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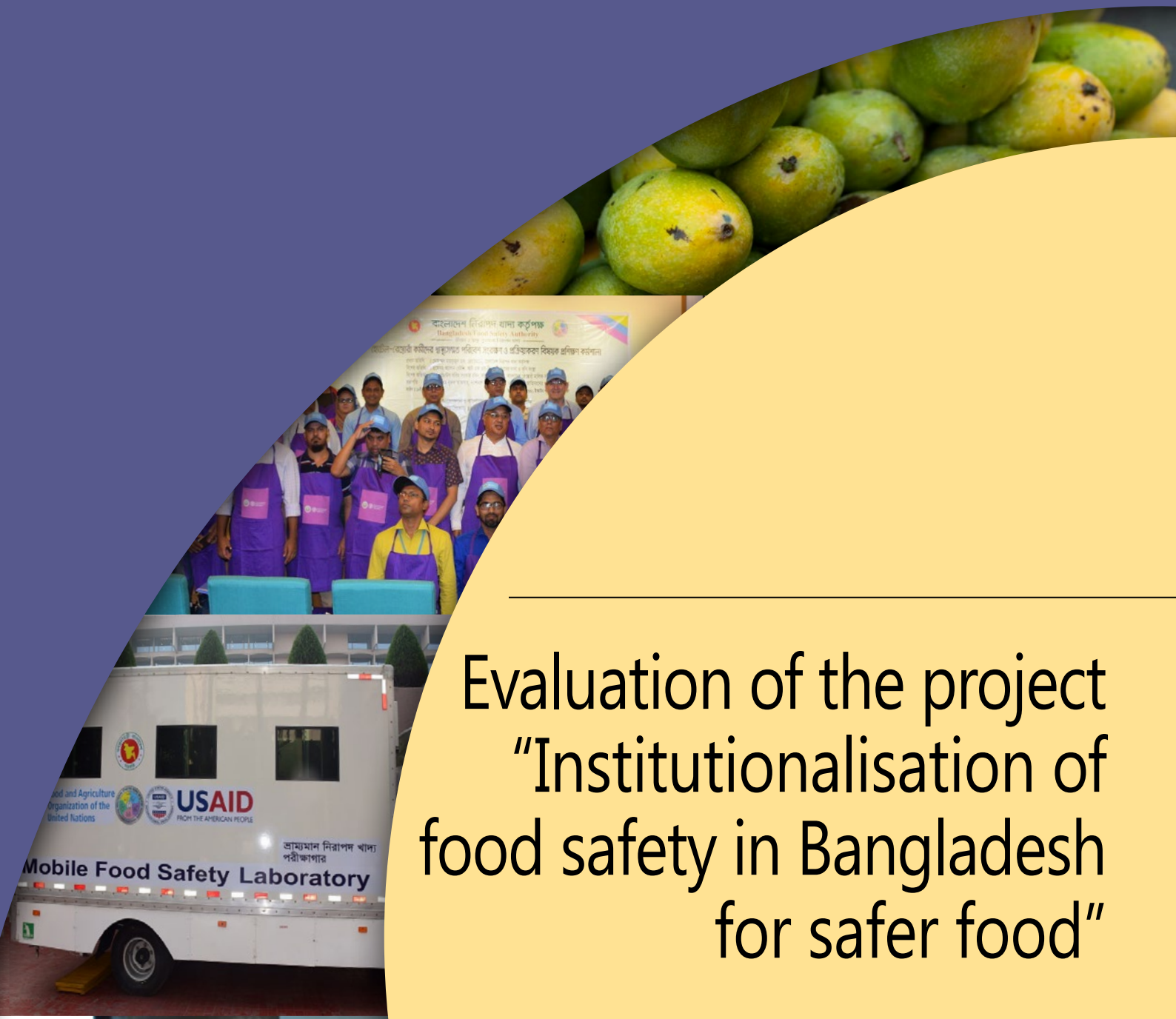

Evaluation of the project "Institutionalisation of food safety in Bangladesh for safer food"

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Project code: GCP/BGD/054/USA

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Abstract

The report presents the main results of the final evaluation of the project "Institutionalisation of food safety in Bangladesh for safer food" (IFSB) funded by the United States Agency for International Development (USAID) and implemented between 2013 and December 2019.

The project was very relevant as implemented at a perfect time while the country was establishing its new food safety authority (the Bangladesh Food Safety Authority [BFSA]). Notable results were achieved in supporting the newly created authority by helping to define its role, objectives and activities as well as draw up standard operating procedures (SOPs) and codes of practice (COPs). The project contributed to strengthen institutional coordination and defining mechanisms for establishing standards and regulations. It also created a strong drive to adopt an integrated 'farm-to-fork' approach in two important economic sectors, namely the poultry and mango sectors.

Important advances were made in raising awareness of the notion that food safety is a shared responsibility between public services, food business operators and consumers. The large media campaigns initiated were effective in reaching consumers, and the various training activities and workshops organized were beneficial and well received by food business operators (FBOs).

Awareness was raised among public authorities and stakeholders of the need for a risk-based approach with regard to allocating public resources for food control and inspection. While the project provided support for the implementation of a risk-based inspection approach, it did not sufficiently addressed the development of data collection and processing skills, risk ranking and risk assessment tools, as well as more generally did not sufficiently integrate the principles of risk analysis applicable to food safety systems.

The extensive training conducted helped to increase the level of awareness of most actors and to develop a general culture conducive to enhanced food safety. While the project trained a large number of people, in some cases the limited duration of such training did not allow for a significant increase in participants' technical capacities. Finally, the introduction of a Bachelor of Science (BSc) degree course in food safety management is an important achievement for medium and long-term capacity development that needs to be sustained after project end.

The main recommendation of the evaluation is for FAO to support BFSA in conducting a self-assessment of the food control system in Bangladesh to identify priority areas for improvement, and to plan sequential and coordinated activities.

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Acknowledgements

The FAO Office of Evaluation (OED) would like to thank all those who contributed to this evaluation. The evaluation team was composed by a lead evaluator, Dr Moez Sanaa, by a subject matter specialist, Mr Rashid Harunur, and managed by Genny Bonomi (Evaluation Officer, OED).

The evaluation was carried out with the invaluable assistance of FAO personnel at country level and in particular Md Masud Alam.

The evaluation benefited from the inputs of many other stakeholders, including government officers, research centres and private sector. Their contributions were critical to the team's work and are deeply appreciated.

Abbreviations and acronyms

BAB	Bangladesh Accreditation Board
BFSA	Bangladesh Food Safety Authority
BSTI	Bangladesh Standards and Testing Institution
COP	Code of practice
FAO	Food and Agriculture Organization of the United Nations
FBO	Food business operator
HACCP	Hazard Analysis Critical Control Point
IFSB	"Institutionalisation of food safety in Bangladesh for safer food" project
SOP	Standard operating procedure
USAID	United States Agency for International Development

Executive summary

1. The "Institutionalisation of food safety in Bangladesh for safer food" (IFSB) project (GCP/BGD/054/USA), funded by the United States Agency for International Development (USAID), has been implemented between 2013 and December 2019. The project was designed by the Food and Agriculture Organization of the United Nations (FAO) in consultation with the Ministry of Food to: i) support the operationalization of the newly established Bangladesh Food Safety Authority (BFSA); ii) assist the revision of food regulations, rules and standards to increase coherence; iii) improve coordination among the different agencies and ministries involved in food safety; and iv) support the development of third-party verification/inspection system.

2. The evaluation was conducted by a team of external independent consultants with food safety system and country-specific expertise supported by FAO's Office of Evaluation (OED). The main purpose of the evaluation was to assess the relevance of the project and of its implementation strategy, document results achieved in strengthening the capacity of BFSA and their sustainability, and provide information to define future activities in support of food safety in Bangladesh.

3. Throughout the process, the evaluation was facilitated by the project team and the FAO Representation in Bangladesh. The evaluation relied on multiple sources and diverse methods of data collection: document review, data analysis, analysis of evidence from past evaluations and interviews with stakeholders at country level which took place between December 2020 and January 2021.

Main evaluation results

4. The project was very relevant to Bangladesh, implemented at the perfect time while the country created its new food safety authority BFSA dedicated to protecting the consumer with a mission to streamline the nation's food control services, which were dispersed across a multiplicity of government departments and agencies.

5. In its conception the project properly considered the aspirations of the country in terms of its sustainable development, especially food security and safety, and the economic development of the agri-food sector. The project addressed the need for modernization and harmonization of the legislative arsenal in the domain of food safety. The assistance provided by this project in the establishment of BFSA and the strengthening of inter-governmental cooperation is a response to initiate a coherent policy to reduce the burden of food-borne diseases.

6. Various projects directly or indirectly related to food safety are ongoing in Bangladesh, and although there is an obvious overlap between them the project under evaluation was complementary, in that it was practically the only one that addressed higher-level organizational aspects to achieve the expected results for institutional capacity building at the national level. The activities and their sequencing were well coordinated with the different stakeholders in consultation with the Government of Bangladesh.

7. Furthermore, the project has undertaken a considerable endeavor to gather the various traditional food safety stakeholders around the table and thus ensure greater coherence between activities across the food control system in Bangladesh. The project was well designed to involve different stakeholders, but in practice the involvement of the private sector has been less successful.

8. Notable results were achieved in supporting the establishment of BFSA. The BFSA's strategic plan shows that a substantial amount of work was undertaken to define the roles, objectives and

activities of the new structure as well as draw up standard operating procedures (SOPs) and codes of practice (COPs). The project strengthened institutional coordination, including mechanisms for establishing standards and regulations.

9. Food safety testing capacity remains a weak element of the food control system in Bangladesh. Coordination of laboratory activities remains weak. Moreover, laboratory activities are not properly geared towards generating data suitable for risk assessments or describing food sectors for the purpose of establishing a risk-based control and inspection system.

10. The project provided support for the implementation of a risk-based inspection approach. However, it did not sufficiently addressed the development of data collection and processing skills, risk ranking and risk assessment tools, and more generally did not sufficiently integrate the principles of risk analysis applicable to food safety systems.

11. The project contributed to raising awareness among public authorities and stakeholders of the need for a risk-based approach with regard to allocating public resources for food control and inspection. However, a real risk-based inspection or control policy is not yet feasible due to the lack of basic industry information and absence of a risk assessment for the major biological and chemical hazards in Bangladesh, as well as the lack of staff with related experience.

12. The project created a strong drive to adopt an integrated 'farm-to-fork' approach in two important economic sectors, namely the poultry and mango sectors, which has facilitated compliance with good agricultural practices (GAP) and good hygienic practices (GHP), and the initiation of Hazard Analysis Critical Control Point (HACCP) implementation. This is an important achievement, which now needs to be complemented by robust risk assessment or risk ranking activities to enable the risk-based approach to food safety in these two sectors.

13. The project made important advances in raising awareness of the notion that food safety is a shared responsibility between public services, food business operators and consumers. The large media campaigns initiated by the project were effective in reaching consumers, and the various training activities and workshops organized with the help of international experts were beneficial and well received by food business operators (FBOs).

14. The project contributed to increase the Bangladesh Accreditation Board (BAB) experience in the implementation of a third-party audit and verification system. However, the project was not able to move forward and involve third parties to undertake better risk profiling of FBOs through information transfer to the public authority in charge of food control systems.

15. The project allocated a lot of resources towards training a large number of technicians and managers that work in the public and private sectors. Even if the training helped to increase the level of awareness of most actors and develop a general culture conducive to enhanced food safety, in some cases the limited duration of such training did not allow for a significant increase in participants' technical capacities. This is the case for the training of inspectors as the survey sent to participants showed that a large number of them did not master some of the basic concepts of risk-based inspection. It would have been beneficial to accompany participants for a longer period of time to allow for better integration of concepts.

16. Finally, the introduction of a Bachelor of Science (BSc) degree course in food safety management is an important achievement for medium and long-term capacity development that needs to be sustained after project end.

17. The project contributed significantly to the setting up of a competent national food safety authority in Bangladesh, however there is a risk that some of the main achievements will not last. Indeed, different external political factors need to be considered by the government to ensure the progress of food safety.

Recommendations

18. Based on the evaluation results, the evaluation proposes the following recommendations:

Recommendation 1. FAO should support BFSA in conducting a self-assessment of the food control system in Bangladesh to identify priority areas for improvement, and to plan sequential and coordinated activities to reach the expected outcomes using the 'Food Control System Assessment Tool' (FAO and WHO, 2019). By repeating the assessment on a regular basis, Bangladesh will be able use this tool to monitor their progress.

