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BUSINESS DRIVERS FOR FOOD SAFETY

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FOOD SAFETY AND NUTRITION: FEEDBACK FROM THE FIELD

Technical Learning Note

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Food Enterprise Solutions

Authors
Douglas Taren, PhD[1,2,3]
Yevheniia Varyvoda, PhD[4]

1. Principal Investigator
2. Professor, Department of Health Promotion Sciences, Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, Arizona.
3. Professor, Department of Pediatrics, School of Medicine, University of Colorado, Aurora, Colorado.
4. Research Specialist, Department of Health Promotion Sciences, Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, Arizona

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INTRODUCTION

Food safety is an integral part of growing food businesses, economic development, and public health. Food businesses, government, policy makers, and researchers all have different perspectives on promoters and barriers that affect food safety, and they provide important contributions to ensuring food safety practices occur in low- and middle-income (LMICs). In order to obtain insight on how to develop policies and programs that ensure food safety practices are present in LMICs, we conducted a rapid assessment with selected food safety experts. This assessment focused on finding out what these experts believe are important requirements for having food businesses implement food safety practices.

METHODS

The food safety survey instrument was developed using Qualtrics® software (Appendix A). The questionnaire was designed to take less than 30 minutes to complete and addressed four areas related to food safety and growing food businesses: (1) challenges and constraints for implementing food safety practices, (2) external and internal elements for growing food businesses, (3) recommendations for adopting food safety practices, and (4) the impact that the COVID-19 pandemic will have on food safety. Most questions were multiple choice, and the results are presented as percent of respondents who selected a given answer. Several questions asked respondents to rank a list of challenges and barriers from one to five or one to six, where one represented the greatest challenge. The results for rank order questions are presented as the mean rank value for a given challenge.

We solicited 39 invitations via LinkedIn and 59 via direct emails between May 20, 2021 and June 22, 2021, with a goal of obtaining at least 18 responses in total. We focused on food safety experts who were from Ethiopia, Senegal, and Nepal or who had worked on food safety projects in LMICs. Once a person agreed to participate in our survey, they were sent a personalized link to the Qualtrics® questionnaire.

RESULTS

A total of 18 food safety experts in Africa and Asia participated in the survey (an 18% response rate), providing valuable insight into our four areas of inquiry. Respondents were from United Nation Agencies (4), Government Ministries (3), Academic Research Institutions (8) and Consultants (3). Results presented herein are considered preliminary, as this initial study contains a small subset of food safety experts and also a relatively low response rate – therefore results are not generalizable to be considered as representative of the broader global community of food safety experts. The questionnaire designed for this study will be adapted based on initial findings and will be utilized for subsequent surveys to expand sampling across sectors and geographic locations. BD4FS is rapidly growing our network of in-country food safety experts and business entrepreneurs, and we look forward to their participation in future applications of this and other surveys to produce more robust results. Please contact BD4FS at info@foodsolutions.global if you would like to contribute to our food safety survey.

Respondent Characteristics

Responders to the survey included key informants from academic institutions, multi-lateral organizations, government agencies, and consultants (Appendix A, Section 1). They had a range of experiences and perspectives, from senior-level directors and academics to those providing technical expertise. Roughly half of the survey respondents (56%) reported that they had more than 10 years working in this area. All but one were male, and all but one had graduate degrees. In terms of age, most respondents were older than 40 years of age (68%), with all but one over 30 years of age. These respondents primarily worked in Africa with most focusing on Senegal and Ethiopia; and nearly a third focused their work in Nepal. Most of the respondents had worked with the formal sector exclusively, but many also worked in both the formal and informal sector, while only a few worked solely in the informal sector. As a group, these subject matter experts have extensive experience working in urban, semi-urban, and rural settings with numerous types of food products, including produce, animal-sourced foods, and dairy. Most of these subject matter experts had worked directly with food processors and consumers, but also a third had worked with wholesalers and retail stores.

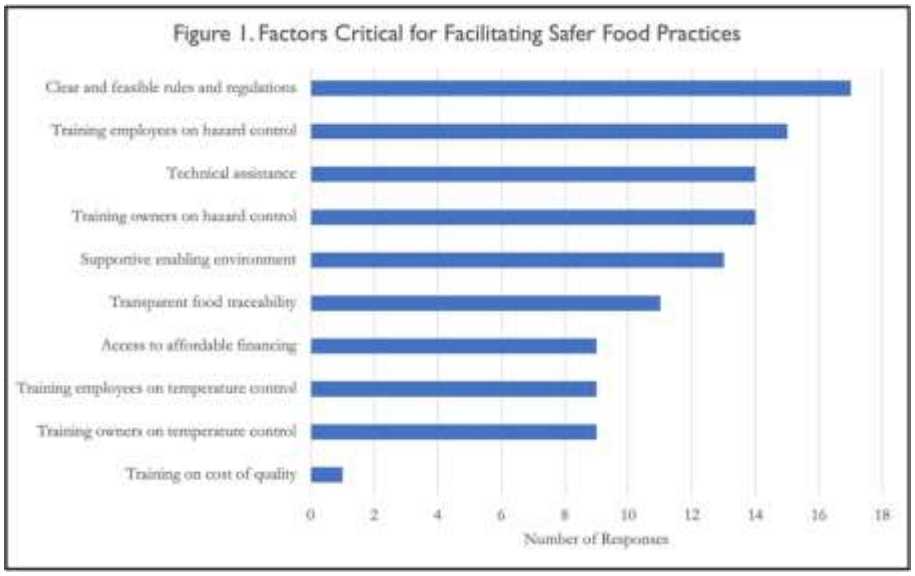
Challenges and Constraints

The challenges and constraints identified by the respondents for improving food safety programs are presented in Appendix A, Section 2 with frequencies and mean values. When asked to rank four types of food safety hazards in terms of importance, biological hazards (e.g., bacteria, viruses) and chemical hazards (e.g., contaminants) were identified as the two most important hazards to address (each having a mean = 1.6 out of 4); while physical hazards were considered less important.

