from data collection tools and field notes. Key themes were identified by reviewing field notes and interview transcripts. This process of theme analysis produced rich insights, which informed the design of the quantitative phase, defining data gathering techniques and sample tactics. Thematic analysis is a technique for identifying, analyzing, and reporting patterns (themes) in qualitative data. To help with this process, Microsoft Excel was used to code and organize the qualitative data, providing a structured strategy for identifying and interpreting major themes connected to critical success elements in Safety, Health, Environment, and Quality. By integrating the qualitative findings with the quantitative analysis, the researcher achieved a balanced approach that combined statistical rigor with qualitative depth. This comprehensive methodology yielded a more nuanced and thorough understanding of the subject matter.

2.4 Ethical Considerations

Throughout the whole study procedure, ethical concerns were paramount, especially with regard to any interruptions to the natural habitats and activities of the participants. Secrecy was preserved by processing all gathered data with utmost confidentiality and removing participant names from interview guides in accordance with stringent ethical guidelines. The study adhered to the Academy of Management Code of Ethical Conduct, putting participants' freedom, privacy, dignity, and well-being first. It was carried out only for academic and decision-making objectives. Informed permission, the ability to withdraw at any time, and voluntary involvement were all considered ethical practices. Furthermore, the study protected confidentiality, honesty, and integrity; it also got participants' permission; it explained how data is used in academia; it guaranteed participant anonymity; and it properly credited sources. Additionally, during the research procedure, the University of Lusaka's regulations and ethical standards regulating research were scrupulously followed.

3 Study Findings

3.1 Demographic Results

Gender

Figure 1 indicates Gender; the total number of respondents were 222. The gender distribution from figure 1 below shows 144 were males with 65% and 78 (35%) females.

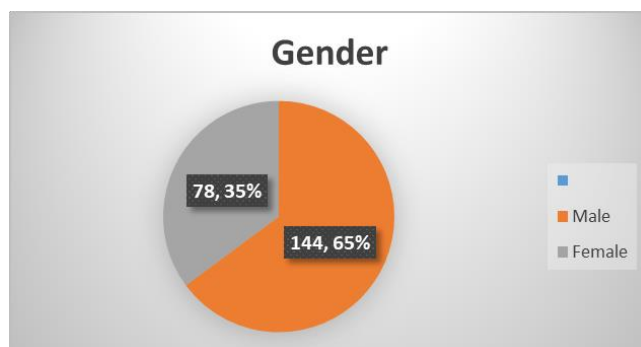


Figure 1: Gender Distribution Response Rate

Number of Years in The Farming Business

Figure 2 below regarding the number of years in the farming business shows that the majority of participants of 3-5 years of experience were 108 respondents, seconding with 6-10 years of experience 83 respondents, then respondents with more than 10 years of experience 16 and lastly less than 2 years 15.x

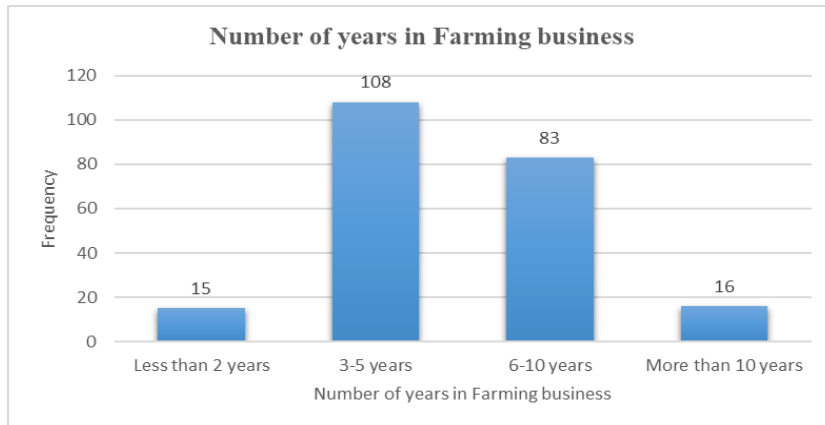


Figure 2: Number of Years in Farming Response Rate

Education Level

The data from figure 3 below shows the educational levels attainment among the respondents. Secondary education (5%), Certificates (42%) and Diplomas (42%) while those with Degrees (10%) Masters holders (1%).