Recommendation 2. FAO should support BFSA in building a multi-disciplinary risk assessment team. Core competencies for such a team might include epidemiology, biostatistics, microbiology, toxicology, data science and food science. This team, through an advanced training cycle in risk assessment methodologies, could constitute the platform for scientific expertise in food safety.

Recommendation 3. The evaluation recommends for FAO to consider the following areas of work for future support to BFSA:

i. data literacy activities that will promote the creation of a data ecosystem for a data-driven food control system;
ii. collaboration such as the twinning projects supported by the European Commission – this type of project will allow BFSA to establish close contacts with food safety agencies that have experience and expertise in providing scientific advice to inform food-safety policy makers; and
iii. test and evaluate how a voluntary third-party assurance (vTPA) programme can be implemented in Bangladesh – although Output 3 of this project addressed the issue of third-party certification, there are still many obstacles to overcome to create a true public–private partnership for better enforcement of hygiene rules and compliance with food safety standards; this type of partnership, which was considered by the project but not yet achieved, could be the solution for the implementation of a real risk-based food safety system and risk-based inspection.

1. Introduction

1. This report outlines the main findings and conclusions of the final evaluation of the "Institutionalisation of food safety in Bangladesh for safer food" (IFSB) project (GCP/BGD/054/USA), funded by the United States Agency for International Development (USAID) and implemented between 2013 and December 2019.

1.1 Purpose of the evaluation

2. The main purpose of the evaluation was to document the results achieved by the project in strengthening the capacity of the Bangladesh Food Safety Authority (BFSA) and identify the areas for which additional support is still required. This analysis provides the Food and Agriculture Organization of the United Nations (FAO) as well as its partners with information to define future activities in support of BFSA, and it could be used to guide the mobilization of additional resources in support of food safety at country level.

3. The evaluation also provides some reflexions that could be useful for other countries that are embarking on developing their food safety systems, as well as for donors that want to support these processes. Indeed, the challenges Bangladesh is facing in developing its food safety system are common to many other countries.

4. The main audience of the evaluation is FAO at the national level, the main national counterparts BFSA and the Ministry of Food, and USAID as resource partner. Other ministries and national agencies/institutions involved in this project and more in general in the food safety sector in Bangladesh might also benefit from the evaluation results.

1.2 Scope and objective of the evaluation

5. The evaluation covered all activities implemented by the project from its starting date in September 2013 to its closure in December 2019. The main objectives of the evaluation were to: i) assess the relevance of activities implemented; ii) evaluate results achieved by the project and their sustainability; iii) assess the implementation strategy (in particular, collaboration and quality of partnerships developed with implementing partners); and iv) draw lessons from this experience.

6. The evaluation focused on five overarching group of questions:

   i. Strategic relevance: to what extent does this project meet the expectations and needs of Bangladesh under its Sixth and Seventh Five Year Plan (2011–2015 and 2016–2020)? What is the relevance of this intervention and its influence on BFSA's needs and development?
   ii. Coherence: how does the project fit into the overall portfolio of development interventions undertaken in Bangladesh, and what are the connections made between the different implemented interventions? Who are the stakeholders involved in food safety and has the project considered and coordinated their actions? Has the project generated specific synergies with other initiatives?
   iii. Effectiveness and contribution to results: the degree to which objectives have been achieved, prioritized according to their importance. What are the main results (outcomes) obtained as a result of the implemented activities and the three project outputs? Specifically, the evaluation will assess the extent to which the project was:
      - successful in supporting BFSA during its start-up period in addressing its capacity to define a national food control strategy, produce science-based food regulations

and standards, provide independent technical and scientific advice, coordinate laboratory control capabilities, manage food-related risks by involving front-line agencies and private food sectors, and communicate risk to consumers, public health professionals and the food industry;

- an instrument to maintain and strengthen inter-ministerial and inter-agency collaboration and coordination on food safety and thus provide a path for BFSA's operationalization;
- successful in promoting an integrated approach to food safety in food supply chains;
- successful in strengthening the capacities of national actors involved in food safety; and
- successful in enhancing awareness on food safety issues and food safety practices at national and local level (for example through the use of media and social media to influence public opinion).

iv. Effectiveness: the extent to which the project delivered results in an economic and timely way. More specifically, the evaluation will assess: i) how the strategy adopted by FAO in the implementation of the project enabled the conversion of inputs into outputs, outcomes, and impacts in the most cost-effective possible way, as compared to feasible alternatives in the context; and ii) the feasibility of delivering on time and if the timeframe has been adjusted appropriately to the demands of an evolving context. This includes an assessment of operational efficiency and whether the various activities have been well managed.

v. Sustainability: the continuation or longevity of the benefits of an intervention after assistance ends. To what extent have the achieved results contributed to better food safety in Bangladesh and to what extent are the generated changes sustainable? What are the existing gaps on which to focus future interventions?

vi. Gender and social equity: to what extent were gender and vulnerable groups integrated in the design and implementation of the project? How have activities implemented been sensitive to gender and the needs of other vulnerable groups?

7. The evaluation questions have been further developed into sub-questions and are presented in the evaluation matrix (Appendix 2).

1.3 Methodology

8. The evaluation was conducted by a team of external independent consultants with food safety system and country-specific expertise supported by FAO's Office of Evaluation (FAO). Throughout the process, the evaluation was facilitated by the project team and the FAO Representation in Bangladesh.

9. The evaluation relied on multiple sources and diverse methods of data collection: document review, data analysis, analysis of evidence from past evaluations and interviews with stakeholders at country level.

10. Answers to the evaluation questions and sub-questions were obtained by reviewing the reports and documents provided by the project team and by interviewing key informants. On total the team interviewed 23 stakeholders from key organisations/institutions involved in the project (see Appendix 1 for the list of organisations/institutions consulted). Teleconference interviews were guided by open-ended questions that allowed respondents to use their own terms and to direct

their responses as they wished. An online-based questionnaire was given to a representative sample of participants at the various training sessions conducted under this project (Appendix 3).

1.4 Limitations

11. The evaluation team faced challenges when it came to travel and working arrangements due to restrictions in response to the COVID-19 pandemic, and experienced delays in reaching key informants as well as compiling and obtaining data and information. The contacts and interactions with the teams and stakeholders were made through virtual meetings. The absence of physical meetings made communication a challenge and may have decreased the overall effectiveness of exchanges.

2. Background and context of the project

2.1 Context of the project

12. In 2013, the Government of Bangladesh passed the Bangladesh Food Safety Act which established the BFSA. The main duties and functions of the BFSA are to regulate and monitor the activities related to manufacture, import, processing, storage, distribution and sale of food so as to ensure access to safe food through exercise of appropriate scientific methods, and to coordinate the activities of all the organizations concerned with food safety management.

13. In consultation with the Ministry of Food, the project under evaluation was designed to: support the operationalization of the newly established authority; assist the revision of food regulations, rules and standards to increase coherence; improve coordination among the different agencies and ministries involved in food safety; and support the development of third-party verification/inspection system. The project, which was funded by USAID, was initially supposed to end in August 2016, but it was subsequently extended three times with no additional costs and finally ended in December 2019.

14. This project follows other interventions implemented by FAO in support to improving food safety in Bangladesh, in particular:

15. Between 2003 and 2005, FAO implemented the Technical Cooperation Programme "Strengthening Food Control in Bangladesh" (TCP/BGD/2901) in collaboration with the Ministry of Food and Disaster Management. The project provided training in laboratory analysis, good hygienic practice and use of Hazard Analysis Critical Control Point (HACCP) tools to improve food safety. A significant outcome of the project was the formation of the National Food Safety Advisory Council (NFSAC).

16. In 2009, FAO implemented the European Union-funded project "Improving food safety, quality and food control in Bangladesh" (GCP/BGD/038/EC) in partnership with the Ministry of Health, mainly focusing on capacity development. It was followed by another project funded by the Netherlands, "Improving food safety in Bangladesh" (GCP/BGD/047/NET), which continued working on a number of initiatives that had already started under the European Union project. Both projects worked along the entire food chain, providing support for food analysis capability and capacity, risk-based food inspection and enforcement services, setting up food-borne disease surveillance and science-based standards formulation systems, and increased food safety awareness 'from farm to fork'.

2.2 Theory of change

17. The aim of the IFSB project was to assist with the institutionalisation of food safety in Bangladesh and to contribute to the improved availability of safe food in the domestic markets, thereby improving food and nutrition security and enhancing the capacity of Bangladesh in the regional and international food trade.

18. The main outputs of the project as indicated in the terminal report were the following:

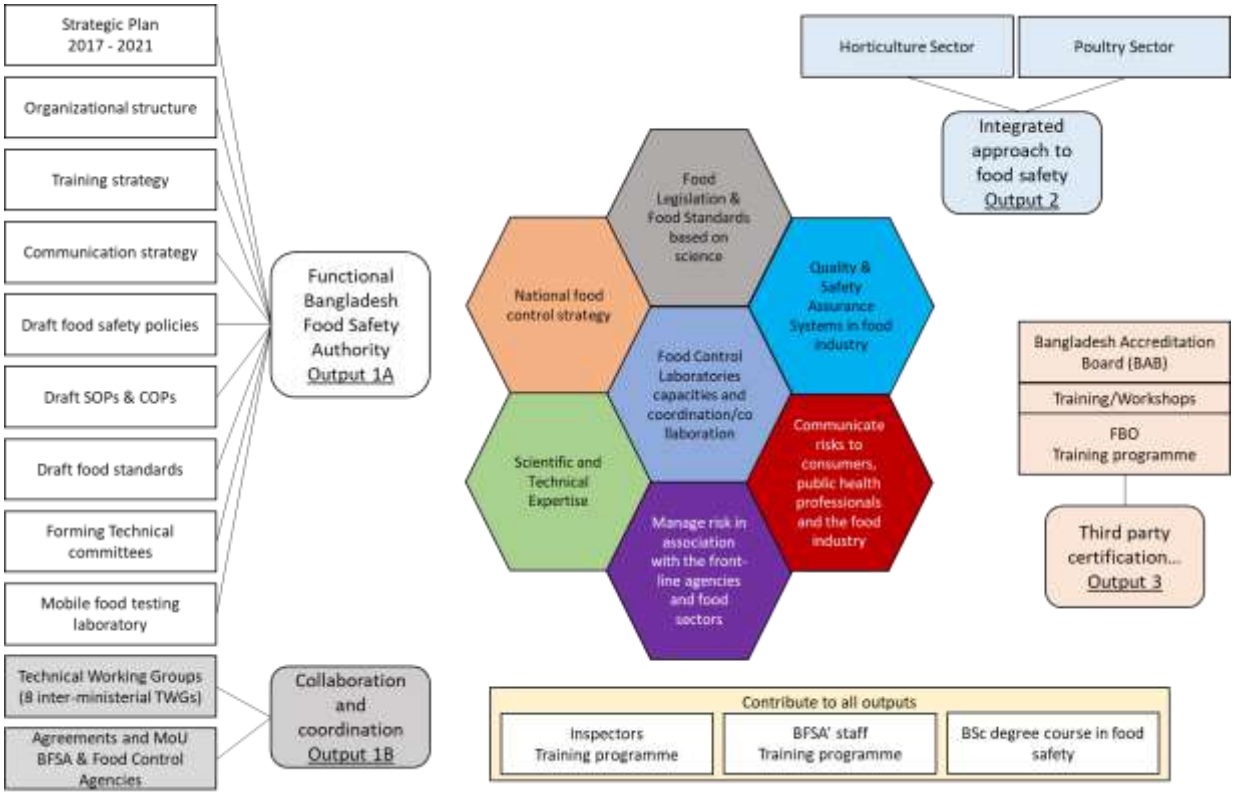
    i. Output 1A: support BFSA's start-up process;
    ii. Output 1B: provide support to strengthening inter-ministerial and inter-agency collaboration and coordination in the field of food safety control to prepare the way for operationalizing the BFSA;

iii. Output 2: effective integrated approaches to food safety in all primary sources of production; and

iv. Output 3: enabling environment for improved third-party verification, inspection and certification for national food control.

19. All of these outputs were expected to contribute directly or indirectly to the creation of a genuine national food control system in Bangladesh. To be effective, this system should have a national food control strategy, science-based food legislation and standards, coordinated food laboratory control capabilities, scientific and technical expertise, safety and quality assurance systems in the food industry, and the ability to manage risks in collaboration with other food sector agencies and communicate risks to consumers, public health professionals and the food industry (see Figure 1 below).

Figure 1. Activities, outputs and expected outcomes



Source: Elaborated by the evaluation team.

20. Based on information provided in the terminal report, the section below presents main activities implemented by the project under each output.