Overall, the sector that these key informants believe needs the greatest improvement for food safety was the government (mean = 1.7). They also identified the private sector (mean = 2.7) and consumers (mean = 2.5) as needing improvement with their input on food safety. Less emphasis was given to making improvements to the education system and media with regards to food safety. The key informants ranked limited budget allocation for government food safety activities as the greatest challenge for improving the food safety system (mean = 2.8 out of 6); followed by inadequate rules, regulations, surveillance, and enforcement (mean = 2.3). Additionally, a low level of food safety awareness was identified as a major challenge. Factors associated with business operations were also considered important, especially as they relate to access to technology, information, and infrastructure with financial issues being less challenging. At the same time, within the food supply system, the greatest challenge for food safety is with food processing and handling (mean = 1.9 out of 5), followed by on-farm production (mean = 2.5), and issues related to food transportation and storage (mean = 2.5); of less concern were the food practices at retail outlets (mean = 3.7) and at consumer households (mean = 4.2); **Table 1**.

Table 1. Greatest challenges to food safety on the supply chain *(1 = greatest challenge, 5 = least challenge)*

Stage on Supply Chain	Mean
Food processing and handling	1.9
On-farm production	2.5
Food transportation and storage (including cold chain logistics)	2.5
Retail	3.8
Consumer household	4.2



Most respondents believed that businesses in the private sector follow standard food safety practices (e.g., HACCP, ISO 2200) *sometimes*; and few believe that businesses *always* or *never* follow these practices. These subject matter experts identified having clear and feasible rules and regulations as the most important factor for facilitating implementation of safer food practices by GFBs (**Figure 1**). Training owners and employees on how to reduce hazards, and to a lesser extent on temperature control, was also important. However, they did believe that providing technical assistance and having a supportive enabling environment by government for business were important critical factors for facilitating safer food practices. Other factors, such as access to affordable financing and transparent food traceability, were less critical but still identified as being important by some of the respondents.

External and Internal Elements for Growing Food Businesses

The key informants were asked about barriers to the implementation of food safety practices by GFBs and about the importance of various external and internal elements to their businesses – results are summarized below and details are presented in Appendix A, Section 3. Respondent reported that the most important motivational factor for food businesses to adopt safe food practices is improved product quality (mean = 2.5 out of 6) followed by factors related to consumers such as certification visible to the consumers, improved consumer preferences, and improved profits (each having a mean = 3.3). Improved brand recognition (mean = 3.4) and reduced liability (mean = 5.3) were the least important motivational factors (**Table 2**).

Table 2. Greatest motivation for GFBs to adopt safe food practices *(1 = greatest motivator, 6 = least motivator)*	
Motivator	**Mean**
Improved product quality	2.5
Awarded certifications that are visible to consumers	3.3
Improved consumer preference	3.3
Increased profits	3.3
Improved brand recognition	3.4
Reduced liability	5.3

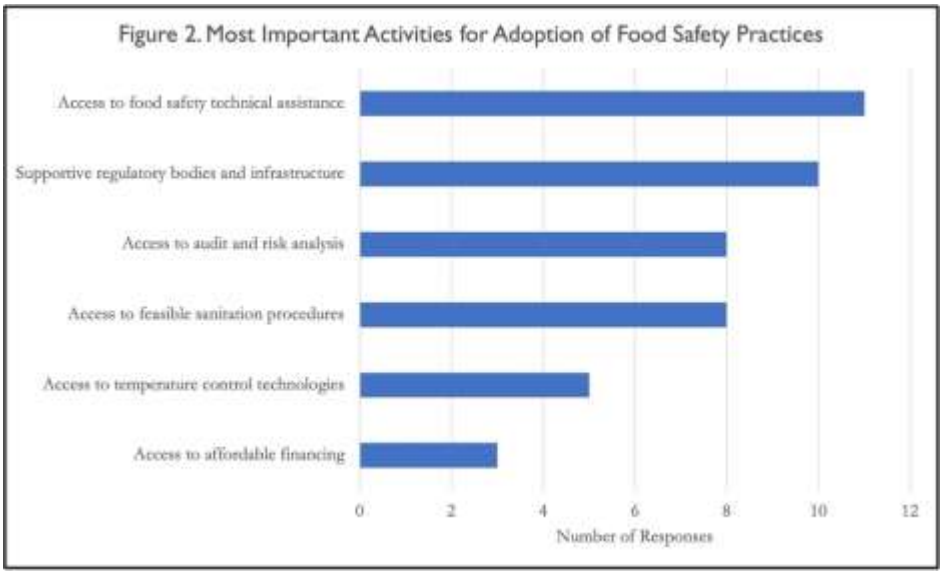
In relation to food safety practices, it was believed that the education level of owners and staff influenced the level of food safety. Additionally, the size of the company and products being prepared were also important factors. What was less important was operating efficiency and access to affordable financing. According to respondents, the food businesses that face the greatest food safety issues after on-farm production are food processors and food retailers. Fewer respondents identified transportation and storage businesses as facing serious food safety issues. Additionally, improved safety for health and nutrition for vulnerable populations was considered to be *very* and *extremely* important as an outcome of GFBs adopting food safety practices.

In terms of public health importance, it is not surprising that the most important relations by these experts was with foodborne illnesses (mean = 2.0 out of 5) and its association with malnutrition (mean = 2.6). Food safety was considered less important in terms of infectious diseases (mean = 2.8), its association with chronic diseases (mean = 3.8), and with environmental contamination (mean = 3.9). As consumers are the primary reason to implement food safety, it is not surprising that almost all of the respondents considered them to be either very important or extremely important for having businesses adopt safer food management practices: respondents believed consumer awareness and willingness to pay were important factors for the adoption of safer food handling practices by GFBs (**Table 3**).

Post-farm food loss is partially due to poor food safety practices and was considered a problem by all but one of the respondents. However, among these experts, for which only about half responded, it was not clear what percent of the food loss was due to food safety practices as the responses of estimated losses ranged from less than 25% to greater than 75%. This highlights the need to train GFBs in tracking food inflows and outflows in order to better monitor food losses and improve their bottom line in the process.