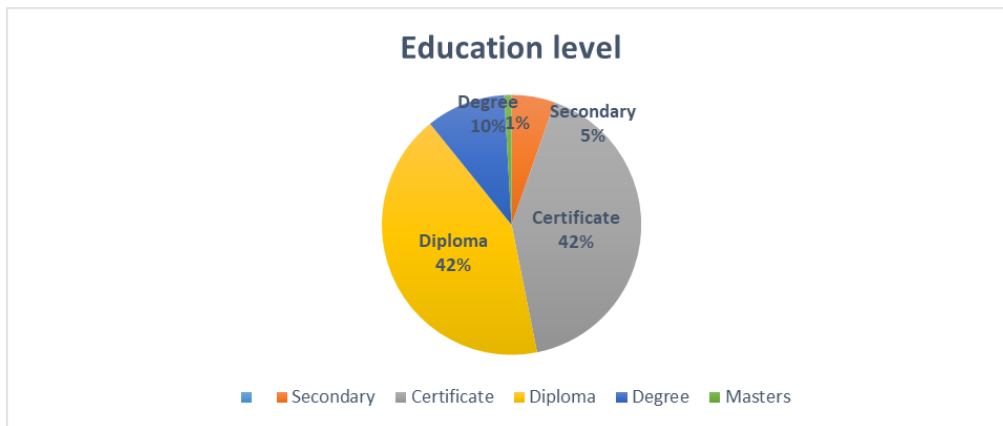


Figure 3: Education Level Attainment Response Rate

Job Occupation

The job occupation in figure 4 below shows respondent from the Finance department were 63 (28.4%), followed by Operation at 49 (22.1%), Human Resource 40 (18%), Marketing 38 (17.1%), Quality Assurance 19 (8.5%) and Production 13 (5.9).



Figure 4: Job Occupation Response Rate at Zamseed

3.2 Successful Integration (SHEQ) System

Table 1 shows respondents' knowledge with the successful implementation of the Safety, Health, Environment, and Quality (SHEQ) Management system in Agri-Business Projects in Lusaka, Zambia. According to the first statement, 54.4%

of respondents (n=123) agreed that integrating safety practices creates a safe working environment in our agribusiness operations. The second statement, "Health procedures applied in our agri-business contribute to the general well-being of employees and stakeholders", the majority agreed (51.8%, n=115). The majority of respondents (47.7%, n=106) agreed that environmental management practices help minimize the ecological footprint of our agri-business activities, as indicated by a mean score of 4. Moving to the fourth item the mean score of 4 reflects agreement that quality assurance measures ensure that our agri-products meet or exceed industry standards. 53.6%, n=119 respondents agreed to the statement. in the fifth item, the integrated SHEQ management system enhances overall efficiency and productivity in our agri-business projects shows (50%, n=111) respondents agreed and (38.3%, n=85) respondents strongly agreed to the statement.

Table 1: Successful Integration (SHEQ) System

Valid		Frequency	Percent	Valid Percent	Cumulative Percent
1	The integration of safety practices ensures a secure working environment in our agri-business operations	21	9.5	9.5	9.5
		123	55.4	55.4	64.9
		78	35.1	35.1	100
2	Health protocols implemented in our agri-business contribute to the overall well-being of employees and stakeholders	21	9.5	9.5	9.5
		115	51.8	51.8	61.3
		86	38.7	38.7	100
3	Environmental management practices help minimize the ecological footprint of our agri-business activities.	22	9.9	9.9	9.9
		106	47.7	47.7	57.7
		94	42.3	42.3	100
4	Quality assurance measures ensure that our agri-products meet or exceed industry standards	19	8.6	8.6	8.6
		119	53.6	53.6	62.2
		84	37.8	37.8	100
5	The integrated SHEQ management system enhances overall efficiency and productivity in our agri-business projects	26	11.7	11.7	11.7
		111	50	50	61.7
		85	38.3	38.3	100
	Total	222	100	100	