2.3 Main activities implemented by outputs

Output 1A. Support the start-up process of BFSA

21. Under Output 1, the project supported the institutionalisation of the BFSA as an apex coordinating body for food safety in Bangladesh assisting in developing the Strategic Plan (2017–2021) and related roadmap for implementation; the organizational structure along with the organizational chart and requisite equipment; and a communication strategy and a training strategy (2017–2020). It worked with the authority to formulate, draft and implement food safety policies, rules, regulations, standard operating procedures (SOPs) and codes of practice (COPs), and to

harmonize food safety and quality standards. The project assisted in forming technical committees, responsible for providing the authority with scientific and technical advice, and for the development of standards for food products. It also provided a mobile food testing laboratory to conduct scientific analysis of food samples at the market and field levels.

Output 1B. Inter-agency cooperation with food safety control agencies

22. Promoting cooperation among the ministries and agencies involved in food safety was one of the major focus areas of the intervention. The project supported the Ministry of Food in forming eight technical working groups and facilitated inter-ministerial and inter-agency collaboration. It assisted in developing framework agreements and memoranda of understanding between BFSA and other food control agencies.

Output 2. Effective integrated approaches to food safety in all primary sources of production (fish, animals and crops)

23. The project focused on three pilot areas – poultry, beef and horticulture. It conducted food safety risk assessments in these value chains and supported the respective technical working groups in reviewing related legislation. The project also supported the review of existing pesticide-related laws in Bangladesh.

Output 3. Enabling environment for improved third-party verification/inspection and certification for national food control

24. The project supported the Bangladesh Accreditation Board (BAB) through a training workshop and assisted BAB in formulating procedures and guidelines for accreditation of food laboratories.

25. It worked closely with BFSA and the Bangladesh Agricultural University (BAU) to develop course curricula and establish an undergraduate Bachelor of Science (BSc) degree course in food safety. While this activity was placed under Output 3, it can be considered a cross-cutting activity benefitting the other outputs. One group of students started the course in 2019 and the second in 2020.

26. Throughout the implementation of the project, a strong focus was placed on training and awareness raising, in particular as follows:

    i. Different training modules on food safety were developed and a total of 2 013 participants were trained on food safety aspects; the project also supported the organization of exposure visits and study tours; among the training activities it is worth mentioning the one provided to inspectors that reached more than 700 people.
    ii. The project conducted several awareness raising activities across the country based on the results of a study on consumer confidence and awareness on food safety issues, the Food Safety Act and relevant regulations; in 2017, it supported the organization of the Bangladesh Food Safety Conference (BFSC); starting from 2018, the Government declared February 2 as the National Food Safety Day. An important activity was the involvement of the media through training provided to journalists on how to communicate scientific information on food safety to the public audience. In addition, the project made use of social media, including by establishing and/or providing content to social media groups and platforms involving students, associations and youth, etc.

3. Findings

3.1 Strategic relevance

Finding 1. The project is in perfect alignment with the country's aspirations and needs according to its Five-Year Plan. It was designed to assist Bangladesh in implementing the core provisions of its 2013 Food Safety Act: the establishment of the BFSA and the coordination of the numerous agencies directly in charge of or indirectly involved in food control.

27. The IFSB project was aligned with the country's food safety priorities (as part of food security) that were described in the Sixth and Seventh Five-Year Plans (2010–2015 and 2016–2020, respectively), as well as the Eighth Five-Year Plan 2021–2025 as declared in 2020) and in the 2018 National Agriculture Policy. In these plans the 'food safety' policy is an essential part of the wider food security policy. Moreover, 'safe and nutritious food for all' is one of the major programmes/manifestos of the present Government of Bangladesh.

28. The project was initiated right after the formulation of the 2013 Food Safety Act and before the establishment of the BFSA in 2015 and it occurred at the right time to help the transformation of the food safety environment requested by the Government of Bangladesh.

29. The new authority, BFSA, is charged with regulating more effectively and efficiently the activities related to the production, import, processing, storage, procurement, marketing and sale of food products in a manner that ensures the right of access to safe food. The BFSA has been established under the 2013 Food Safety Act without clear policy provisions to support it and render it functional. The project under evaluation included activities to assist clarifying the position of this authority within the food safety policy, as well as to support establishing a regulatory framework to render its activities functional.

30. The project also responded to the need to strengthen the legislative framework for food safety. Indeed, legal instruments are needed to cover the different food sectors, including the primary and processed food sectors in Bangladesh.

31. In assisting the work of BFSA, the project was designed to contribute to improving the coordination of the different food safety functions performed by other agencies, such as the Department of Fisheries, the Department of Livestock Services and the Department of Agricultural Extension. Various agencies and administrations involved in food safety existed with weak communication capacity and without a well-defined scope of their activities.

Finding 2. Food safety is a serious public health issue in Bangladesh.

32. The food safety situation in Bangladesh is devastating; diseases caused by food contamination and adulteration are a major public health problem in Bangladesh. Although no studies have been conducted specifically in Bangladesh to quantify the overall public health burden of food-borne disease, the Global Burden of Foodborne Disease (GBFD) report by the World Health Organization (WHO) provides useful information for the Southeast Asian Region.

33. From the GBFD report, in the Southeast Asian Region the 31 included hazards, mainly microbial hazards, caused about 8 068[1] food-borne illnesses and nine[2] deaths per 100 000 population in

[1] 95 percent UI 3 294–20 663.

[2] 95 percent UI 4–17.

2010. For the population of Bangladesh, this would represent more than 12 million illnesses (one in 13), 14 000 deaths and 900 000 disability-adjusted life years (DALYs)[3] per year.

34. In this region, diarrhoeal disease agents contributed approximately to 50 percent of the total disease burden, mainly caused by a range of hazards including the enteropathogenic *Escherichia coli*, norovirus, non-typhoidal *Salmonella enterica*, the enterotoxigenic *Escherichia coli*, and *Campylobacter spp*. There was also a considerable burden of *Salmonella typhi*. The burden of disease due to the fluke *Opisthorchis spp*. was almost exclusively concentrated in this region.

Finding 3. Bangladesh, as an agro-industrial country, has great potential for exporting agro-processed food products, but the country has not been able to fully leverage this potential partly due to the weakness of its food safety system and food standards. The project aimed at responding to some of these weaknesses.

35. Notwithstanding various policies to support agricultural exports, they represent a small share of the country's total exports. In 2018, more than 90 percent of the USD 40.5 billion in exports from Bangladesh were ready-made garments. In contrast, agriculture-related exports were very small, including frozen food (USD 500 million or 1.3 percent), agricultural products (USD 909 million or 2 percent), leather and leather products (USD 1.02 billion or 3 percent), and jute and jute products (USD 816 million or 2 percent) (World Bank, 2020).

36. More than 50 percent of food exports from Bangladesh consist of fish and crustaceans, whether live, frozen or prepared. Shrimp is the country's second largest export commodity and shrimp exports reached a peak in volume at 96 500 tonnes during 2011/12 and then gradually declined to 68 300 tonnes during 2016/17, mainly due to poor compliance with international food safety and quality standards. The shrimp export sector suffered from periodic bans and high incidences of alerts for imports from Bangladesh (UNCTAD, 2017). Despite the government's efforts to promote better management practices (BMPs) and good agricultural practices (GAPs), awareness of international standards and HACCP, and food safety infrastructure, compliance and enforcement need to be improved.

37. Agribusinesses, as well as other public and private interviewed key informants, have identified some key bottlenecks along the agribusiness value chain, including limited access to finance, weak food quality and safety standards, poor marketing and logistics infrastructure, missing national quality and safety standards, poor marketing and logistics infrastructure (e.g. cold chains, cold storage, etc.), high cost of logistics services, lack of GAPs among farmers, and lack of modern, quality seed varieties, *inter alia*. Effective integrated approaches to food safety in all primary sources of production (Output 2), and an enabling environment for improved third-party verification, inspection and certification for national food control (Output 3) address part of these key bottlenecks along the agribusiness value chain.

38. Bangladesh has a high export potential for commodities in the global *halal* market that can be expanded (Kabir and Ali, 2020). In order to ensure this expansion, measures for quality certification and food safety are essential. The Government of Bangladesh has taken several initiatives to promote export of *halal* meat products to Muslim countries, mainly in the Near East. In 2013, the National Livestock Extension Policy was drafted to address the key challenges and constraints prevailing in livestock productions systems. The livestock programme has been supplemented by the enactment of several laws to ensure quality in meat, including the Food Safety Act (2013), the Animal Slaughter and Meat Quality Control Act (2011), the Animal Disease Act (2005), the Animal

[3] Disability-adjusted life years (DALYs) are the sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.

Product Quarantine Act (2005) and the Agro-food Processing Industry Promotion Policy (2020). One of the key policy goals of the newly formulated 'Agro-food Processing Industry Promotion Policy (2020)' is described as follows: "*during the policy implementation period (2020–2025), the food processing industry will be expanded and diversified towards making Bangladesh a regional food production and distribution hub, with particular emphasis on* halal *brands*". This project in its third-party certification component (Output 3) was contributing to the promotion of the *halal* sector.

Finding 4. The project is in line with the perspectives of improving food safety and quality that are supported by FAO and WHO.

39. The global mission of FAO and WHO in relation to food safety is to reduce the burden of food-borne diseases, thereby improving the health security and contributing to the sustainable development of Members. Especially in low and middle-income countries, the projects should help governments rely on science when setting food safety policies and regulations or making decisions about food safety events. In line with this mission, the projects were designed to promote interdisciplinarity and effective collaboration between the different sectors acting directly or indirectly in the food system, and assist the government in developing and strengthening an integrated and risk-based approach for food safety.

Finding 5. The project design has not sufficiently integrated one of the key attributes of the risk-based approach to food safety: risk analysis.

40. Beyond the standards themselves, the Codex Alimentarius (hereafter referred to as 'Codex') has established risk analysis principles for food safety that guide its *modus operandi*. These comprise three components: i) risk assessment,[4] ii) risk management[5] and iii) risk communication,[6] as well as the requirement to involve all stakeholders throughout the decision-making process and the requirement for transparency. Codex recommends that these principles of risk analysis should also be adopted by Members when developing and implementing their food safety policies and regulations.

41. The project under evaluation was intended to promote a scientific and risk-based approach. However, the project has not fully integrated the risk analysis paradigm as defined in Codex. Given the resource-constrained context of Bangladesh, a better integration of this paradigm would have provided procedures to assist in regulatory and resource allocation decisions, where the challenge is to maximize benefits and minimize risks while considering the associated costs. Risk assessment as a tool for integrating independent and transparent science to inform stakeholder policy decisions was not sufficiently developed in this project.

[4] Risk assessment: a scientifically based process consisting of the following steps: (i) hazard identification, (ii) hazard characterization, (iii) exposure assessment, and (iv) risk characterization.

[5] Risk management: the process, distinct from risk assessment of weighing policy alternatives, in consultation with all interested parties, considering risk assessment and other factors relevant for the health protection of consumers and for the promotion of fair trade practices, and, if needed, selecting appropriate prevention and control options.

[6] Risk communication: the interactive exchange of information and opinions throughout the risk analysis process concerning risk, risk-related factors and risk perceptions, among risk assessors, risk managers, consumers, industry, the academic community and other interested parties, including the explanation of risk assessment findings and the basis of risk management decisions.

3.2 Coherence

Finding 6. Overall, the development of this project is consistent with previous projects implemented by FAO and some links with ongoing projects are present.

42. Among previous project implemented by FAO, project "Improving food safety, quality and food control in Bangladesh" (GCP/BGD/038/EC), implemented during 2009–2012 under the Ministry of Health and Family Welfare, supported a number of activities aimed at developing a comprehensive draft food safety and quality policy document, reviewing capacity-building needs in inspection and food analysis, and developing guidelines and sampling requirements for inspectors. It also established a new National Food Safety Laboratory (NFSL) in the Institute of Public Health (IPH), an organization under the Ministry of Health and Family Welfare.

43. As follow-up and continuation of the activities for the development of the food control system, the Government of the Netherlands provided financial support to a second project, "Improving food safety in Bangladesh" (GCP/BGD/047/NET), which was implemented between 2012 and 2018. During the project, the Government of Bangladesh recognized the importance of food safety issues and formulated a new act – the Bangladesh Food Safety Act 2013 under which BFSA was established. The IFSB project was funded to support the start-up of the newly established institution.

44. In 2016, FAO commissioned an evaluation of these two projects. The evaluation report indicates that both projects focused on the development of an effective and well-coordinated food control system and built upon previous FAO projects (particularly GCP/BGD/038/EC). The evaluation also states that "*the cluster's two projects were complimentary in achieving the expected outcomes of building institutional and grassroots capacities. The activities and their implementation sequence were well-adjusted to ongoing policy and institutional developments in consultation with the Government of Bangladesh*." The IFSB project was operated under the Ministry of Food, while the previous two projects were operated under the Ministry of Health and Family Welfare.