Table 3.	***Importance of consumer awareness of food safety***	***Importance of consumer willingness to pay***
Importance	**Frequency**	**Frequency**
Extremely important	7	6
Very important	8	7
Moderately important	1	3
Slightly important	1	0
Not important at all	0	1

Recommendations for adopting food safety practices



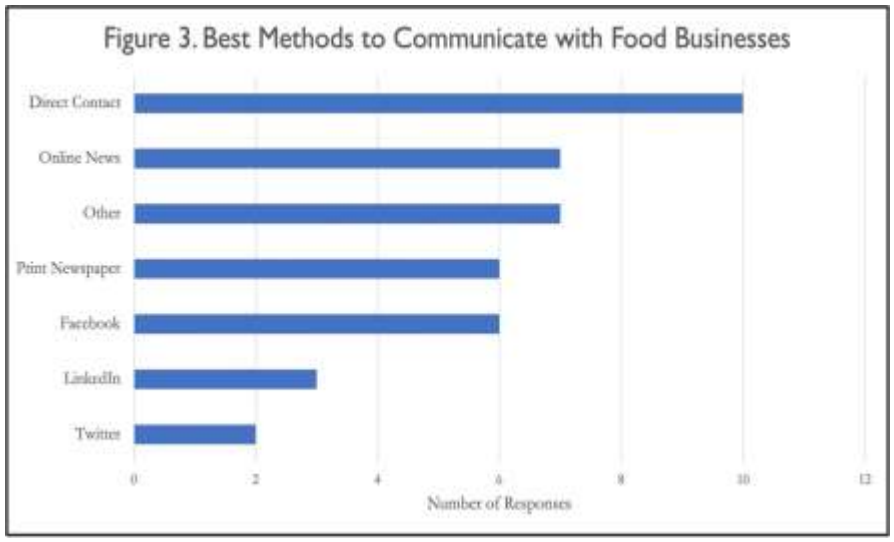
Key informants provided important insight on opportunities for GFBs to adopt food safety practices (Appendix A, Section 4). The activities that these respondents believed were the most important for having businesses adopt safe food management practices were access to technical assistance and supportive regulatory bodies and infrastructure, along with access to low-cost and feasible sanitation procedures (**Figure 2**). Related to regulatory guidelines was the need to have access to food handling audit and risk analysis. These respondents put less emphasis on getting access to technology and financing for adopting safe food practices.

On average, having food safety as a shared commitment (mean = 2.1 out of 5) was considered the most important attributes for GFBs, along with the financial resources (mean = 2.7) and skills (mean = 2.7) to implement food safety plans. Having a clear

and measurable return on investment (mean = 3.9) was considered less important for the adoption of safe food practices. When it came specifically to having proper temperature control for products, having access to cooling systems during transportation and storage were considered to be the most important, including cooling systems at the retail sites. Precooling in the field was also considered important but not at the same level as transportation and storage.

As government oversight, inputs, and regulations were considered important factors influencing the implementation of food safety measures, a more detailed analysis was conducted to determine how government agencies can improve the uptake of food safety practices by food businesses. All factors identified were important and the most important support measures by government agencies was to have a national food safety policy and legislation. However, national food standards, science-based risk assessments, inspections, laboratory safety services, and training were all considered important support measures by governments followed by having a surveillance program.

Food businesses in LMICs have multiple ways to communicate with each other and with the larger network of stakeholders. The respondents were asked the best methods to communicate with food businesses, and direct contact (via email, phone, or video call) was selected most frequently (by 10 of the 18 respondents) as the best method to communicate with food businesses, even with the availability of other communication technologies (**Figure 3**). Online news, print newspaper, and Facebook® were also identified by many respondents (6 or more) as best methods for communicating with food businesses. "Other" includes television, advertisement, through associations, and producer organizations.

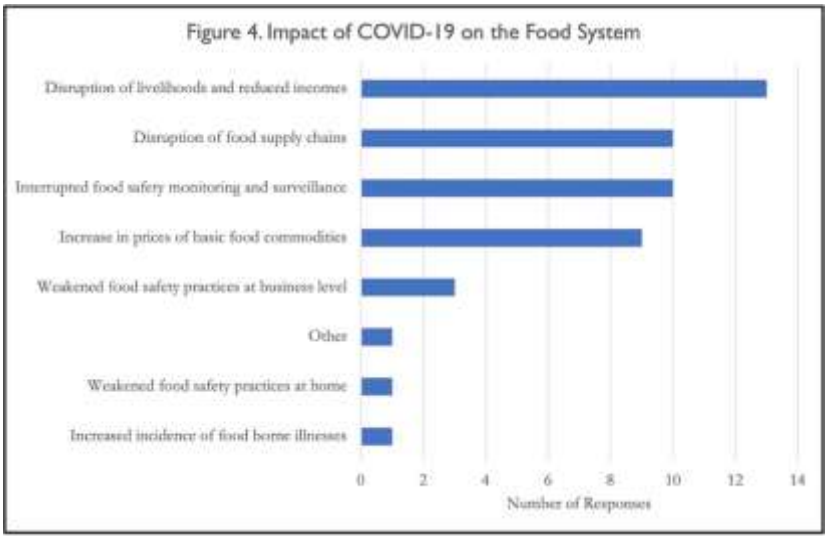


The key recommendations provided by these experts for scaling up food safety practices were congruent with the challenges previously identified. Their recommendations focused on five key areas as listed below.

1. Improve regulations and oversight. The implementation of regulations should meet export standards that will also improve local standards.
2. Provide appropriate financial incentives. Governments and other financial institutions need to implement incentives for businesses to increase food safety practices. It was recognized that incentives may be more difficult for the informal and small businesses.
3. Education. A frequent response was the need to educate all stakeholders. These stakeholders include consumers who need to link food safety with health; food producers who need to understand how food safety practices improve their return on investment; and policy makers who need to understand the intimate relationship between food safety, economic development, and public health.
4. Training. Continual training was another frequent response. Trainings need to focus on technical issues for implementing food safety practices and be directed to key personnel working in food businesses. Additionally, the trainings also need to address the cost effectiveness of food safety practices.
5. Collaboration. In order to have a successful scaling up of food safety practices, it was recognized that there needs to be collaboration among all stakeholders to implement and maintain these practices.

Impact of COVID-19 pandemic on the food system

The most consistent outcome of this inquiry was that COVID-19 had a significant impact on the food system with more than half of the respondents (68.75%) believing it had a severe or extremely severe impact. These respondents believed that the major effect that COVID has had on the food systems was its economic impact (**Figure 4**) in terms of how it (1) disrupted livelihoods and reduced income, (2) disrupted the food supply chain, and (3) increased prices. Secondly, it interrupted and weakened food safety practices at businesses and at homes. Interestingly, most of the respondents did not identify that COVID had an impact on increasing the incidence of foodborne diseases. However, most believe that it would take at least six months (82%) for the food system to recover from the COVID pandemic.



DISCUSSION

There was strong consistency for the responses to our inquiry about food safety. Investment in the areas recommended by these experts is needed. We believe that the results do provide insight about information on what should be the focus for future interventions and studies. However, the results of this study need to be assessed in respect to the fact that the study occurred just before and during an increase in COVID-19 infections in Nepal and during a time of conflict in Ethiopia. Additionally, even though we focused on three countries (Nepal, Ethiopia, and Senegal), it was not possible to report country specific information due to the small sample per country. However, many of the results were very distinct and had clear outcomes which provide some evidence that the factors identified as promoters and challenges to implementing food safety practices are consistent across these countries.