3.3 Critical Success Factors (CSF) of Integrating SHEQ Management System in Agri-Business

Table 2 offers valuable insights into respondents' perceptions of critical success factors (CSF) of integrating SHEQ management system in Agri-business. For the first item, "The commitment of top management is crucial for the successful integration of SHEQ management systems in agri-business projects," the mean score of 4.4 indicates that on average respondents believe commitment of top management is crucial for the successful integration of SHEQ management systems in agri-business projects. The mode of 4 suggests that a significant number of respondents agreed with this statement. In the second item, "Adequate training and awareness programs regarding safety, health, environment, and quality practices significantly contribute to the effectiveness of SHEQ integration in agri-business," the mean score of 4.32 suggests that respondents generally agreed to that the commitment of top management is crucial for the successful integration of SHEQ management systems in agri-business projects. The mode of 5 supports this statement. The third item, "Clear communication channels within the organization enhance the implementation of SHEQ management systems in agri-business projects," had a mean score of 4.32 and a mode of 4, indicating the majority of respondents (109, 49.1%) agreed. The fourth item, "Regular monitoring and evaluation of SHEQ performance indicators are essential for identifying areas of improvement in agri-business operations," the mean score of 4.32 reflects agreement that regular monitoring and evaluation of SHEQ performance indicators are essential for identifying areas of improvement in agri-business operations. A mode of 4 shows widespread agreement among responders. Finally, the fifth item, "Collaboration and cooperation among different departments are key factors in successfully integrating SHEQ management systems in agri-business projects," has a mean score of 4. 31 indicating agreement, while the mode of 4 indicates agreement among a significant portion of respondents.

Table 2: Critical Success Factors of Integrating SHEQ Management System in Agric-Business

Valid		Mean	Mode	Frequency	Percent	Valid Percent	Cumulative Percent
1	The commitment of top management is crucial for the successful integration of SHEQ management systems in agri-business projects	4.4	4	18	8.1	8.1	8.1
				106	47.7	47.7	55.9
				98	44.1	44.1	100
2	Adequate training and awareness programs regarding safety, health, environment, and quality practices significantly contribute to the effectiveness of SHEQ integration in agri-business.	4.32	5	16	7.2	7.2	7.2
				102	45.9	45.9	53.2
				104	46.8	46.8	100
3	Clear communication channels within the organization enhance the implementation of SHEQ management systems in agri-business projects.	4.35	4	21	9.5	9.5	9.5
				109	49.1	49.1	58.6
				92	41.4	41.4	100

4	Regular monitoring and evaluation of SHEQ performance indicators are essential for identifying areas of improvement in agri-business operations	4.3	4	17 111 94	7.7 50 42.3	7.7 50 42.3	7.7 57.7 100
				222	100	100	
5	Collaboration and cooperation among different departments are key factors in successfully integrating SHEQ management systems in agri-business projects	4.31	4	12 130 80	5.4 58.6 36	5.4 58.6 36	5.4 64 100
	Total			222	100	100	