45. At the time of the evaluation, FAO implemented a project titled "Meeting the Undernutrition Challenge" (MUCH) that was working with the Government of Bangladesh – operated under the Ministry of Food's Food Panning and Monitoring Unit (FPMU) – to strengthen the enabling environment for eradicating food insecurity and malnutrition. The main focus of MUCH is contributing to better sectoral and cross-sectoral work on food security and nutrition in Bangladesh.

46. Two projects are going to start on the foundation and progress made by the IFSB project: USAID has funded another project, "Bangladesh improving trade and business enabling environment" (2020–2024), working with BFSA on capacity development; in February 2021, the Japan International Cooperation Agency (JICA) signed an agreement with the Government of Bangladesh to fund and implement a project titled "Strengthening the inspection, regulatory and coordinating function of the BFSA"; this project aims to enhance food safety control systems based on the 2013 Bangladesh Food Safety Act through strengthening the inspection, regulatory and coordinating function of BFSA.

Finding 7. Despite the fragmentation of responsibilities and the numerous institutions in charge of food safety, the project was successful in bringing the key public players around the table to foster better collaboration and coordination for food control.

47. In order to involve relevant stakeholders, the project formed technical working groups under the leadership of BFSA. The members of these technical working groups come from different

organizations in the public and private sectors. In addition, the project developed certain coordination mechanisms for the participation of key stakeholders. Thus, the project interacted and involved many stakeholders from relevant institutions and entities, such as the ministries of health, livestock and fisheries, the Bangladesh Atomic Energy Commission, the Bangladesh Council of Scientific and Industrial Research, public universities and others. Gradually, the most relevant government organizations in the sub-sector (notably the Ministry of Agriculture and its departments involved with input supply, farmer support, subsidy management, production, and the storage and distribution of crops, vegetables and horticulture products) were involved throughout the project and inclusive partnerships were established.

Finding 8. In its conception the project sought to involve all stakeholders and particularly the private sector.

48. The project tried to bring government departments related to food, academia, civil society and all the different stakeholders under a common platform through different awareness programmes, seminars, symposia, etc. As part of this effort, an International Food Safety Symposium was organized in 2017 with participants from Bangladesh and abroad, including the Codex chairman, representatives from the Bangladesh Standards and Testing Institution (BSTI), the Ministry of Health and Family Welfare, city corporations, universities, and others.

49. The private sector is one of the main final beneficiaries of the capacity development activities organized by the project, and the involvement of this sector in this project is promising but will need further consideration in the future.

3.3 Effectiveness

50. This section presents the results of the project and is organized around the main outputs.

3.3.1 Support the start-up of the BFSA (Output 1A) and strengthen inter-ministerial and inter-agency collaboration and coordination in the field of food safety control (Output 1B)

Finding 9. Overall, the interviewees appreciate the effectiveness of the project in supporting the setting up of BFSA.

51. Overall, almost all of the respondents considered the FAO-implemented IFSB project as playing a foundational role towards start-up and operationalization of BFSA. In addition, concurrence was notable that the project helped BFSA to define clearly its vision and mission, and establish objectives and strategic plans.

Finding 10. The project set the stage for BFSA's technical committees, while additional efforts to make them fully operational and independent are needed.

52. Good science is essential to regulatory decision-making, and BFSA cannot ensure the translation of science into action alone. In order to set food safety standards based on sound science, BFSA must rely on strong public and private partnerships. By improving the science beyond decision-making, consumers will be more likely to receive the level of public health protection they expect and deserve.

53. For this reason, during the project period, several technical committees were formed at BFSA to support scientific advice that could contribute to the formulation of food safety regulations. Almost all the required technical and scientific expertise (such as food technology, microbiology,

toxicology, epidemiology, laboratory analytics, etc.) was present in BFSA's technical committees during the project period, and the project took initiative to develop and activate these technical committees.

54. The operating procedures and governance of these committees have yet to be defined by BFSA. It is very difficult to have an overview of the work or results of these committees, and the technical and scientific advice produced by these committees is still not significant in scale and impact.

55. The process of selecting members for these committees was not always inclusive, as some organizations nominated their representatives instead of an open call based on relevant expertise. The *curricula vitae* (CVs) and personal declaration of interest of the experts are not available, nor a short description of their fields of expertise, which makes it difficult to determine whether the current composition of these committees is optimal and will allow for a pluralistic and independent scientific expertise.

56. Some interviewees questioned the absence of private sector representatives, reflecting a lack of understanding of the need for these committees to work independently of influences that may come from private actors.

57. More critical in the project's approach is the absence of the risk analysis paradigm in the development of these scientific committees. The three components of risk analysis are: i) risk assessment, ii) risk management and iii) risk communication, which are not commonly understood by the majority of key interviewees. It is not clear to everyone that the activities of these committees fall under the umbrella of risk assessment and that these committees are expected to provide advice to inform the managers and contribute to evidence-based communication.

58. During the project, BFSA did not have enough scientific staff to provide scientific and technical advice on its own. However, since then BFSA recruited about 100 qualified food safety officers, and it is now better equipped to activate the scientific and technical boards by bringing in competent experts.

59. In general, the difficulties of establishing a fully functioning scientific and technical body within BFSA to serve public policy could be explained by the lack of clear governance of food safety in Bangladesh; for instance, the functional separation between risk assessment and risk management is not well defined and many management or assessment activities are mixed up. In addition, the risk culture and the place of science in the decision-making process deserve more advocacy.

Finding 11. The project has contributed significantly to building BFSA's capacity to establish food safety regulations and standards.

60. Long before BFSA was formed, BSTI was the government authority for different standards in Bangladesh. The International Organization for Standardization (ISO) recognizes BSTI as its Member representing Bangladesh. The project has allowed the transfer to BFSA of certain standardization activities that are more specific to food safety. For instance, as a result of this project BFSA developed the "Food Safety and Standards (contaminants, toxins and harmful residues) Regulations" (2017), which established a maximum residue limit (MRL) for acceptable daily intake (ADI) for a wide of range of substances.[7]

[7] Heavy metals, nitrates, polycyclic aromatic hydrocarbons, Polychlorinated biphenyls, dioxins, radionuclides, mycotoxins, pesticides, plant growth regulators, and antibiotics and residues in food, feed, feed ingredients and agricultural, fisheries, and livestock products, with reference to Codex.

61. Several SOPs were drafted with the support of the project (and approved by BFSA) to clarify the roles of the various regulatory drafting committees. The project also contributed to the drafting of eight rules or regulations and the translation of a law, the Food Safety Act of 2013, which was translated into English in 2016.

Finding 1. The project carried out a complete inventory of laboratory capacities and tried, without much success, to federate and coordinate the different available laboratory capacities.

62. Laboratory analyses play an essential role in the implementation of food control systems by helping to assess the level of exposure of populations, identify potential sources of contamination in the food chain and assess compliance with regulations. Laboratory services can be provided by both government and the private sector, and there are a number of examples around the world where both types of operations are working well.

63. The project was not designed to provide assistance or support for increasing laboratory capacities in Bangladesh. The objective was mainly to make the most accurate inventory of laboratory capabilities and to promote collaboration and cooperation in order to optimize the use of available capabilities. This inventory exercise was properly conducted by the project.

64. In Bangladesh, the analytical capacity is not sufficiently developed yet to deal with the large food safety challenges. The IFSB project took initiative to list analytical laboratories operated by different organizations throughout the country. A total of 50 laboratories were listed from both the public and private sectors, and a publication was produced by the project that describes these laboratories. The laboratories listed are operating mainly for research purposes; they lack improved machinery, standard methodologies and other capacities for food safety regulatory testing, and they lack accreditation. Laboratories dedicated to performing food safety testing to meet regulatory requirements are yet to be established.

65. In the view of BFSA officials, publishing a list of laboratories is only the first step towards laboratory coordination; coordination in the specific areas of food control (such as risk assessment, food contamination monitoring, accreditation and laboratory capacity development) is very much needed, however this was not in the scope of the project.

66. Memoranda of understanding (MOUs) were signed between BFSA and laboratories from different government departments of Bangladesh, and the IFSB project can be credited for having developed a framework of collaboration under BFSA to work with other agencies.

67. The project also formed a technical working group named 'Food Safety Analytical Services' which involved research and academic experts in laboratory analyses in different aspects of food safety. Analytical tools used by different public universities and government research institutes were listed, whether accredited or not.

68. For this project, two mobile laboratories were ordered, but only one was delivered. The acquisition of a mobile laboratory allocated to BFSA was essentially a communication operation where the mobile laboratory was used during different publicized restaurant inspection campaigns in the major cities. The capacity of this mobile laboratory is presently limited and its maintenance is already proving to be difficult.

Finding 13. The project was not entirely successful in building the momentum for the collection of data needed to monitor food contamination, which is a requirement for any data-driven, risk-based food safety system.

69. For a functioning food control system, it is critical to have knowledge about the current situation and trends regarding the occurrence and spread of chemical contaminants and pathogens in the food production chain. Currently, in Bangladesh there are no structured activities to monitor the contamination in primary animal and vegetable production, nor in processed food of animal and non-animal origin, nor in animal feed.

70. The BFSA is aware that universities and research institutes are conducting studies on food contamination, but these studies are usually based on a small number of samples, which are insufficient to draw conclusions and trends on the situation in Bangladesh. As a result, BFSA is now considering developing its own food contamination monitoring plan with a larger number of samples. This objective is well within the remit of BFSA, but the various exchanges with the key informants showed that BFSA still does not have the capacity to design or carry out this type of activity.

71. The project team and hired consultants did not comprise members with qualifications in epidemiology, statistics and data science. The project succeeded to demonstrate the value of having laboratories that can perform effective tests on food, while it did not raise enough awareness on the importance of statistical protocols for sampling, the logistics of taking samples and transporting them to the laboratories, the importance of collecting essential information on the origin and nature of the food sampled (metadata), or ultimately the necessity of having computer systems and skills for storing and processing data.

72. Despite efforts to raise awareness on the need to rely on science in policymaking and regulation for food safety, the project did not allocate sufficient resources to promote the collection of more reliable data on food contamination. Some studies were occasionally supported by the project to describe the contamination of certain food products, but not with a view towards having a sustainable monitoring system. In this context, the project should have carried out more activities to demonstrate that food safety cannot be managed without reliable data obtained through well-established monitoring and surveillance systems.

73. These monitoring and surveillance systems can be created in future through better collaboration of actors 'from farm to fork' and availability in the relevant agencies of qualified staff that are trained on how to organize these systems. The results of the project are limited insofar as efforts were focused on assessing the availability of laboratories and their capacity to perform high-quality analytical tests. The project was, however, not focused on developing a data-driven approach. Indeed, it lacked activities to define the objectives and methodologies of data generation further, so as to make them useful for science-based and risk-based policymaking.

74. In the absence of monitoring or surveillance data, the priorities in terms of food safety are difficult to define and different opinions are expressed by different interviewed actors – for instance that that the major problem of food safety is the fraudulent use of pesticides or veterinary drugs, arsenic in food, adulterated food, genetically modified food, environment pollutants in food, human-induced food adulteration during farm production, industrial production, marketing, and street-food vending; and this opinion is not based on real data.

Finding 14. A high number of officers were trained in risk-based food inspection under this project, but there remains a shortage of well-trained inspectors to carry out such inspections.

75. During the IFSB project, BFSA did not have its own inspectors. As a result, the trained inspectors came from other government departments (such as the Ministry of Health and Family Welfare, municipal inspectors, etc.). After the various training sessions, BFSA declared a total of 725 inspectors from other government departments as "designated inspectors".

76. The level of academic and professional background of practicing inspectors that underwent the training organized by the project is very heterogeneous, and some may have little scientific knowledge, for instance on microbiology or food hygiene. A three-day training course might therefore not be sufficient to acquire advanced skills in food inspection and more specifically in risk-based inspection. Tailored training programmes with different levels would have been more suitable for the Bangladesh context.

77. BFSA considers the current number of designated inspectors to be insufficient to perform inspections of food business operators (FBOs). Therefore, at the time of drafting this report BFSA considered assigning its 100 newly hired officers – called food safety officers (FSOs) – to perform inspections. They believe this will improve the effectiveness of inspections. In the opinion of several key informants, this decision by BFSA to appoint its own inspectors (i.e. FSOs) would contradict its mandate. According to food safety policies, BFSA should coordinate and organize inspections instead of conducting these itself.

