International Livestock Research Institute

Training course report

Food safety risk assessment for informal value chains in Bangladesh

Dhaka, Bangladesh
22–24 October 2018

RESEARCH PROGRAM ON
Agriculture for
Nutrition
and Health
CGIAR
Led by IFPRI

INTERNATIONAL
FOOD POLICY
RESEARCH
INSTITUTE
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ILRI
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LIVESTOCK RESEARCH
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Contents

Acknowledgements

Introduction

Food safety is moving rapidly up the development agenda as new studies reveal its severely under-estimated importance. Foodborne disease is responsible for an enormous health burden and negative livelihood, nutritional and economic impacts. Effective solutions in developed countries and export systems have not translated well to informal or formalizing markets. There is an urgent need for technical and institutional solutions to food safety challenges and broader policy and regulatory approaches to manage food safety risks in dynamic and developing markets. Food safety refers to addressing all those hazards, whether chronic or acute, that may make food injurious to the health of consumers. In Bangladesh, food safety hazards are highly prevalent; these include adulteration, microbial contamination, residues of insecticides, pesticides antibiotics and growth hormones, and harmful additives, colours and heavy metals.

Training summary

This training workshop on food safety risk assessment for informal value chains in Bangladesh was held at Lake Shore Hotel, Gulshan, Dhaka, Bangladesh on 22–24 October 2018.

Co-organizers: CGIAR Research Program on Agriculture for Nutrition and Health, International Livestock Research Institute (ILRI), International Food Policy Research Institute, Bangladesh Food Safety Authority, Bangladesh Livestock Research Institute, Bangladesh Agriculture University and International Centre for Diarrhoeal Disease Research, Bangladesh

Lecturers/facilitators

Hung Nguyen-Viet is ILRI's regional representative for East and Southeast Asia and a senior scientist in food safety and ecohealth. His research focuses on health, agriculture, food safety, infectious and zoonotic diseases with emphasis on integrative approaches (One Health and ecohealth). He led a regional ecohealth initiative in Southeast Asia (2012–16). He co-founded and until 2013 led the Centre for Public Health and Ecosystem Research at the Hanoi University of Public Health in Vietnam where he is an honorary professor. After his PhD, he was a postdoctoral researcher at the Swiss Tropical and Public Health Institute and carried out research and teaching in France. He has published in the areas of food safety, ecohealth, water sanitation, health and ecology. In 2016, he received the *Exceptional early career contribution to the field of ecohealth* award of the International Association for Ecology and Health, of which he is a board member and editor of several journals. He holds a BSc (Biology) from Vietnam and a PhD (Life and Environmental Sciences) from France. h.nguyen@cgiar.org

Johanna Lindahl is a veterinary epidemiologist with a PhD from the Swedish University of Agricultural Sciences. Her doctoral thesis was on the epidemiology of Japanese encephalitis virus in South Vietnam. She has worked as a clinician and in food safety and disease control. She is interested in research on vector-borne viral infectious diseases. She joined ILRI in April 2013 and is involved in risk assessment of aflatoxins in the dairy chain, among other projects. j.lindahl@cgiar.org

Sinh Dang gained his DVM degree in 2006, the dual MVPH degree from Chiang Mai University and Freie Universität Berlin (2013) and a PhD in Veterinary Epidemiology Unit from Rakuno Gakuen University (2018). He works at the Center for Public Health and Ecosystem Research, Hanoi University of Public Health and is a jointly appointed research scientist at ILRI Vietnam. He is engaged in research on food safety, risk assessment, veterinary epidemiology, zoonoses and One Health/ecohealth. s.dang@cgiar.org

Objectives (Days 1 and 2)
1. Increase knowledge on the basics of hazards, risk assessment and risk communication
2. Practise qualitative risk assessments of priority hazards
3. Enable participants to become familiar with different frameworks for risk assessment and to build national networks for implementation

Objectives (Day 3)
1. Introduce participants to quantitative risk assessment
2. Practise risk assessment using the participants' data

The first day mainly focused on the basic introduction of ILRI and relevant local agencies working on food safety. A mapping exercise was done to have a glimpse of existing works. The second day featured theoretical topics on risk assessment, hazard analysis, basic statistics and the workings of the task force on food safety risk assessment in Vietnam. The third day was dedicated to the software used for risk assessment, risk management and sensitivity analysis as well as group work.

A total of 33 participants attended the workshop, comprising government officials, academicians, researchers from public and private universities and food safety activists working on food safety and consumer awareness (Bangladesh Food Safety Authority, Bangladesh Food Safety Network and Consumer Association of Bangladesh).