3.4 The CSFs in the integrating SHEQ management system in Agri-business

Table 3 below reveals significant insights into the relationship between various factors and the effectiveness of Safety, Health, Environment, and Quality (SHEQ) integration in agri-business projects. The first statement “There is a noticeable relationship between top management commitment and the effectiveness of SHEQ integration in agri-business.” is strong, with a mean score of 4.39 and a mode of 4, indicating that most respondents highly agree with this statement. The standard deviation of 0.604 suggests relatively low variability in responses. Specifically, 45% of respondents rated this factor at the highest level, demonstrating its critical role in successful SHEQ integration. The second statement “Adequate training and awareness programs positively correlate with the successful implementation of SHEQ management systems in agri-business projects,” reflected in a mean score of 4.4 and a mode of 4. The standard deviation is 0.543, indicating slightly less variability than the previous factor. The cumulative percent distribution shows that 42.3% of respondents believe in the significant positive effect of training and awareness programs, emphasizing their necessity in SHEQ management. Third statement “Clear communication channels within the organization are associated with better integration of SHEQ management systems in agri-business operations.” as evidenced by a mean score of 4.41 and a mode of 4 and a standard deviation of 0.562, the responses show low variability. The percent distribution highlights that 45% of respondents see clear communication as crucial, with cumulative percentages indicating a consensus on its importance. The fourth statement “Regular monitoring and evaluation of SHEQ performance indicators significantly influence SHEQ integration success.” This factor has a mean score of 4.41 and a mode of 5, indicating that many respondents strongly agree with this statement. The higher standard deviation of 0.657 suggests more variability in responses. Notably, 50% of respondents rate this factor at the highest level, showing that continuous assessment is vital for SHEQ effectiveness. The fifth statement “Collaboration and cooperation among different departments exhibit a strong correlation with effective SHEQ integration,” with a mean score of 4.38 and a mode of 5 showing many respondents agreed to this statement. The standard deviation is 0.653, indicating some variability in responses. The percent distribution shows that 47.3% of respondents rate this factor at the highest level, underscoring the importance of interdepartmental collaboration for successful SHEQ management

Table 3: CSF in the Integrating SHEQ Management System in Agric-Business

Valid		Mean	Mode	Standard Deviation	Percent	Valid Percent	Cumulative Percent
1	There is a noticeable relationship between top management commitment and the effectiveness of SHEQ integration in agri-business.	4.39	4	0.604	6.3 48.6 45	6.3 48.6 45	6.3 55 100
2	Adequate training and awareness programs positively correlate with the successful implementation of SHEQ management systems in agri-business projects.	4.4	4	0.543	2.7 55 42.3	2.7 55 42.3	2.7 57.7 100
3	Clear communication channels within the organization are associated with better integration of SHEQ management systems in agri-business operations.	4.41	4	0.562	3.6 51.4 45	3.6 51.4 45	3.6 55 100
4	Regular monitoring and evaluation of SHEQ performance indicators significantly influence the success of SHEQ integration in agri-business	4.41	5	0.657	9.5 40.5 50	9.5 40.5 50	9.5 50 100
5	Collaboration and cooperation among different departments have a strong correlation with the effectiveness of SHEQ integration in agri-business projects	4.38	5	0.653	9.5 43.2 47.3 100	9.5 43.2 47.3 100	9.5 52.7 100

3.5 Integrated SHEQ Management Framework suitable for Agri-business

Table 4 offers valuable insights into the perceived importance of various components necessary for an integrated SHEQ (Safety, Health, Environment, and Quality) management framework in agri-business projects. The first statement “An integrated SHEQ management framework is necessary to address safety, health, environment, and quality concerns in agri-business projects comprehensively.” The necessity of an integrated SHEQ management framework is highly

recognized, with a mean score of 4.43 and a mode of 5, indicating strong agreement among respondents. The standard deviation of 0.661 suggests some variability in responses. The percent and cumulative percent values show a progression, with 51.4% of respondents rating this factor at the highest level, demonstrating a consensus that a comprehensive framework is crucial for addressing SHEQ concerns in agri-business. The second statement “The development of standardized procedures and protocols is deemed essential for the successful implementation of an integrated SHEQ management framework,” as evidenced by a mean score of 4.26 and a mode of 4 with a standard deviation of 0.618 indicates that respondents agreed to this statement. A significant 35.1% of respondents rated this factor at the highest level, with cumulative percent reaching 100%, highlighting the importance of standardization in SHEQ management. The third statement “Flexibility and adaptability are seen as crucial aspects of an integrated SHEQ management framework to accommodate diverse agri-business needs,” with a mean score of 4.29 and a mode of 4. The standard deviation of 0.631 shows the majority of respondents agreed with this statement. Continuous improvement processes are viewed as critical to the SHEQ management framework's long-term performance and relevance. This resulted in a mean score of 4.32 and a mode of 4, with a standard deviation of 0.647, indicating moderate reactions. The cumulative percent values reveal that 57.7% of respondents agree with the statement: "Continuous improvement mechanisms should be built into the integrated SHEQ management framework to ensure its effectiveness and relevance over time in agri-business projects." The fifth statement “Stakeholder involvement and feedback are vital for refining and optimizing the integrated SHEQ management framework to suit the specific requirements of agri-business projects.” This factor has a mean score of 4.29 and a mode of 4, with a standard deviation of 0.616, with 53.7% of respondents agreeing to the statement.