78. Some respondents felt that BFSA does not need to do the inspections on its own, but that the FSOs could represent BFSA and be included within the inspection team (consisting of appointed inspectors) to ensure science-based decision-making.

79. While the inspections carried out under the auspices of BFSA covered Dhaka's restaurants and markets, no inspection and certification system was or is planned to be established in the agricultural sector. The BSTI is the only organization that performs inspections of agricultural products, however on a voluntary basis, with only 72 processed food products being subject to mandatory certification by BSTI. Therefore, a large part of the fresh food products is not subject to any form of food safety inspection.

Finding 15. Despite project endeavours, inspection is currently not risk-based, and remains a repressive tool rather than a preventive one.

80. The common inspection routine under BFSA is carried out by a so-called "mobile court". When a media outlet (such as newspapers, television, social media, etc.) informs the public about the sale of unsafe food products at a marketplace or restaurant, a mobile court is formed and a magistrate from the government administration is appointed to represent it.

81. While magistrates are appointed because they are the only government officials who can take legal action during the mobile court and are authorized to enforce the Penal Code of Bangladesh, magistrates who act as inspectors have no training on risk-based food inspection, which may lead to scientifically misguided decisions.

Finding 2. Despite the various obstacles, the project reached an important milestone towards developing a risk-based operational inspection, i.e. raising awareness among public authorities and stakeholders on the need for a risk-based approach with regard to the allocation of public resources for food control and inspection.

82. A guide for planning and monitoring the risk-based inspection system was developed by the project to assist inspectors in other departments.

83. The project was also successful in developing inspection procedures and grading for urban restaurants and BFSA is currently pursuing this programme. Criteria were developed for grading restaurants (graded "A+", "A", "B" and "C"), with restaurants graded "C" receiving a warning letter. While the restaurant ratings are appreciated by consumers, there is no centralized rating system to share with other organizations in a network and the list of restaurants that were rated is not

available online. In addition, there is no ranking system for other for-profit organizations such as food factories and grocery stores.

Finding 17. The project paves the way to modernize the food control system of Bangladesh.

84. The organizational structure of BFSA established with the support of the project may be viewed to have great potential for the implementation of the food safety framework in Bangladesh. However, there are some factors that may hamper the effectiveness of BFSA's food safety control: i) frequent changes in the top administration of BFSA and the appointment of officers without prior experience in food control, and ii) administration of food safety control without sufficient consideration of technical or scientific aspects.

85. Since its inception in 2015, BFSA has had three chairmen (i.e. 'chief executive officers'), who are being transferred from one government department to another. This is also the case for the four Executive Board members and other senior officers (i.e. five directors, five deputy directors and two executive magistrates), who are being seconded from different government agencies or semi-governmental organizations and will return to their parent organizations at the end of their tenure with BSFA. Most of these senior management positions, including the chairman, are occupied by officials who do not have prior work experience or academic training in food safety.

Finding 18. One of the outputs of the project was to strengthen inter-ministerial and inter-agency collaboration and coordination in the field of food safety control. Despite considerable endeavours, the project struggled to actually engage some of the traditional players and thus ensure greater coherence in the current food control system scene in Bangladesh.

86. Before the establishment of BFSA, BSTI was the authority for developing and implementing food standards. The 2013 Food Safety Act has delegated to BFSA the duties "*to specify food standards and formulate guidelines, where no quality and safety parameters or guidelines of such food is determined under existing laws*", "*to specify standards and prescribe testing procedures, if not otherwise done, of any food to be imported under existing laws, and accordingly provide necessary support to the concerned authority or organization to ensure adherence to acceptable quality parameters of food and implementation monitoring thereof*", and "*to identify strategies to harmonize safety and quality standards between the international and domestic food articles*".[8]

87. During the project, IFSB and BFSA were to work closely with BSTI, however this alliance did not work well because of conflicting interests regarding authority over different food standards. Involvement of a government research agency like the Bangladesh Council of Scientific and Industrial Research was also a failure due to conflicting and competing interests, and collaboration with IPH under the Ministry of Health and Family Welfare was problematic.

88. The 2013 Food Safety Law assigned BFSA the functions of coordination and collaboration and to act as an umbrella for food safety control. This is a big challenge for a new organization like BFSA (founded in 2015), as other departments of the ministries, much longer-standing than BFSA, had been performing these food control functions in their jurisdictions and each created its own rules, regulations, and policies. For example, BFSA is an organization under the Ministry of Food, while food inspections were (and still are) carried out separately by inspectors from local authorities, municipal corporations, the Ministry of Health and Family Welfare, BSTI and the Ministry of Agriculture, with no common procedures for food safety inspections and little coordination

[8] These three duties can be found in sections 13(2)c, 13(3)l, and 13(2)j, respectively, of the 2013 Food Safety Act.

among them (IPHN, 2021). This was and still is a great challenge for BFSA, as it was mandated to coordinate these inspections.

89. There are gaps in coordination of enforcement of the consumer law between the mobile court and BFSA. For example, in one instance BFSA gave a restaurant an "A" rating and the mobile court (run by the National Consumer Rights Protection Directorate of the Ministry of Commerce) gave it a "B" rating the next day. The mobile courts for FBOs are run independently by the Rapid Action Battalion (the anti-crime and anti-terrorism unit of the Bangladesh Police), which also creates conflicts with BFSA.

3.3.2 Effective integrated approaches to food safety (Output 2)

90. The project supported BFSA in strengthening food controls in three pilot areas – poultry, livestock and horticulture. This involved carrying out a regulatory gap analysis and needs assessment in these three sectors, focusing on food controls and regulations 'from farm to fork'. The work was carried out in close collaboration with the Department of Agricultural Extension and the Department of Livestock Services. The project analysed and prioritized rules and regulations to be drafted as well as the SOPs and COPs to be prepared for proper implementation of the 2013 Food Safety Act.

3.3.2.1 Livestock sector

91. In Bangladesh, approximately 37 percent of the total animal protein meat consumption comes from poultry. Small commercial broiler farms, defined as those with less than 5 000 birds per flock, represent 81 percent of the commercial poultry sector and provide about 78 percent of the total poultry meat supply in Bangladesh. Small-scale broiler farms are generally traditional open-system barns with natural ventilation, hand feeding and open walls. They are typically built on land owned by farmers, with low-cost locally accessible materials, and often rely on family labour.

92. In comparison with other countries in the Asia–Pacific region, the poultry sector in Bangladesh is under-developed at most of the segments of the value chain, and most notable is the weakness of the professional 'downstream' segment (i.e. slaughtering, processing, and cold chain logistics and infrastructure). Slaughtering of birds in modern slaughterhouses is limited to Dhaka and Chittagong, covering only 2–3 percent of all broilers consumed in Bangladesh, with the remaining birds being slaughtered manually in the wet markets. Wet markets are also the most important distribution channel for eggs, where over 90 percent (about 14 billion eggs per year) are sold.

93. To meet the rapidly growing domestic demand, the government aims to increase the productivity of the poultry sector of Bangladesh through the introduction of improved production techniques based on scientific knowledge (Netherlands Enterprise Agency, 2020).

Finding19. The project conducted a pilot study to illustrate the importance of defining and planning actions based on properly collected data on the poultry sector. However, the study did not take into account the data already available and the collected data were not utilized to perform a "farm-to-fork" risk assessment as per Codex guidelines.

94. In collaboration with the International Centre for Diarrhoeal Disease Research, Bangladesh, the project conducted a study to assess the occurrence of selected biological hazards in poultry meat, eggs and animal feed. The study targeted raw poultry in retail markets in Dhaka. Microbial

contamination levels of poultry meat, eggs and feed were assessed, as well as the presence of antibiotic residues and chromium levels in poultry meat, eggs and feed.[9]

95. The scope of the study was limited to 15 wet markets in Dhaka and is therefore not representative of the situation in the whole country. The final report was submitted to BFSA with the recommendation to use it as a baseline study for Dhaka and not to cover the whole country as expected.

96. The conduct of such a study is a key activity to push actors to plan their actions based on properly collected data. However, the study provides a description of the current situation of poultry meat contamination instead of conducting a risk assessment for the poultry sector. As in the case of other activities assessed, the project did not sufficiently take into account the importance of creating a dynamic for promoting data acquisition and the connection with risk assessment, which includes hazard identification, hazard characterization, exposure assessment and risk characterization.

97. Back to the study itself, it was very difficult to evaluate its protocol or to see the detailed results and how these results were interpreted and presented to the different stakeholders. In addition, the analysis did not include a review of existing studies on the poultry sector of other countries which could have contributed to a better description of the situation of the poultry sector with respect to the most important pathogens, namely Salmonella and Campylobacter, and especially the presence of some residues of veterinary drugs as well as antibiotic resistance.

98. The project also conducted another pilot study on red meat from the wet markets of Dhaka, Chittagong and Cumilla, specifically for species detection, and identification of microbiological hazards (*Escherichia coli, Salmonella* spp. and *Mycobacterium tuberculous*) and chemical hazards (antibiotics, toxic elements and pesticides). In total 230 samples were analyzed. The evaluation did not cover this study.

3.3.2.2 Mango sector

Finding 20. The project raised awareness among mango producers on the adoption of an integrated approach to food safety, the respect of GAPs for greater compliance with standards and regulations, and on the importance of adopting an approach based on reliable data. It has also helped to dispel false news and settle disputes related to the presence of pesticides and the trading of mango.

99. Mango and other fruits were subject to accelerated ripening by chemical treatment and people were scared of consuming them due to such chemical use. The food safety technical group of BSFA discussed this issue and developed a harvest calendar for mangoes, so that harvesting mangoes following the calendar would help growers prevent use of chemicals for ripening. The IFSB project circulated this calendar well through mass media, which benefitted mango growers. Moreover, SOPs on mango-ripening that were developed under this project and adopted by mango growers helped to gain the trust of the consumers and contributed to good marketability of the mangoes.

100. There was a misconception among the public that formaldehyde was being used in fruits and vegetables. To test this, the project carried out research and found that formaldehyde was not used in fruit and vegetables. The amount of formaldehyde detected during the tests was within

[9] The study mainly revealed the presence of E. coli and Salmonella resistant to five main antibiotics, namely ampicillin, sulfamethoxazole trimethoprim, tetracycline, ciprofloxacin and nalidixic acid. Chromium residues were found in all samples, although all were below the MRL. Tetracycline group residues were found in some samples, but all were below the MRL.

the normal range produced naturally by fruits or vegetables. Mass media was used to publicize these findings, which helped to dispel this misconception among the public.

101. The Bangladesh Agricultural Research Institute (BARI) was contacted by IFSB to conduct a nine-month pesticide residue analysis in horticultural crops (i.e. fruits and vegetables) in three markets (supermarkets and local markets) in the capital Dhaka during 2018. Presence of pesticide residues in vegetables were reported by BARI as high in local markets compared to supermarkets: 50 percent of samples contained pesticide residues, with 8–10 percent of samples above MRL levels. The collected data were used to take the necessary steps to resolve issues related to pesticide residues in mangoes and to facilitate the marketing of mangoes both in the domestic and export markets.

102. Particularly for exporters, IFSB helped to implement pesticide residue testing of mangoes for expert in the IPH Food Safety Laboratory established under FAO's "Improving food safety, quality and food control in Bangladesh" project. These initiatives are likely to strengthen the development of mango exports to Europe. Bangladesh currently exports mangoes to six European countries: Austria, France, Germany, Italy, Switzerland and the United Kingdom of Great Britain and Northern Ireland (The Financial Express, 2021).

103. During interview, the respondents suggested that BFSA should have programmes to utilize pesticide residue data on vegetables and fruits generated regularly by BARI.

3.3.3 Enabling environment for improved third-party verification, inspection and certification for national food control

Finding 21. The project has contributed to increasing awareness and commitment of food business operators.

104. Several interviewees believed that the project contributed significantly to raising the awareness and commitment of FBOs to food safety principles. These achievements can be attributed to the training activities, awareness campaigns and outreach programmes conducted by the project throughout the country.

105. Interviewed FBOs concurred with this assessment: for instance, one importer reported that he is no longer penalized by the authorities for non-compliance in relation to his imported meat since he learned about food safety issues through the training activities provided by the project, and he is now able to apply this knowledge appropriately.

106. The project created a lot of awareness materials and trained different industry fora (for milk, meat, etc.) to educate them on applicable food safety issues. Various consultative workshops with these fora and groups were organized by the project. The food safety requirements of the World Trade Organization (WTO) were also communicated by the project.

107. In addition to awareness raising activities, IFSB tried to create linkages between the different stakeholders in the food sector. Many people working in the restaurants were trained and provided with SOPs on hygiene practices, and the restaurants were then ranked according to their hygiene level. Many restaurants responded well to the project's interventions and cooperated in this assessment and ranking process.