Training proceedings

The workshop was opened by Johanna Lindahl and Hung Nguyen from ILRI. The participants then introduced themselves and stated their expectations from the workshop. Johanna Lindahl elaborated the work of ILRI and explained the concerns with food safety.

Participants who had been involved in the food safety issues presented their work. Practical Action Bangladesh showcased their organic pumpkin production and how it is contributing to local poverty alleviation. Bangladesh Poribesh Andolon (Bangladesh Environment Movement) described their work with the food safety authority and their success in banning of plastic bags and two-stroke engines. SNV Netherlands Development Organisation Bangladesh has been working to promote sustainable consumption and production with funding from the European Union. They are doing excellent work with tomato and mango processed food related awareness among the consumers and ensuring access of certified products to wider markets. SHISUK Bangladesh has been working with agriculture and safe food production at floodplain. They have also been involved in food safety public awareness and education as a partner of Bangladesh Food Safety Network and have trained farmers on food safety codes of practice. In the Daudkandi Upazila, they are working on production of safe and quality fish along with winter vegetables.

Bangladesh Safe Agro-Food Efforts are working on policy advocacy, awareness creation, Good Agriculture Practice and action research. They are conducting action research at Manikganj to establish a bio-village and food safety model in Jessore. The Bangladesh Livestock Research Institute has been working on poultry products and are involved in laboratory testing of products and monitoring standards of supermarket products. The Bangladesh Food Safety Authority is collaborating with local and international organizations towards a safe food supply chain, risk-based food inspection, consumer awareness and coordination with other food control agencies. Faculty from Bangladesh Agriculture University showcased their safe food research. The Bangladesh Agriculture Research Council explained their work on food safety of agricultural products.

For the group work on mapping of food safety projects, participants randomly formed groups and identified research programs by local and international non-governmental organizations in Bangladesh. They also identified the gaps in food safety work and the coordinating agencies and stakeholders with roles in the food safety management in the country.

In the afternoon session of day 1, Hung Nguyen discussed the establishment and success of the food safety risk assessment task force in Vietnam. Johanna Lindahl then explained the concepts of hazard- and risk-based approaches to food safety management.

Day 2 started with Sinh Dang introducing the pre-workshop questionnaire to the participants and later Hung Nguyen and Johanna Lindahl elaborating interactive sessions on hazard and risk analysis frameworks, risk ranger and practices, hazard identification and characterization and risk characterization. Participants worked in groups on hazard identification and characterization, building a value chain model mapping exercise, prioritized hazards and developed risk assessment cases. Day 2 concluded with the installation of @Risk software.

Day 3 focused on practical use of the software through demonstrations of data analysis. Later, group work and presentations were given by the participants, followed by sessions on risk communication and risk management. Participants were then requested to fill in the post-training evaluation questionnaire. At the closing session, the trainees received certificates of participation.