Table 4: Integrated SHEQ Management Framework Suitable for Agri-business

Valid		Mean	Mode	Standard Deviation	Percent	Valid Percent	Cumulative Percent
	An integrated SHEQ management framework is necessary to address safety, health, environment, and quality concerns in agri-business projects comprehensively.	4.43	5	0.661	0.5 6.8 41.4	0.5 6.8 41.4	0.5 7.2 48.6
	The development of standardized procedures and protocols is essential for the successful implementation of an integrated SHEQ management framework in agri-business.	4.26	4	0.618	51.4 9.5 55.4 35.1	51.4 9.5 55.4 35.1	100 9.5 64.9 100
	Flexibility and adaptability are crucial aspects of an integrated SHEQ management framework to accommodate the diverse needs of agri-business operations.	4.29	4	0.631	9.5 51.8 38.7	9.5 51.8 38.7	9.5 61.3 100
	Continuous improvement mechanisms should be built into the integrated SHEQ management framework to ensure its effectiveness and relevance over time in agri-business projects.	4.32	4	0.647	9.9 47.7 42.3	9.9 47.7 42.3	9.9 57.7 100
	Stakeholder involvement and feedback are vital for refining and optimizing the integrated SHEQ management framework to suit the specific requirements of agri-business projects.	4.29	4	0.616	8.6 53.6 37.8	8.6 53.6 37.8	8.6 62.2 100
					100	100	

3.6 Coefficients Regression Analysis

The regression analysis results for the study on the effective integration of the SHEQ management system in Agri-Business Projects in Lusaka, Zambia, provide a complete understanding of the impact of control and independent variables on dependent variables. In model 1, just control variables were used. Gender has a substantial positive effect on the effective integration of the SHEQ system with a beta value of 0.151 ($p < 0.05$), whereas number of years in farming industry has a negligible effect with a beta coefficient of -0.005 ($p < 0.05$). Model 2's independent variable, Critical Success Factors (CSFs), has a strong positive influence on the successful integration of the SHEQ system, with a beta value of 0.694 ($p < 0.001$). Model 3 included CSF in the Integrating SHEQ Management System, resulting in a positive beta coefficient of 0.458 ($p < 0.001$). Critical Success Factors (CSFs) remain significant at 0.431 ($p < 0.001$), highlighting their importance for SHEQ system success. The final model 4 includes the Integrated SHEQ Management Framework, which has a significant beneficial influence on the successful integration of the SHEQ system (beta = 0.866, $p < 0.001$). The Critical Success Factors (CSFs) remain significant at 0.145 ($p < 0.001$), however the CSF Integrating SHEQ Management System has a non-significant beta coefficient of -0.051 ($p < 0.085$).

Table 5: Coefficient Regression Analysis

		Coefficients ^a						Collinearity Statistics	
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF	
		B	Std. Error	Beta					
1	(Constant)	4.096	.162		25.302	<.001			
	Gender	.151	.073	.138	2.060	.041	.997	1.003	
	Number of years in Farming business	-.005	.048	-.007	-.111	.912	.997	1.003	
2	(Constant)	1.262	.222		5.680	<.001			
	Gender	.029	.052	.027	.562	.574	.973	1.028	
	Number of years in Farming business	-.012	.034	-.017	-.354	.724	.997	1.003	
3	(Constant)	.332	.235		1.415	.158			
	Gender	.057	.047	.052	1.212	.227	.967	1.034	
	Number of years in Farming business	-.005	.030	-.006	-.148	.882	.996	1.004	
	The_Critical_Success_Factors	.694	.047	.712	14.872	<.001	.976	1.025	
	The_CSF_in_the_Integrating_SHEQ_Management_System	.458	.062	.413	7.449	<.001	.582	1.717	
4	(Constant)	.161	.096		1.681	.094			
	Gender	.026	.019	.024	1.360	.175	.965	1.037	
	Number of years in Farming business	-.023	.012	-.032	-1.841	.067	.994	1.006	
	The_Critical_Success_Factors	.145	.024	.149	6.077	<.001	.495	2.022	
	The_CSF_in_the_Integrating_SHEQ_Management_System	-.051	.029	-.046	-1.732	.085	.423	2.366	
	Integrated_SHEQ_Management_Framework	.866	.026	.893	33.031	<.001	.406	2.464	