Finding 22. The project contributed to raising public awareness on food safety.

108. Awareness-raising activities have improved the level of knowledge in the media, and civil society and the general public on food safety issues. For instance, a journalist who received training and

participated in awareness seminars as part of the project stated that: "*As a journalist, I was not aware of the many food safety issues in Bangladesh that the public is concerned about. The training activities, various awareness campaigns and meetings organized by the project had a very good impact on me and many other stakeholders in terms of awareness raising*".

109. More importantly, the IFSB project activities have helped to dispel many misconceptions about food security issues among lay persons. This was possible thanks to the numerous newspaper articles published and television campaigns organized to raise awareness among the public and food operators.

Finding 23. The project contributed significantly to the dissemination of key concepts of food safety management to FBOs.

110. The project conducted several workshops with food processors (for instance meat processors) to raise awareness on various food safety issues, including ISO standards, HACCP, etc. The workshops encouraged some of the larger FBOs to conduct their own awareness raising and training of their own staff on different good practices, as reported by a representative of a professional organization.

111. In addition to training activities, the project provided guidelines for maintaining food safety in food processing facilities (for example, written guidelines for meat processors on how to store and deliver meat). The training activities and guidelines specifically targeted small FBOs. Representatives of a large number of small food processing companies and technicians were trained under IFSB, in this manner disseminating good practices to ensure food safety. The inspectors trained by the project and the inspections they conducted also helped FBOs learn more about BFSA policies, practices and regulatory requirements.

Finding 24. The project contributed to increase the BAB's experience in the implementation of a third-party audit and verification system.

112. The BAB is the national authority with responsibility of the accreditation in Bangladesh. It offers accreditation programs for various types of conformity assessment bodies, such as laboratories, certification bodies, inspection bodies and training institutions. The board first commenced with laboratory accreditation and then in 2015 with certification. Accreditation is still a 'voluntary' practice in Bangladesh.

113. The policies of BAB allow third-party certification schemes, and BAB already accredited several certifying bodies in Bangladesh, which are authorized to provide certifications related to inspection and food issues (e.g. ISO 17020). The BAB has a pool of 'food safety' and 'traceability' assessors. Apart from BAB, FBOs are allowed to receive certifications from third parties (representatives of foreign or international certification schemes) operating in Bangladesh. BAB has accredited seven laboratories for food testing to date, and more are in pipeline.

114. The IFSB project provided training to a number of BAB personnel. These training activities assisted BAB to develop expertise among their assessor pools, who are now helping BAB to accelerate their activities.

115. In order to best assist BAB, BFSA should develop testing criteria and an accreditation scheme for testing laboratories so that they can offer proper testing reports. Moreover, BFSA can create provisions for third-party inspection and certification and allow both government and private organizations for inspect and certify FBOs.

Finding 25. Overall, the project established a foundation to build a common understanding of consumers and other stakeholders on common food safety issues and the importance of food safety control.

116. Most respondents credited this project for performing activities (such as meetings, seminars, exhibitions and awareness-raising events, etc.) under BFSA that helped to raise food safety awareness among the various stakeholder groups – FBOs, consumers, and law-enforcing agencies at national and local levels. This was a combined effort, with project staff and BFSA staff working closely together.

117. The project was able to convene food-related government departments, academia, civil society and all different stakeholders, fostering their mutual communication and exchange through the different awareness programmes, seminars, symposia, and other activities. In 2017, the International Food Safety Symposium was held, with domestic and foreign participants including the Codex president, and representatives from BSTI, the Ministry of Health and Family Welfare, municipal enterprises, universities, *inter alia*. Scientific discussions were held among all participants during the symposium, and the results of these open discussions as well as the presented scientific investigations were compiled to help combat some of the misconceptions that had been long debated by the public. Some of these misconceptions included use of formalin on fruits and vegetables to preserve them, use of synthetic dyes in fruits to lighten them, and 'fake' rice made of plastic.

118. The project made good progress in raising awareness, with professional organizations, food handlers, transporters, consumers and vendors now aware of the food safety issues they need to address. However, consumers and even food control authorities still have misconceptions around fraud and food safety issues. In general terms, food fraud[10] often results in a reduction in quality rather than safety. In some cases, however, food fraud can lead to public health complications, which is contrary to the general ethics of food safety. Some interviewees believe that the level of awareness regarding a common understanding of food safety and contamination is still low.

119. Overall, the project established a foundation to build a common understanding among consumers and other stakeholders of common food safety issues and the importance of food safety control. By way of IFSB's awareness activities, BFSA gained the trust of consumers, and it is now BFSA's duty to carry forward the activities initiated by the project.

3.3.4 Building capacities based on training activities provided by the project

120. The training activities provided by IFSB were effective in developing the capacity of many FBOs and inspectors to improve food safety practices. During the period from February 2015 to 31 December 2019, a total of 2 013 participants were trained on food safety aspects such as HACCP, risk-based inspection system, GAP, good hygienic practices (GHP), good manufacturing practices (GMP), and others. Twelve percent of participants were women (and 88 percent men), 64 percent government officials, 30 percent private food operators, 4 percent producers, and 2 percent were civil society representatives.

121. Most interviewees believe that training activities should be continued to maintain and increase current capacity. Following the training sessions the trainees were not monitored or supported to ensure use of the potential they gained from the training. Some interviewees also noted that the

[10] Food fraud, or 'economically motivated adulteration', is defined as the sale of food products that are not up to recognized standards in order to generate financial gain.

selection of trainees was not well thought-out and many trainees did not have the necessary background to receive or absorb the training contents.

Food inspectors training

Finding 26. The training of the inspectors was well designed, the results and the degree of satisfaction are deemed very good, however the survey conducted during the evaluation showed that a large number of participants did not master some of the basic concepts of risk-based inspection.

122. The training of inspectors involved the greatest number of participants out of all training activities. The programme for this three-day training was designed to highlight the benefits of shifting from traditional food inspection methods to a risk-based system; discuss the benefits of risk-based national food inspection management; explore the current provisions in Bangladesh for food inspection service delivery; and make a comparison with international best practices. In addition, this training addressed the development of a roadmap for introducing risk-based food inspection as a national standard throughout the food chain in Bangladesh. Many inspectors (i.e. 686) from different departments designated as food safety inspectors by BFSA attended this training, which was conducted across seventeen sessions.

123. Most inspectors who participated were glad to deepen their understanding of food safety issues. Some inspectors interviewed, however, point to the fact that "*the training made their jobs more complicated*", that is to say that the proposed procedures requires them to be more systematic during inspections and therefore their work becomes increasingly cumbersome and time-consuming.

124. To assess the effectiveness of inspector training further, an online survey was conducted as part of this evaluation. The questionnaire is presented in Appendix 3. The online survey collected responses from 419 participants (the analysis of the survey results is presented in Annex 1).

125. Regarding the training outcomes, 408 participants (or 97 percent) reported gaining self-confidence as a result of the training; 409 (97 percent) believed that the training made their daily work easier; 405 (96 percent) concurred that the training improved the quality and efficiency of their inspections; 397 (95 percent) reported increased knowledge; and 410 participants (98 percent), developed new skills as a result of the training.

126. Participants also expressed a high degree of satisfaction with the training. Indeed, the majority of respondents concurred that the training met their initial expectations, that the objectives of the training were achieved, and that the issues addressed were in line with the reality of the field and that the knowledge acquired was applied by the participants.

127. Beyond their perceptions about the training and its impact on their work lives, participants were asked about the basic concepts of the risk-based approach. A quiz was thus administered to review the concepts addressed during the training sessions, which are essential for all food safety inspectors to master. The scores obtained by the 419 respondents are relatively low; they range from 0 to 94 percent, with an average of 51 percent. Only 28 (6.7 percent) of the participants obtained a score equal to or higher than 80 percent (see Annex 1 for the details of the answers). This shows that a short training is not enough and that it is necessary to accompany these participants for a longer period of time to allow for better integration of these basic concepts.

Bachelor of Science in Food Safety Management degree

Finding 27. The introduction of a BSc degree course in food safety management is an important achievement for medium and long-term capacity development.

128. The Dublin Institute of Technology was commissioned by BFSA and the project to evaluate potential providers and assist in the development of the programme. The BAU was identified as the most suitable institution to provide the programme. The Academic Council of BAU later agreed to place the degree under the umbrella of its Interdisciplinary Institute for Food Security.

129. The curriculum is particularly challenging because of its multidisciplinary nature. It must ensure food safety 'from farm to table' based on science, and requires a wide range of additional skills from food law to rural sociology, from food safety auditing to communication, from organizational management to animal production. The programme must therefore be delivered by several academic departments, each of which makes an essential contribution.

130. The establishment of this programme was appreciated by most interviewees and the graduation of the first batch of students is expected with great enthusiasm. Previously, the country had undergraduate programmes on food technology and nutrition but there was no specialized programme on food safety. It is expected that the workforce produced by BAU will be skilled in the various aspects of food safety. The project team is anticipating that universities will start offering professional masters and short courses for mid-career professionals in both the public and private sectors to enrich their knowledge and skills in different areas of food security.

131. The interviewees suggested to: i) update curricula to provide graduates with more practical and professional food safety skills; ii) involve regulatory agencies and industries and gather their feedback when updating curricula; iii) organize internships for students in FBOs and food safety regulatory organizations; and iv) support new capacity building projects to improve curricula and overall educational offerings.

132. The universities perform well but there is a need for a more sustainable approach. Key informants recommend that funders provide more support for academic programmes in order to acquire a more skilled workforce. Also, it is important for universities to develop more collaboration with industry on food safety, as well as with government control agencies. Within the framework of its new projects, BFSA is planning to support the capacity of universities further.

3.4 Efficiency

133. In terms of the efficiency of this project, this evaluation encountered difficulties in obtaining adequate details on the criteria used to allocate resources to the various project activities.

134. The implementation of some activities was made difficult by the infancy of BFSA and the lack of qualified BFSA staff at the start of the project. Throughout the project, staff from other government departments were assigned to BFSA based more on their administrative rank or management experience and less on their experience in food safety management.

Finding 28. The project did not sufficiently involve BFSA staff in carrying out key activities for the establishment of BFSA.

135. According to the available information, most of the activities carried out for the establishment of BFSA were often conducted and supervised by project staff, with fewer contributions from BFSA

staff. A significant portion of the resources was allocated to hire exerts to carry out the main tasks related to the establishment of BFSA (such as SOPs, COPs, etc).

Finding 29. While many staff were trained, there is still a need for more selective training to produce a cadre of experts in food safety.

136. Considering the lack of an operational structure and proven expertise in food safety at country level, it was sensible of project managers to allocate a large portion of the budget to workshops to raise awareness of and provide training in modern science-based and risk-based food safety concepts. Also, it is important to highlight the efficiency of the project in creating solid frameworks for the establishment of SOPs and COPs. Through these different activities the project helped to advance this new food safety authority, which is now an indispensable component of food safety management in Bangladesh.

137. Nonetheless, some of the project's strategic choices can be questioned. For example, the decision to train a very large number of people on modern food safety basics and concepts to the detriment of a higher level of training designed to create a group of food safety experts. An intermediate solution would have been to have fewer participants in training courses, which would have enabled better trained agents with the responsibility of training other agents in turn.

138. Undoubtedly, the BSc degree programme in food safety management will educate a new generation of professionals and equip them with the scientific knowledge needed for effective food safety management. Leadership will be needed to guide this new generation of professionals.

3.5 Sustainability

Finding 30. The results achieved in setting up a new food safety authority are most likely to be sustainable.

139. Most interviewees viewed the creation of BFSA and its operationalization as a functional organization as the main achievement of the project and as a great success. The establishment of BFSA is also seen as a sustainable outcome, given that BFSA now has its own cadre of staff, is regularly provided with a sizeable budget, and programmes are being developed for the continued growth of BFSA as an organization as well as to ensure its food control activities.

140. The Government of Bangladesh recently approved a large capacity-building budget for the establishment of BFSA laboratories in eight divisional headquarters across the country, and a project funded by JICA is in pipeline to promote the food safety inspection system in Bangladesh further.

141. The 2013 Food Safety Act, and the rules and regulations formulated by the project are also considered a good basis for the sustainability of project results. In addition, BFSA quickly gained the trust of consumers, as it is perceived as an authority that is striving to ensure safe food and protect public health.

Finding 31. External factors may jeopardize the sustainability of the project achievements towards the development of BFSA.