Agenda

Day 1: 22 October 2018 - Food safety in Bangladesh- Stakeholders meeting		
09.00 – 09.15	Opening remarks	
09.15 – 9.45	Introduction of participants and objectives	All; organizers
09.45 – 10.15	Introduction to ILRI and work on food safety	Johanna Lindahl
10.15 – 10.45	Coffee break	
10.45 – 12:00	Food safety activities in different ministries and institutes in Bangladesh	All presentative
12.00 – 12.30	Mapping food safety projects in Bangladesh and discussion on food safety projects	All
12.30 – 13.30	Lunch	
13.30 – 14.00	Introduction about food safety risk assessment task force in Vietnam	Hung Nguyen
14.00 – 14.30	Setting the scene: Concepts of hazard-based and risk-based approaches in food safety	Johanna Lindahl
14.30 – 15.00	Introduction to other projects by ILRI: Safe Food, Fair Food (in Cambodia and Africa)	Hung/Johanna
15:00 – 15:30	Coffee break	
15.30 – 16.30	Discussion on activities food safety Bangladesh: What are the objectives? Who is responsible? What are the activities?	Johanna Lindahl
16:30	Conclusion and close	Iqbal Mamun
18:30	Dinner	All
Day 2: 23 October 2018 - Introduction to food safety risk assessment		
09.00 – 09.15	Pre-evaluation questionnaire	Sinh Dang
09.15 – 09.45	Hazards and risk analysis frameworks	Hung Nguyen
09.45 – 10.30	Risk ranger and practices	Johanna and Hung
10.30 – 11.00	Coffee break	
11.00 – 11.40	Hazard identification and characterization	Sinh Dang
11.40 – 12.30	Dose – response and exposure assessment	Johanna Lindahl
12.30 – 13.30	Lunch	
13.30 – 14.00	Group work: Hazard identification and characterization	
14.00 – 14.30	Building a value chain model mapping exercise	Sinh Dang
14.30 – 15.00	Basic statistics and probability	Johanna Lindahl
15.00 – 15.30	Coffee break	
15.30 – 16.00	Risk characterization (point estimate, stochastic)	Hung Nguyen
16.00 – 16.45	Group work: Developing case studies in food safety risk assessment	
16.30 – 17.00	Install @Risk (trial version)	Sinh Dang
Day 3: 24 October 2018 -Introduction to food safety risk assessment		
08.30 – 09.00	Recap day 2, questions	Hung Nguyen
09.00 – 09.30	How does it work in practice: case studies of risk assessments? Aflatoxin in milk/maize; *Salmonella* in pork	Johanna/Hung
09.30 – 10.30	@Risk introduction and building a risk model (followed the group work of day 2)	Johanna/Hung
10.30 – 11.00	Coffee	
11.00 – 12.00	Group work	Johanna/Hung
12.00 – 12.30	Sensitivity analysis	Johanna/Hung
12.30 – 13.30	Lunch	
13.30 – 14.00	Group work	All
14.00 – 14.30	Presentation of group work	All
14.30 – 15.00	Coffee	
15.00 – 15.20	Risk communication	Hung Nguyen
15.20 – 15.45	Risk management	Hung Nguyen
15.45 – 16.00	Post-evaluation	Johanna Lindahl
16.00 – 16.30	Issuance of certificates; closing ceremony	Johanna/Hung

List of participants

No.	Name	Sex	Country of origin
1	Professor Dr. Md. Iqbal Rouf Mamun	Male	Bangladesh
2	Abu Shahid Saleh Md. Zubery	Male	Bangladesh
3	Kulsum Begum Chowdhury	Female	Bangladesh
4	AZM Nazmul Chowdhury	Male	Bangladesh
5	Md Abu Hasan Ali	Male	Bangladesh
6	Dr. Sukanta Chowdhury	Male	Bangladesh
7	Mahbub Ullah	Male	Bangladesh
8	Dr Md Shah Kamal Khan	Male	Bangladesh
9	Mahe Alam	Male	Bangladesh
10	Dr. Abu Noman M. Atahar Ali	Male	Bangladesh
11	Nafiz Ahmed	Male	Bangladesh
12	Md. Asif Mahbub Tanvir	Male	Bangladesh
13	Dr. KHM Nazmul Hussain Nazir	Male	Bangladesh
14	Dr. Sujan Kumar Sarkar	Male	Bangladesh
15	Dr. Md. Harun-Or-Rashid	Male	Bangladesh
16	Dr Farzana Yeasmin	Female	Bangladesh
17	Dr. Abdullah-Al-Maruf	Male	Bangladesh
18	Dr MdFazlul Karim	Male	Bangladesh
19	Dr S M Khorshed Alam	Male	Bangladesh
20	Dr Md Abdul Awal	Male	Bangladesh
21	Dr Mohammad Rafiqul Islam	Male	Bangladesh
22	Dr Abdus Samad	Male	Bangladesh
23	Dr Ashab Uddin	Male	Bangladesh
24	Dr Ruhena Begum	Female	Bangladesh
25	Sakiul Millat Morshed	Male	Bangladesh
26	RaisulSafkat	Male	Bangladesh
27	DelowerHoshen	Male	Bangladesh
28	Atnu Chanda	Male	Bangladesh
29	MdOmorFaruque	Male	Bangladesh
30	Ataur Rahman Miton	Male	Bangladesh
31	Ahmad Ekramullah	Male	Bangladesh
32	Dr. SM Monowar Hossain	Male	Bangladesh
33	Md. Zahedur Rahman	Male	Bangladesh

Evaluation forms

PRE-COURSE EVALUATION FORM: 22 October 2018

Your name (Optional):

Please answer the questions below for your pre-course evaluation.