a. Dependent Variable: Successful_Integration_of_SHEQ_System

3.7 Identification of Critical Success Factors

Table 6 presents the thematic findings related to the critical success factors for integrating SHEQ management systems in Agri-businesses. The themes, codes, and representative quotes are provided in the table below.

Table 6: Identification of Critical Success Factors

Theme	Code	Representative quote
Leadership Commitment (C1)	R1	Management is very supportive of SHEQ policies. They lead by example and ensure everyone follows the guidelines."
Employee Engagement and Training (C2)	R2	"We have regular training sessions and workshops to ensure everyone is up to date on the latest SHEQ protocols."
Effective Communication (C3)	R3	"Communication is key. We ensure everyone is informed about SHEQ updates through regular meetings and bulletins."
Resource Allocation (C4)	R4	"Without proper resources, it's challenging to implement SHEQ practices effectively."
Organizational Culture (C5)	R5	"Our culture is evolving with an increasing focus on SHEQ, which is promising."

Leadership Commitment and Organizational Culture (C1 and C5)

Leadership commitment and organisational culture emerged as a crucial factor for successful SHEQ integration. Leadership commitment influences organizational culture. Leaders who are dedicated to SHEQ not only set a standard but also influence the broader culture of the organization. As seen from Respondent 1 and 5's statements, committed leadership fosters a culture that inherently values SHEQ principles, leading to a more seamless integration. Leadership commitment can drive cultural change, promoting an environment where SHEQ is prioritized and supported at all levels.

Employee Engagement, Training, and Communication (C2 and C3)

Employee engagement, training, and good communication were emphasized as critical aspects. Employee engagement and training are intimately related to effective communication. Respondent 2 noted that regular training sessions are most beneficial when there is clear and consistent communication, which Respondent 3 also highlighted. Employee engagement through training and good communication guarantees that they are knowledgeable and motivated to follow SHEQ principles. This comprehensive strategy guarantees that staff are not only trained, but also regularly updated and involved in SHEQ activities.

Resource Allocation and SHEQ Implementation (C4)

The allocation of resources directly impacts the implementation of SHEQ systems. Respondent 4's emphasis on the necessity of resources indicates that without adequate support, SHEQ initiatives cannot be effectively realized. Proper resource allocation ensures that the necessary tools and infrastructure are in place to support SHEQ activities. Respondent 8's mention of modern equipment highlights that investing in technology can greatly enhance SHEQ implementation, making processes more efficient and effective.

4 Discussion of findings

4.1 The Critical Success Factors (CSF) of Integrating SHEQ Management System in Agri-Business.

The critical success factors found to be influencing integration of SHEQ management system include commitment of top management with a 1.81% of the responses with a mean score of 4.4, adequate training and awareness of programs regarding safety, health environment, and quality practices with a 7.2% suggesting respondents agreed, and clear communication channels with a 9.5% showing that clear communication channels within the organization enhance the implementation of SHEQ management. These findings are consistent with other studies, such as Asah-Kissiedu's (2019) study on the development of an integrated safety, health, and environmental management capability maturity model, which discovered that strategy, process, people, resources, and information influenced the management system. Similarly, Mambwe et al. (2021) discovered that the key elements that drove integration were compliance and workplace procedures, policy and human resource development, and leadership and structures, with scores ranging from 0.513 to 0.972. Based on the findings, the researcher concluded that these are the elements influencing the integration of SHEQ management systems in agribusiness. This demonstrates the necessity to offer training seminars that raise awareness and contribute to good integration.