142. The project contributed strongly to the establishment of BFSA owing to the involvement of some BFSA staff and particularly to the commitment of the national and international experts contracted under the project. To ensure the sustainability of these achievements it is important to continue

to strengthen the capacities of BFSA staff, to establish a clear internal governance of BFSA, as well as a clearer set-up for food safety governance in Bangladesh.

143. With regard to capacity development of BFSA staff, the project identified the needs clearly in terms of quality and quantity. However, after discussions with some key informants, a tendency by BFSA to recruit a larger number of agents to perform inspection activities was noted. This emphasis on quantity in terms of inspection staff risks transforming BFSA into an agency that is difficult to manage and which could lead to an administrative inertia not conducive to the implementation of tools and mechanisms for a more scientific and risk-based approach to food safety. It is important to have smaller teams with recognized expertise in food safety in general, but also officers with a strong scientific background, before contemplating such mass recruitments. The newly recruited competent teams will be tasked with planning the various food control activities while considering the available scientific facts and risk assessments. Therefore, it is important to move as quickly as possible towards the creation of a directorate whose role is to produce independent scientific advice and risk assessments without political influence.

144. The leadership of BFSA is also a limiting factor for the sustainability of project achievements. It is important that the executive committee, in addition to persons with proven management skills and experience in other governmental organizations, include executive officers with a scientific and technical background. The activities of BFSA will include food risk assessment and management, and communication activities. Therefore, it is important to create appropriate internal governance rules. For example, it is imperative that the executive committee protect risk assessments and scientific advice from political interference. Clear and transparent procedures were developed under this project to ensure that the production of scientific advice is not biased by any conflict of interest. However, implementing these procedures requires a real cultural change at all levels and the leadership of BFSA will have an important role to play in this regard.

145. Internal governance of BFSA does not remain the only question; the roles, interactions, and modes of collaboration between the different stakeholders also require better definition. The project indeed contributed to establishing agreements between the different public organizations. These agreements now need to be implemented effectively. However, in the absence of a clear government directive, there is still a lot of overlap between the activities of different public agencies. Also, a certain degree of drift in the mission of BFSA can be observed. For instance, BFSA wishes to create its own laboratories and install them in the different provinces of the country. Moreover, BFSA exhibits aspirations to lead the inspection of food and restaurants while at the time of its creation its mission was more that of a coordinator and planner than that of an executor.

4. Conclusions and recommendations

4.1 Conclusions

Conclusion 1. Relevance

146. The project was very relevant to Bangladesh, implemented at the perfect time while the country created its new food safety authority dedicated to protecting the consumer with a mission to streamline the nation's food control services, which were dispersed across a multiplicity of government departments and agencies. In its conception the project properly considered the aspirations of the country in terms of its sustainable development, especially food security and safety, and the economic development of the agri-food sector. The project addressed the need for modernization and harmonization of the legislative arsenal in the domain of food safety. The assistance provided by this project in the establishment of BFSA and the strengthening of inter-governmental cooperation is a first response to initiate a coherent policy to reduce the burden of food-borne diseases. The project is in line with the perspectives of improving food safety and quality that are supported by FAO and WHO.

147. The project provided support for the implementation of a risk-based inspection approach without addressing the development of data collection and processing skills, risk ranking and risk assessment tools, and more generally did not sufficiently address the principles of risk analysis applicable to food safety systems.

Conclusion 2. Coherence

148. Various projects directly or indirectly related to food safety are ongoing in Bangladesh, and although there is an obvious overlap between them the project under evaluation is complementary, in that it was practically the only one that addressed higher-level organizational aspects to achieve the expected results for institutional capacity building at the national level. The activities and their sequencing were well coordinated with the different stakeholders in consultation with the Government of Bangladesh. Furthermore, the project has undertaken a considerable endeavour to gather the various traditional food safety stakeholders around the table and thus ensure greater coherence between the project activities across the food control system in Bangladesh. The project was well designed to involve different stakeholders, but in practice the involvement of the private sector has been less successful.

Conclusion 3. Effectiveness

149. Notable results were achieved in supporting the establishment of BFSA. The BFSA's strategic plan shows that a substantial amount of work was undertaken to define the roles, objectives and activities of the new structure as well as draw up SOPs and COPs. The project strengthened institutional coordination, including mechanisms for establishing standards and regulations. Food-safety testing capacity remains a weak element of the food control system in Bangladesh. Coordination of laboratory activities remains weak. Moreover, laboratory activities are not properly geared towards generating data suitable for risk assessments or describing food sectors for the purpose of establishing a risk-based control and inspection system.

150. The project contributed to raising awareness among public authorities and stakeholders of the need for a risk-based approach with regard to allocating public resources for food control and inspection. However, a real risk-based inspection or control policy is not yet feasible due to the

lack of basic industry information and absence of a risk assessment for the major biological and chemical hazards in Bangladesh, as well as the lack of staff with related experience.

151. The project created a strong drive to adopt an integrated 'farm-to-fork' approach in two important economic sectors, namely the poultry and mango sectors, which has facilitated compliance with GAP and GHP, and the initiation of HACCP implementation. This is an important achievement, which now needs to be complemented by robust risk assessment or risk ranking activities to enable the risk-based approach to food safety in these two sectors.

152. The project made important advances in raising awareness of the notion that food safety is a shared responsibility between public services, food business operators and consumers. The large media campaigns initiated by the project were effective in reaching consumers, and the various training activities and workshops organized with the help of international experts were beneficial and well received by FBOs.

153. The project contributed to increase BAB's experience in the implementation of a third-party audit and verification system. However, the project was not able to move forward and involve third parties to undertake better risk profiling of FBOs through information transfer to the public authority in charge of food control systems.

Conclusion 4. Efficiency

154. The project allocated a lot of resources towards training a large number of technicians and managers that work in the public and private sectors. Even if the training helped to increase the awareness level of most actors and develop a general culture conducive to enhanced food safety, in some cases the limited duration of such training did not allow for a significant increase in participants' technical capacities. This is the case for the training of inspectors as a large number of them did not master some of the basic concepts of risk-based inspection. It would have been beneficial to accompany participants for a longer period of time to allow for better integration of concepts.

Conclusion 5. Sustainability

155. The project contributed significantly to the setting up of a competent national food safety authority in Bangladesh, however there is a risk that some of the main achievements will not last. Indeed, different external political factors need to be considered by the government to ensure the progress of food safety. Finally, the introduction of a BSc degree course in food safety management is an important achievement for medium and long-term capacity development that needs to be sustained after project end.

4.2 Recommendations

156. Based on the evaluation results, the team proposes the following recommendations:

Recommendation 1. FAO should support BFSA in conducting a self-assessment of the food control system in Bangladesh to identify priority areas for improvement, and to plan sequential and coordinated activities to reach the expected outcomes using the 'Food Control System Assessment Tool' (FAO and WHO, 2019). By repeating the assessment on a regular basis, Bangladesh will be able to use this tool to monitor their progress.

Recommendation 2. FAO should support BFSA in building a multi-disciplinary risk assessment team. Core competencies for such a team might include epidemiology, biostatistics, microbiology, toxicology,

data science and food science. This team, through an advanced training cycle in risk assessment methodologies, could constitute the platform for scientific expertise in food safety.

Recommendation 3. The evaluation recommends for FAO to consider the following areas of work for future support to BFSA:

i. data literacy activities that will promote the creation of a data ecosystem for a data-driven food control system;
ii. collaboration such as the twinning projects supported by the European Commission – this type of project will allow BFSA to establish close contacts with food safety agencies that have experience and expertise in providing scientific advice to inform food-safety policy makers; and
iii. test and evaluate how a voluntary third-party assurance (vTPA) programme can be implemented in Bangladesh – although Output 3 of this project addressed the issue of third-party certification, there are still many obstacles to overcome to create a true public–private partnership for better enforcement of hygiene rules and compliance by establishments with food safety standards; this type of partnership, which was considered by the project but not yet achieved, could be the solution for the implementation of a real risk-based food safety system and risk-based inspection.

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Appendix 1. Organizations and institutions consulted

Bangladesh Accreditation Board (BAB)
Bangladesh Agricultural Research Institute (BARI)
Bangladesh Agricultural University (BAU)
Bangladesh Council of Scientific and Industrial Research (BCSIR)
Bangladesh Food Safety Authority
Bangladesh Frozen Meat Association
Bangladesh Standard and Testing Institution (BSTI)
Beangal Meat Ltd.
BSAFE Foundation
Department of Agricultural Extension
Department of Livestock Services
Dhaka North City Corporation (DNCC)
Institute of Food and Health, University College Dublin, Ireland
Institute of Public Health, Directorate General of Health Services, Ministry of Health and Family Welfare
Ministry of Food

In addition the team consulted a journalist of The Daily Business Standard and former project advisors and consultants.

Appendix 2. Evaluation matrix

Questions	Sub-questions	Source of information
1. Relevance: To what extent does this project meet the expectations and needs of Bangladesh under its 6th and 7th Five Year Plan (2011–2015 and 2016–2020)? What is the relevance of this intervention and its influence on BFSA's needs and development?		
1.1. What aspects of this project meet the main expectations and needs of the country according to the Five-Year Plans (2011–2015 and 2016–2020)?		Interviews: FAO project team members and Food supply chain main actors in Bangladesh
1.2. Has there been any evaluation of Bangladesh's needs in regard to the organization of the national food control system?		Interviews: FAO project team members and Food supply chain main actors in Bangladesh
1.3. What were the main food safety issues encountered prior to the implementation of this project?		Interviews: FAO project team members and food supply chain main actors in Bangladesh
1.4. Was there a national or regional estimate of the burden of food-borne illnesses? If yes, did such data guide the project's strategic choices?		Interviews: FAO project team members and food supply chain main actors in Bangladesh
1.5. What were the major obstacles to improving the food supply system in Bangladesh before the project was implemented?		Interviews: FAO project team members and food supply chain main actors in Bangladesh
1.6. Prior to the implementation of this project, what were the export volumes of raw and manufactured agricultural products and the government's targets for the growth of these exports for the years 2018–2019? And what actions were planned by the government and/or the food industry to ensure this growth?		Interviews: FAO project team members and food supply chain main actors in Bangladesh
2. Coherence: How does the project fit into the overall interventions undertaken in Bangladesh, and what are the connections made between the different implemented interventions? Who are the stakeholders involved in food safety and has the project considered and coordinated their actions? Has the project generated specific synergies with other initiatives?		
2.1. How does the project align with the FAO and WHO's strategic plan for improving food security and food safety?		Interviews: FAO project team members and food supply chain main actors in Bangladesh FAO and WHO strategic plans
2.2. What are the completed or ongoing projects that the project under evaluation was expected to interact with?		Interviews: FAO project team members and food supply chain main actors in Bangladesh List of ongoing projects
2.3. Did the project associate the most relevant actors to increase the chances of achieving the targeted changes? If not, who are the missing stakeholders		Interviews: FAO project team members and food supply chain main actors in Bangladesh Including non-partners

Questions	Sub-questions	Source of information
who could have helped overcome the shortcomings?		
2.4. Were there challenges related to issues of power/counter-power and competition among particular stakeholders? If yes, how were these difficulties addressed?		Interviews: FAO project team members and food supply chain main actors in Bangladesh Including non-partners
3. Effectiveness: The degree to which objectives have been achieved, prioritized according to their importance. What are the main results (outcomes) obtained thanks to the implemented activities and the three project outputs? Specifically, the evaluation will assess the extent to which the project was: • successful in supporting the BSFA during its start-up period in addressing its capacity to define a national food control strategy, produce science-based food regulations and standards, provide independent technical and scientific advices, coordinate laboratory control capabilities, manage food-related risks by involving front-line agencies and private food sectors, and communicate risk to consumers, public health professionals and the food industry. • an instrument to maintain and strengthen inter-ministerial and inter-agency collaboration and coordination on food safety and thus provide a path for BFSA's operationalization. • successful in promoting an integrated approach to food safety in food supply chains. • successful in strengthening the capacities of national actors involved in food safety. • successful in enhancing awareness on food safety issues and food safety practices at national and local level? How did the project involve the media and use social media to influence public opinion?		
3.1. Has the project effectively supported the start-up of BFSA and enabled its operationalization?	• Are BFSA's vision and missions clearly defined? • What are the values of BFSA? • What are the strategic directions of BFSA? • Which are the objectives of BFSA? • Does BFSA's organization align with its vision, mission and goals? • What is the organization chart of BFSA and the distribution of its staff in the different departments and units? • Is there an information system? How does BFSA consider collecting, storing, processing and distributing the data and information necessary for its operations? • Does the resource definition align with the agency's objectives? • What are the major achievements completed by BFSA between 2017 and 2019 that would not have been accomplished without this project?	Interviews: FAO project team members and BFSA staff