1. Your field of study/expertise

A. Public Health

B. Veterinary Medicine

C. Food safety

D. Other (please specify)

2. Your level of education

A. Undergraduate student

B. Graduated

C. MSc student

D. Ph.D. student

E. Ph.D.

3. Please indicate the level of understanding of risk assessment before starting the course?

A. Have never learned.

B. Partially involved.

C. Actively involved.

D. I am a risk assessor.

E. Do not want to mention.

4. What is your goal of this course for you?

A. To familiarize yourself with risk assessment

B. To be able to understand the results of risk assessment

C. To be able to conduct risk assessment

D. To become a risk assessor

5. Before this course, what was your knowledge of:

(1). Hazard and risk analyses

A. Had not heard about it

B. Had heard about it, but didn't really understand it

C. Had worked with it a little, but still feeling insecure.

D. Understand it, but have never worked with it.

(2) Risk ranger (and practice)

A. Had not heard about it

B. Had heard about it, but didn't really understand it

C. Had worked with it a little, but still feeling insecure.

D. Understand it, but have never worked with it.

(3) Hazard identification and characterization

A. Had not heard about it

B. Had heard about it, but didn't really understand it

C. Had worked with it a little, but still feeling insecure.

D. Understand it, but have never worked with it.

(4) Exposure assessment and dose-response assessment

A. Had not heard about it

B. Had heard about it, but didn't really understand it

C. Had worked with it a little, but still feeling insecure.

D. Understand it, but have never worked with it.

(5) Risk management and communication

A. Had not heard about it

B. Had heard about it, but didn't really understand it

C. Had worked with it a little, but still feeling insecure.

D. Understand it, but have never worked with it.

6. Before the course, had you used the following software?

*(1) @Risk, a*t which level:

A. Never used

B. Tried a little

C. I use but feeling insecure at using it

D. I use it and feel confident.

*(2) R, a*t which level:

A. Never used

B. Tried a little

C. I use but feeling insecure at using it

D. I use it and feel confident.

*(3) Excel, a*t which level:

A. Never used

B. Tried a little

C. I use but feeling insecure at using it

D. I use it and feel confident.

7. If the probability is 0.8 that chicken meat is contaminated with *Campylobacter*, and the probability is 0.2 that contaminated meat remains infected after cooking: What is the probability of getting contaminated chicken served?

A. 0.8   B. 0.4   C. 0.16   D. 0.2

8. What is the difference between a stochastic and a deterministic model?

A. A stochastic model uses two parameters while a deterministic model uses only one parameter

B. A stochastic model uses risk inputs entered as fixed values while a deterministic model uses a bootstrap

C. A stochastic model is only run in R software while the deterministic can be run both in @Risk and R software

D. A stochastic model uses risk inputs entered as probability distributions while a deterministic model uses risk inputs entered as fixed values

9. What is sensitivity analysis used for?

A. To understand costs and benefits of a project

B. To separate variability from uncertainty

C. To know which variable can influence the risk

D. To know the best parametric distribution to fit

10. How do you plan to use the knowledge gained in this course?

A. Assessing a risk on an on-going project

B. Managing a risk in your or other country

C. For a study associated with a risk assessment

D. No idea

E. Other purpose (specify)

Thank you for your cooperation!

POST-COURSE EVALUATION FORM
24 October 2018

Your name:
Please answer the questions below for your post-course evaluation.
1. Your field of study/expertise
A. Public Health
B. Veterinary Medicine
C. Food safety
D. Other (please specify)
2. Your level of education
A. Undergraduate student
B. Graduated
C. MSc student
D. Ph.D. student
E. Ph.D.
3. Please indicate how many days did you attend this course?
A. Every day.
B. First 2 days
C. Missed 2/3 days of the course
D. Do not want to mention.
4. Technical questions
(1) Which risk assessment framework is more targeted for an assessment of the public health risk associated with consumption of processed meat in Cambodia?
A.   OIE framework
B. Codex Alimentarius framework
C. HACCP
D.   All of them
E. None of them

(2) If the probability is 0.8 that chicken meat is contaminated with *Campylobacter*, and the probability is 0.2 that contaminated meat remains infected after cooking: What is the probability of getting contaminated chicken served?
A. 0.8   B. 0.4   C. 0.16   D. 0.2

(3) What is the difference between a stochastic and a deterministic model?
A. A stochastic model uses two parameters while a deterministic model uses only one parameter
B. A stochastic model uses risk inputs entered as fixed values while a deterministic model uses a bootstrap
C. A stochastic model is only run in R software while the deterministic can be run in @Risk
D. A stochastic model uses risk inputs entered as probability distributions while a deterministic model uses risk inputs entered as fixed values

(4) What would be the correct way to write the probability of AIDS given HIV infection?
A. $Pr(HIV \cap AIDS)$
B. $Pr(HIV|AIDS)$
C. $Pr(AIDS \cap HIV)$
D. $Pr(AIDS|HIV)$

(5) What does a p-value of 0.01 mean?