One important theme from these experts in the field centered around training and education. The need for training was a consistent factor for improving food safety. What was interesting from these findings was that the financial consideration tended to be more important for the food businesses with the expectation that there would be a trickle up effect on economic development with the requirement that there needs to be initial investments by funding agencies.

There is also a need to conduct more research to better define if there is a link between food safety, food loss, and economic development and then determine how increasing food safety practices can lead to economic development and improved health. These results suggest that educating consumers about food safety can be an important conduit to improving food safety business practices. Additionally, studies on what are the financial cut-points that consumers will bear for improved food safety needs to be determined and will most likely be site specific.

APPENDIX A: SURVEY RESPONSES

Section 1 – Respondents Characteristics

Respondent Characteristic	Responses (#)	Responses (%)
Years of experience in agri-business		
Less than 1 year	1	6.25
1-5 years	2	12.50
6 - 10 years	4	25.00
10 - 15 years	4	25.00
Greater than 15 years	5	31.25
Total	16	100.00
The highest level of education	Freq.	Percent
Graduate Degree	15	93.75
Undergraduate Degree	1	6.25
Total	16	100.00
Age	Freq.	Percent
20-29 years of age	1	6.25
30-39 years of age	4	25.00
40-49 years of age	7	43.75
50-59 years of age	4	25.00
Total	16	100.00
Gender	Freq.	Percent
Female	1	6.25
Male	15	93.75
Total	16	100.00
Institutions	Freq.	Percent
Government agency	3	16.67
Academic institution	8	44.44
UN, multi-lateral, NGO	4	22.22
Consultancy	3	16.67
Total (answers)	18	100.00
Positions		
Executive: President or Director	4	22.22
Senior: Manager/Department Chair	5	27.78
Technical: Researcher/Professor	5	27.78
Mid-level: Associate/Assistant	3	16.67
Other (Please specify)	1	5.55
Total (answers)	18	100.00
Primary country		
France	1	7.14
Nepal	4	28.57
Ethiopia	3	21.42
Senegal	4	28.57
Burkina Faso	1	7.14
Kenya	1	7.14
Total (answers)	14	100.00
Food Sector Experience		
Informal	3	16.67
Formal	8	44.44
Both	7	38.89
Total (answers)	18	100.00
Settings		
Urban	16	43.24
Semi-urban	11	29.72
Rural	9	24.32
Other	1	2.70

Respondent Characteristic	Responses (#)	Responses (%)
Total (answers)	18	100.00
Food products		
Produce (fruits and vegetables)	12	24
Animal-source foods: Meat (beef, lamb, goat, pork, etc), chicken, fish and eggs	13	26
Milk or other dairy products (eg, cheese)	12	24
Grains, Beans, Legumes, Pulses	11	22
Other (bouillon cubes, beverages)	2	4
Total (answers)	18	100.00
Food chain partnership		
Food Processors	14	35
Wholesalers	7	17.5
Retail Stores	6	15
Consumers	12	30
Other (farmer)	1	2.5
Total (answers)	18	100.00

Section 2 – Challenges and Constraints

Food safety hazards in order of importance (**Q10**; 1 = most important hazard, 4 = least important hazard)	Freq.	Percent
Biological hazards: bacteria, viruses, parasites and fungi		
1	6	54.54
2	4	36.37
3	1	9.09
Total	11	100.00
Mean = 1.55		
Chemical hazards: contaminants, veterinary drug residues, pesticide residues, cleaning chemical residues, allergens, additives and migration from food contact materials		
1	5	45.45
2	6	54.54
Total	11	100.00
Mean = 1.55		
Physical hazards: intrinsic - bones or parts thereof in fish and meat products, etc.		
3	3	27.27
4	8	72.73
Total	11	100.00
Mean = 3.73		
Physical hazards: extrinsic - metal, glass, wooden splinters, etc.		
2	1	9.09
3	7	63.64
4	3	27.27
Total	11	100.00
Mean = 3.18		
The overall quality of food safety (Q11)		
Good	3	17.65
Average	10	58.82
Poor	4	23.53
Total	17	100.00
Sector that needs the greatest improvement in food safety (**Q12**; 1 = greatest need, 5 = least need)	Freq.	Percent
Government		
1	8	47.05
2	6	35.30
3	3	17.67
Total	17	100.00
Mean = 1.71		
Private sector		
1	3	17.65
2	6	35.29
3	3	17.65
4	3	17.65
5	2	11.76
Total	17	100.00
Mean = 2.71		
Consumers		
1	6	35.29
2	1	5.88
3	6	35.29
4	3	17.65
5	1	5.88
Total	17	100.00
Mean = 2.53		
Education system		

2	3	17.65
3	3	17.65
4	7	41.18
5	4	23.53
Total	17	100.00
Mean = 3.71		
Media		
2	1	5.88
3	2	11.76
4	4	23.53
5	10	58.82
Total	17	100.00
Mean = 4.35		
The key food safety challenges in order of importance (**Q13**; 1 = greatest challenge, 6 = least challenge).	Freq.	Percent
Inadequate rules, regulations, surveillance and enforcement		
1	5	29.41
2	6	35.30
3	3	17.65
4	2	11.76
5	1	5.89
Total	17	100.00
Mean = 2.29		
Limited budget allocations for government food safety activities		
1	5	29.41
2	2	11.76
3	5	29.41
4	2	11.76
5	2	11.76
6	1	5.88
Total	17	100.00
Mean = 2.82		
Insufficient capacity and limited interest of businesses		
1	2	11.76
2	2	11.76
3	3	17.65
4	3	17.65
5	4	23.53
6	3	17.65
Total	17	100.00
Mean = 3.82		
Restricted access to technology, information, and infrastructure		
1	1	5.88
2	3	17.65
3	5	29.41
4	1	5.88
5	5	29.41
6	2	11.76
Total	17	100.00
Mean = 3.71		
Lack of affordable financing for businesses		
2	1	5.88
4	4	23.53
5	4	23.53
6	8	47.06
Total	17	100.00
Mean = 5.06		
Low level of food safety awareness		
1	4	23.53