Questions	Sub-questions	Source of information
3.2. Did the project activities contribute to the BFSA's capacity to provide technical and scientific advice on food safety issues?	• What technical and scientific expertise are included in BFSA's technical committees? • Which procedures have been used to select technical committee members? • Which procedures are in place to review the scientific and technical competencies and independency of the committees' members? • What procedures are in place for the production of technical and scientific opinions, from the definition of the request to the publication of the opinion? • How does BFSA ensure the proper functioning of the committees in taking into consideration the available scientific data and their interpretation, while ensuring the contradictory debates and all the experts' views? • What are the main scientific or technical opinions produced by BFSA's Technical Committees?	Interviews: FAO project team members, BFSA staff, and stakeholders
3.3. Did the project activities contribute to the BFSA's ability to establish food safety regulations or standards?	• Who prepares food safety regulations and standards? • How does the work of technical committees relate to the work of regulatory development and food safety standards? • How many regulations or standards have been adopted during the period 2017–2019? List the main regulatory work. • What is the expected volume of work in drafting food safety regulations and standards in the coming years?	Interviews: FAO project team members, BFSA staff, and stakeholders
3.4. Did the project activities create a collaborative environment leading to better coordination and mobilization of laboratory control resources?	• How effective were the technical working groups in creating or strengthening the relationships among the various stakeholders participating in the food control system? Describe the representativeness of the groups, the selection of group members and the issues of coordination or collaboration dealt with.	Interviews: FAO project team members, BFSA staff, and stakeholders
3.5. Is the existing food contamination monitoring system deemed to be well developed and well-functioning?	• In addition to laboratory tests carried out on food specimens during official controls, is there a national/sectorial program for monitoring contaminants based on statistical sampling of foods at the production or marketing stage?	Interviews: FAO project team members, BFSA staff, and stakeholders

Questions	Sub-questions	Source of information
	• Does the project lead to a discussion on the value of developing national surveillance plans targeting specific commodities and hazards?	
3.6. Is the inspection of agriculture and food businesses operators well-developed and well-coordinated?	• Who is in charge of inspections of agri-food establishments? Are there any overlaps in the scope of inspections? What has the project done to help prevent overlaps and to better define the scope and objectives of inspections for each of the organizations in charge of official inspections? • What is the state of understanding of risk-based inspection principles? • Has the training provided to inspectors improved inspectors' knowledge on risk-based food safety? • Did the project effectively contribute to the revision of inspection procedures to align them with the risk-based principles? • Did the inspectors get the possibility to apply the knowledge learned in the different training workshops? • Do inspectors feel that their work is more effective and better understood by FBOs as a result of the training they receive and/or the procedures and guidance that have been produced in this project? • Do inspectors feel that they are well equipped intellectually and materially to carry out their inspections? If not, what are the shortcomings? • Is there a central reporting system for inspection results and are the outcomes made available and accessible to the public? What is the planned role of the BFSA in carrying out this activity?	Interviews: FAO project team members, BFSA's staff, and stakeholders Online Survey
3.7. Is the principle of food operator accountability well understood in Bangladesh?	• Did the training sessions enhance FBOs' understanding and knowledge on the concepts of GAP, GMP, GHP, PrP and HACCP? • Which actions of the project have resulted in the implementation of food safety management and hygiene principles by FBOs? • Have FBOs hired or provided food safety training to their employees?	

Questions	Sub-questions	Source of information
3.8. Has the project met the expectations for capacity building of food safety actors in Bangladesh?	• Do FBOs currently have the capacity to properly define and implement their food safety control plan? • Do the food inspectors currently have the capacity to properly conduct risk-based inspection? • Do the scientific staff of BFSA and other agencies have the capacity to design and implement surveillance or monitoring programs? • Are the principles of food safety management system, GAP, GHP, PrPs, traceability and HACCP well understood by all the food safety actors?	
3.9. Is the food-borne disease surveillance system adequately developed and what collaboration and coordination mechanisms being in place in the event of food-borne disease outbreaks?	• Who in Bangladesh is in charge of food-borne illness surveillance? • Is there periodic reporting of incident cases of gastroenteritis? • During the project period, approximately how many outbreaks of communicable diseases were reported? • Have the project activities facilitated any coordination or collaboration in elucidating the sources of the outbreaks? • Did the project establish guidelines to be used in the event of outbreaks?	
3.10. Collaboration with public health	• Did the project involve health professionals in the promotion, outreach and public education on food safety and nutrition?	
3.11. Integrated approach for poultry	• What are the significant hazards identified in the poultry sector in Bangladesh? What approach was used to identify these hazards and how did the project facilitate the implementation of this approach? • Hazards can enter at any stage of the food chain. Are the stages where hazards may enter, persist or increase well defined, as well as the roles of stakeholders in preventing or reducing the associated risk? • Did the project help establish a national poultry industry self-assessment programme?	
3.12. Integrated approach for mango	• What are the significant hazards identified in the mango sector in Bangladesh? What approach was	

Questions	Sub-questions	Source of information
	used to identify these hazards and how did the project facilitate the implementation of this approach? • Hazards can enter at any stage of the food chain. Are the stages where hazards may enter, persist or increase well defined, as well as the roles of stakeholders in preventing or reducing the associated risk? • Did the project help establish a national mango industry self-assessment program?	
3.13. Awareness on food safety	• To what extent has the project increased public and civil societies' understanding of the critical importance of food safety and its role in protecting the health of consumers and promoting national and international trade in food products? • Are consumers aware of the major health risks associated with food and what is their role in preventing or mitigating these risks? • Are consumers more confident in the food supply system?	
4. Effectiveness: The extent to which the project delivers results in an economic and timely way. In other words, the question is on how the strategy adopted by FAO in the implementation of the project enabled the conversion of inputs into outputs, outcomes, and impacts in the most cost-effective possible way, as compared to feasible alternatives in the context? Were the results completed at lower costs? Is the delivery on time? If not, has the timeframe been adjusted appropriately to the demands of an evolving context? This may include an assessment of operational efficiency and whether the various activities have been well managed.		
4.1. What was the breakdown of budgetary resources in the different categories of activities and outputs? Is this breakdown in alignment with the expected objectives?		
4.2. What were the main difficulties encountered in implementing the project work programme and how were they overcome?		
4.3. The project has been extended several times, what are the main reasons? And did these extensions affect the programme and its expected outcomes?		

Questions	Sub-questions	Source of information
5. Sustainability: The continuation or longevity of the benefits of an intervention after assistance ends. To what extent have the results achieved contributed to better food safety in Bangladesh and to what extent are the changes generated sustainable? What are the existing gaps on which to focus future interventions?		
5.1. Is the establishment of BFSA a success and are the achievements sustainable?		
5.2. Do partnership agreements between BFSA and other public or private stakeholders have the potential to be implemented and contribute to better coordination of food control activities?		
5.3. What are the obstacles or issues not addressed by the project that may hinder the implementation of a modern food safety and control system in Bangladesh?		
5.4. What are the necessary resources to keep up the momentum of this project?		
6. Gender and social equity: To what extent were gender and vulnerable groups integrated in the design and implementation of the project? How have activities implemented been sensitive to gender and the needs of other vulnerable groups?		
6.1. What was the involvement of women and vulnerable groups in the design and implementation of this project?		
6.2. Are women involved in the different project bodies (TC, technical working groups, BFSA's divisions) and what was their level of representation?		

Appendix 3. Online questionnaire

1. First name
2. Last name
3. Phone number
4. E-mail
5. Which training did you take?
6. Date of the training attended
7. In which district are you posted?

At the end of this training, do you consider that this training allowed you to:

8. Gain self-confidence: yes/no

9. Make your daily work easier: yes/no

10. Improve work quality or efficiency: yes/no

11. Improve yourself in a field that you have already know: yes/no

12. Develop new skills: yes/no

13. Did the training allow you to prepare or obtain a certification? Yes/No

14. If yes, have you obtained the desired certification? Yes/No

15. Tick a choice according to your satisfaction:

    - Did the training meet your initial expectations?
    - Do you think that you have achieved the learning objectives of the training?
    - Do you feel that the training was in line with your job or the realities of the sector?
    - Would you recommend this training course to someone working in the same sector as you?
    - Do you use the knowledge gained during the training?

16. "Food industries have the responsibility of protecting public health by reducing the risk of food-borne disease and providing food safety education and information to consumers". Do you agree with this statement? Yes/No

17. According to the WHO, the burden of food-borne disease is substantial in the Southeast Asia Region. In Bangladesh, it is estimated that more than 13 million fell ill after consuming contaminated food annually.

    - this figure overestimates what is happening in Bangladesh
    - this figure is a fair estimate
    - the actual situation is even worse
    - I don't know

18. Bangladesh's regulations clearly define the role of the different agencies in food control inspection. Yes/No

19. Due to a lack of sufficient resources and time, we are inspecting only businesses at the end of the chain (e.g restaurants and grocery stores). What are the most important risk factors for foodborne illness in Bangladesh?

20. How frequently have you observed the following food poisoning risk factors?

- Cross contamination (e.g. from a raw to a ready-to-eat product).
- Food from unsafe sources
- Inadequate cooking
- Improper holding temperatures
- Contaminated equipment
- Poor personal hygiene
- Food handlers' health status
- Water quality
- Presence of pests

21. In the district/city corporation under your jurisdiction, do you think that all food companies/manufacturers/sellers/restaurants/... are registered and identified?

- Yes totally
- Partially yes
- Not at all
- I don't know

22. In your organization, do you have access to a database or files that describe food establishments/businesses and the history of their inspections? Yes/No

23. Do you receive clear notes from your hierarchy or the BFSA on the prioritization of inspections to be executed? Yes/No

24. Do you regularly use the inspection checklists provided during the training by the FAO Food Safety Project? Yes/No

25. If the answer is "no" above explain why?

- The checklist is too much and I don't have enough time to go through all the steps
- No need for me because I know in advance where the issues are
- The checklist is very conceptual and does not match the field realities
- I do not have the resources to print the checklist
- Other

26. What are the three hazards that may be introduced to food products during preparation?

- Biological, chemical, and environmental
- Environmental, chemical, and circumstantial
- Chemical, radiation, and physical
- Chemical, biological, and physical

27. HACCP, developed first by NASA, is being used in food processing and serving industries to reduce pathogens and prevent hazards from being introduced into the food. HACCP stands for:

- Hazard Awareness and Crucial Compliance Plan
- Hazard Awareness and Crucial Control Points
- Hazard Analysis and Critical Control Points
- Health Analysis and Critical Control Plan

28. Bacteria grow especially well in food that is

- Warm, moist, contains protein, and has a pH that is neutral to slightly acidic.
- Cool, dry, low in protein, and high in acid.
- Very hot, wet, calcium rich, and neutral.
- Cool, dry, and metallic.
- Don't know

29. A different form of bacterial cells that can survive some cooking and freezing temperatures are called:

- Pathogens.
- Viruses.
- Spores.
- Parasites.
- Don't know

30. The purpose of HACCP is to:

- Make you do more work
- Eliminate potential hazards from food to make it safe to eat
- Clean equipment properly
- None of the above
- Don't know

31. GMP stands for Good Manufacturing Practices

- True
- False

32. Among the following which can be regarded as Critical Control Point (CCP)?

- Metal Detection
- Water Treatment
- Shipping/Receiving
- Maintenance

33. What percentage of time should your CCP be functional?

- 30%
- 80%
- 100%
- 90%

34. If your CCP is not functional, what action should be taken?

- Stop production immediately until repaired
- Ignore it and continue with production
- Slow down production
- None of these

35. Which of the following is an example of a Prerequisite Program?

- Human Resources
- Parking Permit
- Employee Training
- None of these

36. Is record keeping required to have a compliant HACCP System?

- Yes
- No
- Only if producing meat products
- Only if producing dairy products

37. Everyone is at risk of contracting a food-borne illness. However, some are at a greater risk of falling ill or even dying of infection, that includes:

- Infants
- Pregnant women
- People with weakened immune systems (those with HIV/AIDS, cancer, diabetes etc)
- All of the above

38. Which of the following is FALSE (not true) about pasteurization?

- It reduces milk's nutritional value
- It does kill harmful bacteria
- Even if the milk is pasteurized, it is not safe to leave it out of the refrigerator for an extended period of time
- All of the above

39. Which of the following would be a critical limit?

- Washing vegetables before using them.
- Cooking chicken to reach a temperature of 74°C for 15 seconds.
- Checking the use by date on canned ingredients.
- The temperature food is kept at in a fridge.

Annex

Annex 1. Evaluation of training activities

https://www.fao.org/3/cb8523en/cb8523en.pdf

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