A. We have the right answer

B. Considering the data, the probability is 0.01 that we are doing a type 1 and type 2 error

C. Considering the data, the probability is 0.01 that we are detecting something that is not true

D. We should not reject the null-hypothesis

(6) What is NOT true regarding incubation period?

A. It is the time from infection until onset of disease

B. Disease transmission can start before the end of the incubation period

C. Incubation period is the same as latent period

D. The incubation period depends on the pathogen and host susceptibility

(7) Which statement belongs to which visual framework?

A. Event tree___   1. Focus on an illness, and list the steps that led to it

B. Fault tree____   2. Shows the steps in a risk pathway

C. Causal diagram____   3. Visualize possible epidemiological association

8) What is sensitivity analysis used for?

A. To understand costs and benefits of a project

B. To separate variability from uncertainty

C. To know which variable can influence the risk

D. To know the best parametric distribution to fit

5. How do you plan to use the knowledge gained in this course?

A. Assessing a risk on an on-going project

B. Managing a risk in your or other country

C. For a study associated with a risk assessment

D. No idea

E. Other purpose (specify)

6. Facilitators

> *Circle the appropriate number for each facilitator*
> 1= Very good communication skills, successful in delivering messages.
> 2= Good communication, but sometimes difficult to follow
> 3= Sometimes lead to misunderstand the delivered messages
> 4= Most of the time failed in delivering messages

	Name	Lecture	Level of evaluation			
Day 1						
	Hung Nguyen	Hazard and risk analysis framework				
	Johanna Lindahl	Risk ranger, lecture and exercise				
	Johanna Lindahl	Hazard identification and characterization				
	Sinh Dang	Dose – response and exposure assessment				
	Sinh Dang	Building a value chain model, mapping exercise				
	Johanna Lindahl	Basis statistics and probability				
	Hung Nguyen	Risk characterization				

	Day 2					
	Johanna Lindahl	How does it work in practice: case studies of risk assessments? Aflatoxin in milk/maize				
	Hung Nguyen	How does it work in practice: case studies of risk assessments? *Salmonella* in pork				
	Johanna Lindahl Hung Nguyen	@Risk introduction and building a risk model				
	Johanna Lindahl Hung Nguyen	Sensitivity analysis				
	Hung Nguyen	Risk communication				
	Johanna Lindahl	Risk management				

7. Logistics   Add a number that reflects your level of satisfaction in the right column
          1= Good, 2= Average, 3= Fair, 4=Poor

	Item	Level of satisfaction			Further comment
	Accommodation/ Hotel				
	Logistic team				
	Usefulness/quality of handouts provided				
	Structure of the sessions in the course				
	Visual aid				

8. Which of the presented topics should be more emphasized in a future course?

9. What additional topics would you have liked included in this course?

10. In your opinion, what topics should be less emphasized or considered for eliminations?

11. Would you recommend this course to your colleagues? A. Yes   B. No
If No, please indicate the reason why:

Thank you very much for your cooperation!