2	3	17.65
3	1	5.88
4	5	29.41
5	1	5.88
6	3	17.65
Total	17	100.00
Mean = 3.29		
The greatest challenges to food safety within food supply chain (**Q14**; 1 = greatest challenges to food safety, 5 = least challenges to food safety).	Freq.	Percent
On-farm production		
1	8	47.05
2	2	11.77
3	1	5.89
4	2	11.77
5	4	23.52
Total	17	100.00
Mean = 2.53		
Food transportation and storage (including cold chain logistics)		
1	3	17.65
2	4	23.53
3	8	47.06
4	2	11.76
Total	17	100.00
Mean = 2.53		
Food processing and handling		
1	5	29.41
2	9	52.94
3	2	11.76
4	1	5.88
Total	17	100.00
Mean = 1.94		
Retail		
2	1	5.88
3	5	29.41
4	8	47.06
5	3	17.65
Total	17	100.00
Mean = 3.76		
Consumer household		
1	1	5.88
2	1	5.88
3	1	5.88
4	4	23.52
5	10	58.82
Total	17	100.00
Mean = 4.24		
The food safety practices implemented (Q15)	Freq.	Percent
Hazard Analysis at Critical Control Points (HACCP)		
Always	3	17.64
Sometimes	11	64.70
Never	3	17.64
Total	17	100.00
ISO 2200 Food Safety Management Standards		
Always	2	12.50
Sometimes	11	68.75
Never	3	18.75
Total	16	100.00
Good Manufacturing Practices (GMPs)		
Always	5	29.41

Sometimes	11	64.71
Never	1	5.88
Total	17	100.00
Good Hygiene Practices (GHPs)		
Always	4	23.53
Sometimes	12	70.59
Never	1	5.88
Total	17	100.00
Sanitation Standard Operating Procedures (SSOP)		
Always	4	25.00
Sometimes	10	62.50
Never	2	12.50
Total	16	100.00
Good Agricultural Practices		
Always	2	14.29
Sometimes	10	71.43
Never	2	14.29
Total	14	100.00

Section 3 - External and Internal Elements for Growing Food Businesses

The greatest motivation for Growing Food Businesses to adopt safe food practices (**Q17**; 1 = greatest motivator and 6 = least important motivator).	Freq.	Percent
Improved product quality		
1	5	31.25
2	3	18.75
3	4	25
4	3	18.75
5	1	6.25
Total	16	100.00
Mean = 2.50		
Improved brand recognition		
1	1	6.25
2	3	18.75
3	5	31.25
4	3	18.75
5	3	18.75
6	1	6.25
Total	16	100.00
Mean = 3.44		
Awarded certifications that are visible to consumers		
1	2	12.50
2	3	18.75
3	4	25.00
4	4	25.00
5	2	12.50
6	1	6.25
Total	16	100.00
Mean = 3.25		
Improved consumer preference		
1	2	12.50
2	4	25.00
3	2	12.50
4	4	25.00
5	4	25.00
Total	16	100.00
Mean = 3.25		
Increased profits		
1	5	31.25
2	2	12.50
3	1	6.25
4	2	12.50
5	4	25.00
6	2	12.50
Total	16	100.00
Mean = 3.25		
Reduced liability		
1	1	6.25
2	1	6.25
5	2	12.50
6	12	75.00
Total	16	100.00
Mean = 5.31		
Characteristics most likely influencing the level of food safety in a business (Q18)	Freq.	Percent
Size of company (micro, small, medium, large)	8	47.05
Education level of owner	10	58.82
Education level of staff	12	70.59

Operating efficiency	4	23.52
Access to affordable financing	5	29.41
Type of food commodity handled	7	41.17
Other (please specify)	5	29.41
Total	17	>100.00
Type of food businesses faces the greatest food safety issues (Q19)	Freq.	Percent
Being a transportation business	2	11.76
Being a storage business	1	5.88
Being a food processor	9	52.94
Being a food retailer	5	29.41
Total	17	100.00
Importance of consumer awareness of food safety (Q20)	Freq.	Percent
Extremely important	7	41.18
Very important	8	47.06
Moderately important	1	5.88
Slightly important	1	5.88
Total	17	100.00
Importance of consumer willingness to pay for safer food (Q21)	Freq.	Percent
Extremely important	6	35.30
Very important	7	41.17
Moderately important	3	17.65
Not at all important	1	5.89
Total	17	100.00
Importance of improved food safety for the health and nutrition of vulnerable population (Q22)	Freq.	Percent
Extremely important	11	64.70
Very important	5	29.41
Moderately important	1	5.89
Total	17	100.00
Issues according to their importance to public health (Q23) (1 = most important, 5 = least important).	Freq.	Percent
Food safety and food borne illnesses		
1	6	37.50
2	6	37.50
3	2	12.50
4	2	12.50
Total	16	100.00
Mean = 2.00		
Malnutrition		
1	2	12.50
2	6	37.50
3	5	31.25
4	2	12.50
5	1	6.25
Total	16	100.00
Mean = 2.63		
Infectious diseases		
1	5	31.25
2	1	6.25
3	5	31.25
4	3	18.75
5	2	12.50
Total	16	100.00
Mean = 2.75		
Chronic diseases		
1	1	6.25
2	2	12.50

3	2	12.50
4	6	37.50
5	5	31.25
Total	16	100.00
Mean = 3.75		
Environmental contamination		
1	2	12.50
2	1	6.25
3	2	12.50
4	3	18.75
5	8	50.00
Total	16	100.00
Mean = 3.88		
Is post-farm food loss a problem (Q24)	Freq.	Percent
Yes	14	93.33
No	1	6.67
Total	15	100.00
Percentage of post-farm food loss can be attributed to poor food safety practices (Q25)	Freq.	Percent
> 75%	1	14.29
50 - 75%	1	14.29
25 - 49%	3	42.86
< 25%	2	28.57
Total	7	100.00