4.2 The Significant Correlation of the CSF's in the Integrating SHEQ Management System in Agri-Business

Under this objective the study found relevant information in regards to the relationship between various factors and the effectiveness of Safety, Health, Environment, and Quality (SHEQ) integration in agri-business projects. Starting with top management commitment, the study discovered a strong mean of 4.39 and a mode of 4, suggesting that there is a relationship between top management commitment and the efficacy of SHEQ integration in agribusiness. Additionally, projects with a score of 4.4 and a mode of 4 showed a favourable link between the successful deployment of the SHEQ management systems and sufficient training and awareness activities. Thus, it is suggested that effective SHEQ implementation is enhanced by sufficient training and awareness campaigns. When the participants were asked whether clear communication channels within an organization are associated with better integration of SHEQ management systems in the agri-business operations, 45% of respondents stated that clear communication were important, with cumulative percentages indicating a consensus on its importance. The results of the study also showed that regular monitoring and evaluation of SHEQ performance indicators significantly influences SHEQ integration success with a mean score of 4.41 and a mode of 5. When asked if regular monitoring and evaluation of SHEQ performance indicators significantly influenced the SHEQ integration success, 50% of respondent's agreed that it had highest level of association with the success of SHEQ integration, therefore showing that continuous assessment is vital for SHEQ effectiveness. Finally, when respondents were asked if collaboration and cooperation among different departments have a high link with effective SHEQ integration, the study's findings revealed a mean score of 4.38 and a mode of 5, indicating that 47.3% agreed. This emphasizes the significance of interdepartmental coordination for effective SHEQ management. These findings are consistent with previously completed studies in the broader literature. For example, Santos, D. et al. (2017) discovered that organizations can improve the successful adoption of integrated management systems through cooperation and collaboration, commitment, organizational culture, leadership, and communication. The findings indicate that all factors have a significant impact on the effectiveness of safety, health, environment, and quality (SHEQ) integration in agri-business projects. High mean scores and modes near to 4 and 5 suggest that respondents strongly agree on the significance of these factors.

4.3 Develop an Integrated SHEQ Management Framework Suitable for Agri-business

This objective discussed the suitable framework for the integration of SHEQ Management Framework for Agri-business. The findings offered valuable useful insights on the perceived relevance of several components required for an integrated SHEQ (Safety, Health, Environment, and Quality) management framework in agribusiness projects. Starting with the first element required for an integrated SHEQ "integrated SHEQ management framework," a mean score of 4.43 and a mode

of 5 indicate that an integrated SHEQ management framework is critical for addressing SHEQ concerns in agri-business and improving operations, which leads to a successful SHEQ implementation. This is confirmed by 51.4% of respondents choosing this aspect as the most important, indicating a consensus that a comprehensive framework is critical for resolving SHEQ challenges in agribusiness. Second, defined procedures and protocols were regarded vital for the successful implementation of an integrated SHEQ management framework," with a mean score of 4.26 and a mode of 4. This shows that consistent procedures and protocols are required for the successful deployment of an integrated SHEQ management framework. This emphasizes the need for better standardized procedures and protocols. Third, the study discovered that flexibility and adaptability were important in the integrated SHEQ management framework for meeting varied agri-business needs. The average score for this statement was 4.29, with a median of 4. This demonstrates that the majority of participants believed that flexibility and adaptability are critical components of an integrated SHEQ management framework for meeting different agri-business objectives. This emphasizes the importance of an adaptable and flexible SHEQ management framework in agribusiness to effectively satisfy the industry's diverse and evolving needs. The fourth factor which is "continuous improvement mechanisms" 57.7% of respondents agreed with the statement: "Continuous improvement mechanisms should be built into the integrated SHEQ management framework to ensure its effectiveness and relevance over time in agri-business projects." The average score was 4.31, with a median of 4. Thus, there is a strong consensus among participants that continual improvement processes are critical to the efficacy and applicability of the SHEQ management framework in agri-business ventures. Furthermore, with a response rate of 57.7%, the majority of respondents support the integration of continuous improvement techniques to ensure the framework's efficacy throughout time. Finally, stakeholder involvement had a mean score of 4.29 and a mode of 4, with 53.7% agreeing that stakeholder involvement and feedback are important in refining and optimizing the integrated SHEQ management framework to meet the unique needs of agri-business initiatives. These findings align with the findings of a study conducted by Hashim (2023). In his study, he discovered that stakeholder involvement was crucial to implementation. These findings imply that the creation of an integrated SHEQ management framework for agri-business is important and highly valued.