Pre-course evaluation result

	Expertise	Education	3_level	4_goal	5_1_Hazard	5_2_rr	5_3_characterization	5_4_exposure	5_5_management	6_1_Risk	6_2_R	6_2_excel	7_probability	8_diff	9_sensitivity analysis	11_pla
2	Public health		Partially involved	B	heard about it, did not really understand	heard about it, did not really understand	heard about it, did not really understand	worked with it a little, still feeling insecure	heard about it, did not really understand	Never used	Tried a little	Used and confident		Stochastic use probability distribution	know which variable can influence the risk	A
3	Public health	Graduated	Do not want to mention	A	Understand it, but have never worked with it	Not heard of	Understand it, but have never worked with it	Understand it, but have never worked with it	Not heard of	Never used	Never used	Used but feel insecure using it			NA	A
4	Public health	MSc	Partially involved	B	Understand it, but have never worked with it	Understand it, but have never worked with it	heard about it, did not really understand	Not heard of	Understand it, but have never worked with it	Tried a little	Tried a little	Used and confident	0.16	Stochastic use fixed values	know which variable can influence the risk	B
5	Food safety	MSc	Actively involved	D	Understand it, but have never worked with it	Understand it, but have never worked with it	Understand it, but have never worked with it	Understand it, but have never worked with it	worked with it a little, still feeling insecure	Never used	Never used		0.8	Stochastic use two parameters	know which variable can influence the risk	A
6	Public health	Graduated	Have never learn	B	heard about it, did not really understand	Not heard of	Not heard of	Not heard of	heard about it, did not really understand	Never used	Never used	Used and confident	0.16		understand costs and benefits of the project	A
7		PhD	Actively involved	C	worked with it a little, still feeling insecure	Understand it, but have never worked with it	Understand it, but have never worked with it	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Never used	Never used	Tried a little	0.8	Stochastic use probability distribution	know which variable can influence the risk	B
8	Public health	MSc	Actively involved	D	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Never used			0.8		know which variable can influence the risk	A
9	Food safety	Graduated	Partially involved	B	heard about it, did not really understand	worked with it a little, still feeling insecure	heard about it, did not really understand	heard about it, did not really understand	worked with it a little, still feeling insecure	Never used	Never used		0.8		know the best parametric distribution	A
10	Food safety	MSc	Partially involved	B	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	heard about it, did not really understand	Understand it, but have never worked with it	Never used	Never used	Used and confident	0.16	Stochastic only run in R	know which variable can influence the risk	B
11	Chemistry	PhD	Partially involved	C		heard about it, did not really understand	Understand it, but have never worked with it	heard about it, did not really understand	heard about it, did not really understand	Never used	Never used	Used but feel insecure using it	0.2		separate variability from uncertainty	A
12	Food safety	PhD	Actively involved	D	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Never used	Never used	Used and confident	0.16	Stochastic only run in R	know which variable can influence the risk	C
13	Veterinary Medicine, Food safety	Graduated	Partially involved	A,B,C,D	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Understand it, but have never worked with it	Understand it, but have never worked with it	Never used	Never used	Used and confident	0.2		know which variable can influence the risk	A,C
14	Food safety	PhD	Partially involved	A	heard about it, did not really understand	Not heard of	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Never used	Never used	Used but feel insecure using it				
15	Food safety	Undergraduate	Partially involved	A	worked with it a little, still feeling insecure	Not heard of	Understand it, but have never worked with it	Not heard of	Understand it, but have never worked with it	Never used	Never used	Used but feel insecure using it	0.16			A
16	Food production for landless	Graduated	Actively involved	D	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Not heard of	worked with it a little, still feeling insecure	Never used	Never used				know the best parametric distribution	D
17	Food safety	MSc	Partially involved	C	worked with it a little, still feeling insecure	heard about it, did not really understand	heard about it, did not really understand	Not heard of	worked with it a little, still feeling insecure	Never used	Never used	Tried a little	0.16	Stochastic use fixed values	know which variable can influence the risk	A
18	Law	Undergraduate	Have never learn	A	Not heard of	Not heard of	Not heard of	Not heard of	Not heard of	Never used	Never used	Used but feel insecure using it	0.2			E