Section 4 – Recommendations for adopting food safety practices

Attributes of Growing Food Businesses in terms of importance for the adoption of safer food management practices (Q27; 1 - most important, 5 - least important**).**	**Freq.**	**Percent**
Food safety is an immediate priority as a shared commitment		
1	9	60.00
2	1	6.67
3	1	6.67
4	3	20.00
5	1	6.67
Total	15	100.00
Mean = 2.07		
Financial resources are committed to food safety		
1	3	20.00
2	4	26.67
3	3	20.00
4	4	26.67
5	1	6.67
Total	15	100.00
Mean = 2.73		
Timely access to food safety knowledge, data and information		
2	4	26.67
3	2	13.33
4	5	33.33
5	4	26.67
Total	15	100.00
Mean = 3.60		
Adequate skills/capacity to implement a concrete food safety plan		
1	2	13.33
2	4	26.67
3	6	40.00
4	2	13.33
5	1	6.67
Total	15	100.00
Mean = 2.73		
Return on investment is clear and measurable		
1	1	6.67
2	2	13.33
3	3	20.00
4	1	6.67
5	8	53.33
Total	15	100.00
Mean = 3.87		
Importance of temperature control within a supply chain (Q28)	Freq.	Percent
Precooling system in the field		
Very Important	7	43.75
Somewhat important	9	56.25
Total	16	100.00
Refrigerated trucks		
Very Important	11	68.75
Somewhat important	4	25.00
Not important	1	6.25
Total	16	100.00
Refrigerated cargo containers		
Very Important	9	56.25
Somewhat important	6	37.50

Not important	1	6.25
Total	16	100.00
Refrigerated storage		
Very Important	12	75.00
Somewhat important	4	25.00
Total	16	100.00
Warehouse		
Very Important	11	68.75
Somewhat important	5	31.25
Total	16	100.00
Retail store refrigeration		
Very Important	11	68.75
Somewhat important	5	31.25
Total	16	100.00
Importance of support measures by government agencies (Q29)	Freq.	Percent
National food safety policy		
Very Important	15	93.71
Somewhat important	1	6.25
Total	16	100.00
Food legislation		
Very Important	15	93.71
Somewhat important	1	6.25
Total	16	100.00
National food standards development platform		
Very Important	13	81.25
Somewhat important	3	18.75
Total	16	100.00
Science-based risk assessment		
Very Important	13	81.25
Somewhat important	3	18.75
Total	16	100.00
Inspection		
Very Important	13	81.25
Somewhat important	3	18.75
Total	16	100.00
Laboratory testing services		
Very Important	13	81.25
Somewhat important	3	18.75
Total	16	100.00
Training and education in food safety		
Very Important	13	81.25
Somewhat important	3	18.75
Total	16	100.00
Epidemiological surveillance		
Very Important	10	62.50
Somewhat important	6	37.50
Total	16	100.00
Key recommendations for scaling up food safety practices (Q30)		
France	Less stacking of laws and more verification (control, audit, inspection) of the correct application of existing laws. Financial incentive for companies that implement an effective approach (training, audits, food safety culture, etc.), to improve food safety and product quality (for example: lower costs).	
Nepal	Awareness of Entrepreneurs regarding GMP requirement in Food Industry before establishment or updating the Establishments with the GMP requirement. Clear and updated Food Safety Regulation Support by Government Authorities to update the industries to meet latest Food Safety Regulation; awareness to Entrepreneurs and Employees	

Nepal	1. Providing more spaces to food business owners during food safety policy making 2. Sharing success stories on better RoI through adopting FS practices elsewhere3. Tailored made action plan for Nepali businesses
Ethiopia	Registration, inspection and laboratory testing
Senegal	In our setting, specificaly in informal food processing units, food safety practices are limited due to the lack of investment in hygiene and quality food production infrastructures. Indeed, operating in informal sector and profitable in the majority of case, the business premises of these growing food business is mostly rented; therefore the promoters refuse to invest for better quality of their product due to the short term rental contract. Thus, the incentive for the food safety practices appeart to be the promotion of secure workplace by the gouverning institutions. To be more cost-effective, this intervention must be associated with the refresh training sessions to promoters and staff on good hygiene and manufacturing practices.
Nepal	'-to scale up food safety practices, the main thing is the responsibility of the producers to produce safer food along with the consumer's awareness to store/transport food according to the commodity produced. Scale-up of food safety practice is only possible through the collaborative efforts from government, food processors and consumers.
Ethiopia	There is a need to improve the training and technical knowledge of local stakeholders and to support them financially to ensure food security.
Nepal	Making food safety system as part of legislation Preparation of comprehensive guidelines Training of food business operators Effective surveillance system
Senegal	Help them implement highly effective food safety management systems
Senegal	1. améliorer l'éducation exploitants en matière de sécurité sanitaire des aliments 2. informer les consommateurs pour qu'ils deviennent des moyens de pressions sur les exploitants 3. renforcer les services gouvernementaux pour le contrôle de la salubrité des aliments 4. encourager la certification aux normes (ISO 22 000, HACCP, IFS, BRC,...) 5. aider les entreprises à exporter dans les pays développer (UE, USA, ...) <u>Translation:</u> 1.Improve farmer food safety education 2.inform consumers so that they become Mean =s of pressure on operators 3.Strengthen government services for food safety control 4.encourage certification to standards (ISO 22 000, HACCP, IFS, BRC, ...) 5.Help companies to export to developing countries (EU, USA, ...)
Kenya	Our research showed that consumers have low WTP for food safety over time. Firms were motivated to adopt improved practices out of fear of negative media or government oversight. This was only true for established brands. Informal firms and small firms are harder to incentivize.
Senegal	Consumer education and support to consumer associations alongside strong, non-corrupted control and regulatory bodies with adequate technical, financial and logistical resources

APPENDIX B: SURVEY QUESTIONNAIRE

Food Safety & Nutrition Survey

Start of Block: Introduction

JS

Q1 Thank you for accepting our invitation to complete this survey on Food Safety and Growing Food Businesses (GFBs). The survey was prepared for Feed the Future Business Drivers for Food Safety (BD4FS), funded by USAID and implemented by Food Enterprise Solutions (FES). Your participation will help identify challenges and opportunities for GFBs to adopt safer food practices in emerging economies and will inform BD4FS research and capacity building efforts towards a culture of food safety.

Your information will be kept confidential, and responses will be summarized in a way that individual responses will remain anonymous. If you have any questions regarding this survey or the BD4FS program, please contact FES at info@foodsolutions.global.

This survey will take about 30 minutes to complete. We greatly appreciate your participation and contribution to global food safety.

End of Block: Introduction

Start of Block: Demographics

Q2 Please indicate the nature of the institution where you work.

- ○ Government agency (4)
- ○ Academic institution (5)
- ○ Private research company (6)
- ○ Foundation (7)
- ○ UN, multi-lateral, NGO (8)
- ○ Consultancy (9)
- ○ Other (Please specify) (10) _____

Q3 From the list below, select the title that most closely describes your position at this institution.