5 Conclusion and Recommendations

5.1 Conclusion

This study concludes that the successful integration of Safety, Health, Environment, and Quality (SHEQ) management systems is critical to the sustainability, resilience, and competitiveness of agri-business projects in Lusaka, Zambia. The study demonstrates that SHEQ efficacy is substantially influenced by essential success elements, including a solid top management commitment, extensive training and awareness, clear and consistent communication, and strong collaboration across organizational levels. These factors are not independent; rather, they are deeply interrelated and mutually reinforcing, underscoring the need for a holistic and integrated approach to SHEQ management. The findings confirm that agri-business projects operate in complex and dynamic environments that demand a SHEQ framework that is both standard and adaptive. An efficient Integrated SHEQ Management Framework must consequently strike a balance between organized procedures and flexibility, incorporate continuous improvement methods, and actively engage stakeholders in response to changing operational, environmental, and regulatory challenges. Such a framework increases risk management, protects human and environmental well-being, raises product quality, and, ultimately, boosts project performance and sustainability.

5.2 Recommendations

Based on the research findings, the following recommendations are made:

Engage Top Management, Integrate SHEQ Goals into Strategy with Leadership Training.

To successfully integrate Safety, Health, Environment, and Quality (SHEQ) efforts inside a business, top management must be actively engaged and committed. This may be accomplished by incorporating SHEQ goals into the organization's strategic objectives and developing leadership training programs centered on SHEQ awareness.

Enhancing Communication for Effective SHEQ Policy Dissemination

Improving communication techniques is critical to the effective distribution and understanding of SHEQ policies and processes. This entails creating clear, simple, and accessible communication channels customized to various audiences inside the company. Regular updates, training sessions, and feedback systems should be created to keep all staff informed and interested in SHEQ activities. Using numerous platforms, such as the intranet, emails, meetings, and workshops, may help reinforce key concepts and ensure that everyone knows their responsibility in upholding safety, health, environmental, and quality standards. This complete strategy will encourage a culture of continual development and adherence to SHEQ principles.

Aligning SHEQ Framework with Stakeholder Feedback

The study also recommended using stakeholder input for identifying gaps, pushing progress, and ensuring that the SHEQ framework meets the requirements and expectations of all parties involved. By actively interacting with workers, customers, suppliers, and regulatory agencies, the firm may get useful information regarding the success of its present policies and processes.

Adoption of the Proposed SHEQ Sustainability Framework

The study recommended the adoption of a SHEQ sustainability framework to be critical for integrating safety, health, environment, and quality principles across an organization's activities, assuring long-term viability and continual development. This framework entails defining explicit SHEQ policies that are consistent with international standards, as well as developing a governance structure to manage programs and ensure accountability and transparency. Conducting detailed risk assessments, offering ongoing training, and cultivating a safety and quality culture are all critical components. Furthermore, performance monitoring, stakeholder participation, and incorporating SHEQ concepts into the sustainability plan are vital. This systematic strategy improves overall safety, health, environmental performance, and quality results, hence promoting long-term organizational success.

By implementing these recommendations, agri-businesses can enhance the integration and effectiveness of their SHEQ management systems, ultimately leading to safer, healthier, and more environmentally sustainable operations with improved quality outcomes

5.3 Future Research Areas

- **Expand Geographical Scope:** Conduct similar studies in different regions and countries to compare findings and identify region-specific critical success factors (CSFs) for SHEQ integration in agri-business. This will help in developing a more universally applicable framework.
- **Comparative Sector Analysis:** Conduct comparative analyses between the agri-business sector and other industries to identify common and unique challenges and best practices in SHEQ integration. This can offer valuable insights and potential cross-sector learning opportunities.

Declaration of Competing Interests

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The article followed all ethical standards appropriate for this kind of research.

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