#	Field	Education	Involvement	Letter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Num	Stochastic	Description	Final
19	Law	Undergraduate	Have never lear[ned]	A,B,C	heard about it, did not really understand	Not heard of	Not heard of	Not heard of	heard about it, did not really understand	Never used	Never used	Tried a little	0.2	Stochastic use probability distribution	separate variability from uncertainty	E
20	Agriculture	PhD	Partially involved	A	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Never used	Never used	Used and confident	0.16	Stochastic use probability distribution	know which variable can influence the risk	A
21	Public health, Food safety	PhD	Partially involved	A	worked with it a little, still feeling insecure	Not heard of	worked with it a little, still feeling insecure									
22	Food safety	Graduated	Activetly involved	D	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Understand it, but have never worked with it	worked with it a little, still feeling insecure	Never used	Never used	Used and confident			know which variable can influence the risk	A
23	Public health, Food safety, Veterinary	PhD	Partially involved	C	worked with it a little, still feeling insecure	heard about it, did not really understand	heard about it, did not really understand	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Never used	Never used	Used and confident	0.2	Stochastic use probability distribution	know which variable can influence the risk	B
24	Food safety	PhD	Partially involved	C	heard about it, did not really understand	Not heard of	Not heard of	Not heard of	heard about it, did not really understand	Never used	Never used	Used and confident	0.4	Stochastic use fixed values	separate variability from uncertainty	B
25	Food safety	PhD	Partially involved	B	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Understand it, but have never worked with it	Understand it, but have never worked with it	Never used	Never used	Never used	0.8	Stochastic use fixed values	separate variability from uncertainty	A
26	Food safety	Graduated	Partially involved	B,C	worked with it a little, still feeling insecure	heard about it, did not really understand	heard about it, did not really understand	Not heard of	heard about it, did not really understand	Never used	Never used	Used but feel insecure using it	0.8	Stochastic use fixed values	know which variable can influence the risk	A
27	Public health	Graduated	Have never learned	A	Not heard of	Not heard of	Not heard of	Not heard of	Not heard of	Never used	Used but feel insecure using it	Used and confident	0.16	Stochastic use probability distribution	know which variable can influence the risk	B
28	Public health	PhD	Partially involved	A	heard about it, did not really understand	Not heard of	heard about it, did not really understand	Not heard of	heard about it, did not really understand	Never used	Never used	Used and confident	0.2	Stochastic only run in R	know which variable can influence the risk	B
29	Public health	PhD student	Partially involved	B	worked with it a little, still feeling insecure	Not heard of	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Never used	Tried a little	Used and confident	0.8		understand costs and benefits of the project	C
30	Veterinary Medicine	PhD student	Partially involved	A	heard about it, did not really understand	heard about it, did not really understand	heard about it, did not really understand	heard about it, did not really understand	Not heard of	Never used	Never used	Tried a little	0.8	Stochastic use probability distribution	know which variable can influence the risk	B
31	Veterinary Medicine	MSc	Partially involved	C	worked with it a little, still feeling insecure	Understand it, but have never worked with it	Understand it, but have never worked with it	Not heard of	worked with it a little, still feeling insecure	Never used	Never used	Never used	0.4	Stochastic use probability distribution	know which variable can influence the risk	B
32	Veterinary Medicine	Graduated	Partially involved	A	heard about it, did not really understand	Not heard of	heard about it, did not really understand	Not heard of	heard about it, did not really understand	Never used	Never used	Used but feel insecure using	0.4	Stochastic use fixed values	understand costs and benefits of the project	B
33	Veterinary Medicine	MSc	Partially involved	B	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	worked with it a little, still feeling insecure	Understand it, but have never worked with it	heard about it, did not really understand	Never used	Never used	Never used	0.4	Stochastic use probability distribution	know which variable can influence the risk	C
34	Veterinary Medicine	MSc	Partially involved	A	Understand it, but have never worked with it	Not heard of	heard about it, did not really understand	Not heard of	Not heard of	Never used	Never used	Used but feel insecure using it	0.4	Stochastic use probability distribution	know which variable can influence the risk	B
35	Public health	Graduated	Partially involved	C	Understand it, but have never worked with it	worked with it a little, still feeling insecure	Understand it, but have never worked with it	Understand it, but have never worked with it	Understand it, but have never worked with it	Tried a little	Tried a little	Used and confident	0.2	Stochastic use probability distribution	know which variable can influence the risk, know the best parametric distribution	A
36	Food safety	MSc	Activetly involved	D	worked with it a little, still feeling insecure	heard about it, did not really understand	worked with it a little, still feeling insecure	Understand it, but have never worked with it	worked with it a little, still feeling insecure	Never used	Never used	Never used			know which variable can influence the risk	B
37	Public health	Graduated	Have never learned	A	heard about it, did not really understand	Not heard of	Not heard of	Not heard of	heard about it, did not really understand	Never used	Never used	Used and confident	0.16	Stochastic use two parameters	know which variable can influence the risk	A