- ○ Executive: President or Director (1)
- ○ Senior: Manager/Department Chair (2)
- ○ Technical: Researcher/Professor (3)
- ○ Mid-level: Associate/Assistant (4)
- ○ Other (Please specify) (5) _____

Q4 Select the primary country where you have worked or studied factors related to food businesses. Please specify just one country and answer the remainder of the survey with that country in mind.

▼ Afghanistan (1) ... Zimbabwe (1357)

Q5 Which sector of food businesses have you worked with?

- ○ Informal (1)
- ○ Formal (2)
- ○ Both (3)
- ○ None (4)

Q6 Does your work include one of the following settings (select all that apply):

- ☐ Urban (1)
- ☐ Semi-urban (2)
- ☐ Rural (3)
- ☐ Other (4)

Q7 What food products have you worked with? (select all that apply)

- ☐ Produce (fruits and vegetables) (1)
- ☐ Animal-source foods: Meat (beef, lamb, goat, pork, etc), chicken, fish and eggs (2)
- ☐ Milk or other dairy products (eg, cheese) (3)
- ☐ Grains, Beans, Legumes, Pulses (4)
- ☐ Other (Please specify) (5) _____

Q8 Which of the following groups have you worked with who buy, process, or sell food? (select all that apply)

- ☐ Food Processors (5)
- ☐ Wholesalers (1)
- ☐ Retail Stores (2)
- ☐ Consumers (3)
- ☐ Other (please specify) (4) _____

End of Block: Demographics

Start of Block: Challenges and Constraints

Q9 Below are a series of questions about food safety practices, challenges, and opportunities for growing food businesses (GFBs). BD4FS is primarily focused on perishable foods -- horticulture products and animal-sourced foods. Please answer to the best of your knowledge on these perishable food groups for the primary country of work that you selected.

Q10 In the country selected, please rank food safety hazards in order of importance. Please sort by dragging the most important hazard to the top and the least important hazard to the bottom. (1 = most important hazard, 4 = least important hazard).

_____ Biological hazards: bacteria, viruses, parasites and fungi (1)
_____ Chemical hazards: contaminants, veterinary drug residues, pesticide residues, cleaning chemical residues, allergens, additives and migration from food contact materials. (2)
_____ Physical hazards: intrinsic - bones or parts thereof in fish and meat products, etc. (3)
_____ Physical hazards: extrinsic - metal, glass, wooden splinters, etc. (4)

Q11 Considering the food system as a whole, how would you rate the overall quality of food safety in the primary country you selected?

- ○ Excellent (1)
- ○ Good (2)
- ○ Average (3)
- ○ Poor (4)
- ○ Terrible (5)

Q12 Please rank in order which sector needs the greatest improvement in food safety in the primary country you selected. Please sort by dragging the sector in greatest need of improvement to the top and the least to the bottom (1 = greatest need, 5 = least need).

_____ Government (1)
_____ Private Sector (2)
_____ Consumers (3)
_____ Education system (4)
_____ Media (5)

Q13 Within the food system as a whole, please rank the key food safety challenges in order of importance. Please sort by dragging the sector in greatest challenge to the top and the least to the bottom (1 = greatest challenge, 6 = least challenge).

_____ Inadequate rules, regulations, surveillance and enforcement (1)
_____ Limited budget allocations for government food safety activities (2)
_____ Insufficient capacity and limited interest of businesses (3)
_____ Restricted access to technology, information, and infrastructure (4)
_____ Lack of affordable financing for businesses (5)
_____ Low level of food safety awareness (6)

Q14 Thinking about the food supply chain (farm to fork) in the primary country you selected, please rank in terms of where the greatest challenges to food safety are currently concentrated. Please sort by dragging the sector in greatest challenge to the top and the least to the bottom (1 = greatest challenges to food safety, 5 = least challenges to food safety).

_____ On-farm production (1)
_____ Food transportation and storage (including cold chain logistics) (2)
_____ Food processing and handling (3)
_____ Retail (4)
_____ Consumer household (5)

Q15 Focusing on the private sector, do the food businesses you have worked with follow the food safety practices listed below?

	Always (1)	Sometimes (2)	Never (3)	Don't know (4)
Hazard Analysis at Critical Control Points (HACCP) (1)	○	○	○	○
ISO 2200 Food Safety Management Standards (2)	○	○	○	○
Good Manufacturing Practices (GMPs) (3)	○	○	○	○
Good Hygiene Practices (4)	○	○	○	○
Sanitation Standard Operating Procedures (SSOP) (5)	○	○	○	○
Good Agricultural Practices (GAP) (6)	○	○	○	○

Q16 Which of the following factors are most critical to facilitate the adoption of safer food management practices by growing food businesses? (Please select all that apply)

- ☐ Food safety training of business owners in hazard control (food contamination) (1)
- ☐ Food safety training of business owners in temperature control (food preservation) (17)
- ☐ Food safety training of employees in hazard control (food contamination) (2)
- ☐ Food safety training of employees in temperature control (food preservation) (18)
- ☐ Technical assistance for food safety (eg, cold chain technologies) (3)
- ☐ Access to affordable financing (12)
- ☐ Clear and feasible food safety rules and regulations (13)
- ☐ Supportive enabling environment by government for business (14)
- ☐ Transparent food traceability (16)
- ☐ Other (please specify) (15) _____

End of Block: Challenges and Constraints

Start of Block: External and Internal Elements for GFBs

Q17 Please rank the following according to what you believe will provide the greatest motivation for Growing Food Businesses to adopt safe food practices? Please sort by dragging the greatest motivator to the top and the least to the bottom (1 = greatest motivator and 6 = least important motivator).

_____ Improved product quality (2)
_____ Improved brand recognition (3)
_____ Awarded certifications that are visible to consumers (4)
_____ Improved consumer preference (5)
_____ Increased profits (6)
_____ Reduced liability (7)

Q18 Which of the following characteristics most likely influence the level of food safety in a business? Please pick the top three (3).

- [ ] Size of company (micro, small, medium, large) (1)
- [ ] Education level of owner (2)
- [ ] Gender of owner/operator (3)
- [ ] Education level of staff (4)
- [ ] Operating efficiency (5)
- [ ] Access to affordable financing (6)
- [ ] Type of food commodity handled (7)
- [ ] Other (please specify) (8) _____

Q19

Which type of food businesses faces the greatest food safety issues?

- ○ Being a transportation business (1)
- ○ Being a storage business (2)
- ○ Being a food processor (3)
- ○ Being a food retailer (4)
- ○ Other (please specify) (5) _____

Q20 How important of a driver is consumer awareness of food safety for businesses to adopt safer food management practices?