Post-course evaluation result

1_Field of study/ Expertise	2_Level of education	3_No. of days attended	4_1_risk assessment framework	4_2_probability of getting contaminated chicken served	4_3_difference between models	4_4_how to write probability of AIDS given HIV infection	4_5_p-value of 0.01	4_6_NOT true regarding incubation period	4_7_statement belonging to visual framework	4_8_sensitivity analysis	5_plan to use knowledge gained in this course	6_facilitators (see detailed evaluation for each facilitator)	7_logistics (see details next tab)	8_topics should be more emphasized in the future	9_addtional topics to be included	10_topics should be less emphasized or considered for eliminations	11_recommend the course to others
Veterinary medicine	Graduated	Every day	B	C	D	A	A	C	A3,B1,C2	C	B			Country based risk assessment and possible solution	Case study of country in which the course is conducted	N/A	A
Veterinary medicine	PhD student	Every day	B	C	D	A	A	B	N/A	C	C			some basic epidemiology terms must included	region based course and condition	reduce more technical sesion	A
Veterinary medicine	MSc	Every day	B	C	D	A	A	B	N/A	C	C			Risk management	reduce more technical topics but also need practical country based solution and risk	more technical points should be reduced	A
Veterinary medicine	MSc	Every day	D	C	D	A	A	C	N/A	C	C			Risk management	country based problem which is severe and its solution	technical topics should be reduced or presented more easier	A
Veterinary medicine	Graduated	Every day	D	C	D	A	A	B	N/A	C	B			sensitivity analysis	country based food item and their risk and hazard analysis	more technical topics should be reduced	A
Public Health	Graduated	Every day	B	C	D	D	B	C	A2,B1,C3	C	A			exposure assessment and stochastic model	more time for mathmatical analysis	less emphasized on theoritical explanation, more emphasized on mathmatical or software analysis	A
Food safety	MSc	Every day	B	C	D	D	B	C	A2,B1,C3	C	B			risk assessment	N/A	duration of course should be extended for better understanding and comprehension	A
Veterinary medicine	Graduated	Every day	B	C	D	D	B	C	A2,B1,C3	C	A			RA by deterministic, stochastic model need to be more extensive & elaborate	N/A	N/A	A
Food safety	PhD	Every day	D	C	D	D	N/A	N/A	N/A	N/A	A			case study aflatoxin	Basic statistics	N/A	A
Public health, Veterinary medicine, food safety	PhD	Every day	B	C	D	A	D	C	A3,B2,C1	D	B			risk assessment	statistical analysis	N/A	A
Food safety	MSc student	Every day	D	C	N/A	C	D	B	A2,B1,C3	C	B			N/A	N/A	N/A	N/A
Public health	MSc student	Every day	D	C	D	C	D	C	N/A	D	A			statistical presentation (at first basics shouldbe oriented)	basics of statistics to elaborate findings/reports	N/A	A
Horticulture	PhD	Every day	B,C	C	D	C	B	B	N/A	C	A			dose response	post harvest spoilage and its risk analysis	the course is good	A

#	Field	Education	Frequency											Q1	Q2	Q3	Q4
15	Food Safety	MSc student	Every day	B,C	C	N/A	C	B	B	N/A	C	A		risk analysis	post haverst technology	N/A	A
16	Food Safety	Graduated	Every day	B	C	D	A	N/A	A	N/A	C	E		mathatical	more national content	N/A	A
17	Public health, Food safety	PhD	Every day	B	C	D	A	B	C	N/A	N/A	A,B		analysis & ice-breaking should be added	commonly consumed food (a few)	analysis part should be more emphasized	A
18	Public health	Graduated	Every day	B	C	D	A	N/A	C	A3,B1,C2	D	C		exposure assessment	food safety acceptable value for Bangladesh	N/A	A
19	Food safety	PhD	Every day	D	B	D	B	D	B	N/A	C	B		prepare a project to help me to risk management	more clarfication of stochastic and deterministic model	theoretical lecture should be eliminated	A
20	Food safety	PhD	Every day	D	B	D	B	D	B	N/A	C	B		Risk management	risk forecasting system	theoretical lectures should be lessen	A
21	Veterinary medicine	PhD student	Do not want to mention	B	C	D	C	B	C	N/A	C	C		dose response, risk characterisation, building risk model	N/A	basic statistics, risk communication	A
22	Agriculture	PhD	Every day	B	C	C	D	B	A	A2,B3,C1	C	A		hazard and risk analyis framework	risk and hazard for crop products/ agri products	risk analysing/ calculation and model	A
23	Food safety	Undergraduate	Do not want to mention	N/A	C	D	D	C	B	A2,B1,C3	C	C		economical evaluation	N/A	N/A	N/A
24	Food safety	Graduated	Every day	B	D	D	D	C	B	A3,B2,C1	C	C		N/A	more practical examples based on the specific area	N/A	A
25	Food safety	MSc student	Every day	B	C	C	D	C	B	A3,B1,C2	C	A		risk communication and risk assessment	details-HACCP-training	basic statistics and probability	A
26	Food safety	PhD	Every day	D	C	C	B	D	C	N/A	B	D		N/A	Comparative analysis	risk assessment	A
27	Public health	Graduated	Every day	D	C	C	D	B	A	A2,B3,C1	C	E		value chain	value chain should have got more focus	N/A	A
28	Public health	Graduated	Every day	B	C	C	D	B	A	A2,B3,C1	C	E		N/A	N/A	N/A	A