- ○ Extremely important (1)
- ○ Very important (2)
- ○ Moderately important (3)
- ○ Slightly important (4)
- ○ Not at all important (5)

Q21 How important of a driver is consumer willingness to pay for safer food for businesses to adopt safer food management practices?

- ○ Extremely important (1)
- ○ Very important (2)
- ○ Moderately important (3)
- ○ Slightly important (4)
- ○ Not at all important (5)

Q22 How important is improved food safety for the health and nutrition of the more vulnerable segments of the populations?

- ○ Extremely important (1)
- ○ Very important (2)
- ○ Moderately important (3)
- ○ Slightly important (4)
- ○ Not at all important (5)

Q23 Please rank the following issues in terms of their importance to public health. Please sort by dragging the most important public health issue to the top and the least important to the bottom (1 = most important, 5 = least important).

_____ Food safety and food borne illnesses (1)
_____ Malnutrition (2)
_____ Infectious diseases (3)
_____ Chronic diseases (4)
_____ Environmental contamination (5)

Q24 Is post-farm food loss a problem in the country you selected?

- Yes (1)
- No (2)
- Don't know (3)

Q25 What percentage of post-farm food loss can be attributed to poor food safety practices at the business level?

- > 75% (1)
- 50 - 75% (2)
- 25 - 49% (3)
- < 25% (4)
- 0 % (5)
- Don't know (6)

End of Block: External and Internal Elements for GFBs

Start of Block: Key recommendations for adopting food safety practices

*

Q26 Please indicate which of the following interventions/activities would best help Growing Food Businesses adopt safer food management practices? Select the top three (3).

- ☐ Access to firm-level food handling audit and risk analysis (1)
- ☐ Access to low-cost/feasible sanitation procedures (3)
- ☐ Access to temperature control technologies and logistics (4)
- ☐ Access to food safety technical assistance (12)
- ☐ Access to affordable financing (13)
- ☐ Supportive regulatory bodies and infrastructure (15)
- ☐ Other (please specify) (14) _____

Q27 Please rank the following attributes of Growing Food Businesses in terms of importance for the adoption of safer food management practices. Sort by dragging the most important attribute to the top and the least important to the bottom (1 = most important, 5 = least important).

_____ Food safety is an immediate priority as a shared commitment (1)
_____ Financial resources are committed to food safety (2)
_____ Timely access to food safety knowledge, data and information (3)
_____ Adequate skills/capacity to implement a concrete food safety plan (6)
_____ Return on investment is clear and measurable (7)

Q28 Focusing on temperature control supply chains, how important are the following for a growing food business to reduce the risk of food contamination among perishable food products (eg, fruits and vegetables, animal-sourced foods)?

	Very Important (1)	Somewhat important (2)	Not important (3)
Precooling system in the field (1)	○	○	○
Refrigerated trucks (2)	○	○	○
Refrigerated cargo containers (3)	○	○	○
Refrigerated storage (4)	○	○	○
Warehouse (5)	○	○	○
Retail store refrigeration (6)	○	○	○

Q29 How important are the following support measures by government agencies for the uptake of improved food safety practices by food businesses?

	Very important (1)	Somewhat important (2)	Not important (3)
National food safety policy (1)	○	○	○
Food legislation (2)	○	○	○
National food standards development platform (3)	○	○	○
Science-based risk assessment (4)	○	○	○
Inspection (5)	○	○	○
Laboratory testing services (6)	○	○	○
Training and education in food safety (7)	○	○	○
Epidemiological surveillance (8)	○	○	○

Q30 What are your key recommendations for scaling up food safety practices among growing food businesses?

_____

_____

_____

_____

_____

Q31 In your experience, what are the best ways to communicate with food businesses? (Select all that apply)

- [ ] Newspaper (print) (1)
- [ ] Online news (2)
- [ ] LinkedIn (3)
- [ ] Twitter (4)
- [ ] Facebook (5)
- [ ] Direct contact (eg, email, phone or video call) (6)
- [ ] Other 1 (please specify) (7) _____
- [ ] Other 2 (please specify) (8) _____

End of Block: Key recommendations for adopting food safety practices

Start of Block: Questions on COVID-19

Q32 For the country you selected, how would you assess the impact of the COVID-19 pandemic on the food system?

- ○ Extremely severe (1)
- ○ Severe (2)
- ○ Somewhat severe (3)
- ○ Moderately severe (4)
- ○ Not severe at all (5)
- ○ No impact at all (8)
- ○ No response (6)

Q33 In what ways has COVID-19 affected the food system? (Please select all responses that apply)

- ☐ Disruption of food supply chains (1)
- ☐ Increase in prices of basic food commodities (2)
- ☐ Disruption of livelihoods and reduced incomes (3)
- ☐ Interrupted food safety monitoring and surveillance (4)
- ☐ Weakened food safety practices at business level (5)
- ☐ Weakened food safety practices at home (10)
- ☐ Increased incidence of food borne illnesses (8)
- ☐ Other 1 (please specify) (6) _____
- ☐ Other 2 (please specify) (7) _____

Q34 Post pandemic, how quickly do you think the food system will return to normal?

- ○ Within a few months (3 - 5) (1)
- ○ At least 6 months (2)
- ○ At least 1 year (3)
- ○ 1 to 3 years (4)
- ○ Greater than 3 years (Long-term recovery required) (5)
- ○ Don't know (6)

End of Block: Questions on COVID-19

Start of Block: Experience and Area of Focus

Q35 How many years of experience do you have working in connection with the agri-business field?

- ○ Less than 1 year (1)
- ○ 1 - 5 years (2)
- ○ 6 - 10 years (3)
- ○ 10 - 15 years (4)
- ○ Greater than 15 years (5)

Q36 What is your highest level of education?

- ○ High School (1)
- ○ Undergraduate Studies (2)
- ○ Undergraduate Degree (3)
- ○ Graduate Degree (4)

Q37 What is your age?

- ○ 20-29 years of age (1)
- ○ 30-39 years of age (2)
- ○ 40-49 years of age (3)
- ○ 50-59 years of age (4)
- ○ 60+ years of age (5)

Q38 What is your gender?

- ○ Male (1)
- ○ Female (2)
- ○ Prefer not to say (3)

Q39 Contact Email (Optional)

_____

Q40 Additional Contact Information (Optional)

_____

Q41 Can you recommend someone else to take this survey? Please provide their contact information.

_____

End of Block: Experience and Area of Focus