

APEC FOOD SAFETY COOPERATION FORUM (FSCF)
PARTNERSHIP TRAINING INSTITUTE NETWORK (PTIN)

EXPERT WORKING GROUP ON FOOD SAFETY
DEVELOPING TRAINING MODULES AND DELIVERY MECHANISMS
FOR THE APEC REGION
MAY 18-20, 2010

Final Report

Executive Summary

The APEC Food Safety Cooperation Forum (FSCF) Partnership Training Institute Network (PTIN) convened an Expert Working Group of food safety professionals and training practitioners from the APEC economies at the World Bank, May 18-20, 2010. The goal of convening these experts was to develop a roadmap of actions to improve the availability, accessibility, and use of food safety training materials based on international standards and best practices. The FSCF previously identified the following capacity building priority areas as being of prime importance: (1) Food Safety Regulatory Systems; (2) Food Inspection and Certification Systems; (3) Technical Skills and Human Resource Capacity; (4) Information-sharing and Communication Networks. The PTIN steering group identified four priority areas in which work to improve the availability and accessibility of training materials could yield significant gains in the ability of the regions' producers, manufacturers, and other supply chain participants to better ensure the safety of the regions' food supply. The Expert Working Group conducted break-out sessions specific to those topic areas: (1) Risk Analysis; (2) Supply Chain Management; (3) Food Safety Incident Management; (4) Laboratory Capacity. This report summarizes the discussions of the Expert Working Group in these four areas, assembles key recommendations presented during those discussions, and outlines a road map of actions to improve the accessibility, effectiveness and use of food safety training materials in the region.

Key Findings from the Expert Working Group

Needs Assessment and Training Materials

- Building food safety capacity in the APEC region will contribute to the prosperity of the region both by improving public health outcomes and by increasing access of the regions' food exports to global markets. Building capacity in food safety also strengthens the resilience of the regions' food supply and contributes to greater food security.
- Considering that APEC is a large, diverse region, with economies in various stages of development, improving food safety training for the APEC region is the responsibility of a diversity of stakeholders across a range of institutions. However, current efforts to improve food safety training are under-resourced and disconnected.
- Key stakeholders need to be made aware of the critical role of food safety in meeting overarching policy priorities. Efforts are needed to document that the costs of strategies to prevent and control food safety hazards are relatively low in comparison with the costs associated with foodborne diseases, both in terms of public health outcomes and loss of economic opportunity.

- A large number of food safety training courses are available in the region through private and public sector organizations, including academic institutions. These programs have been developed for various audiences. While particular segments of the supply chain are being served by these materials, many groups, including farmers and small processors, are currently underserved. Existing training resources need to be leveraged, particularly through partnerships and other collaborative efforts, to address underserved populations.
- *Codex Alimentarius* guidance documents and standards should be the basis for food safety training. A sound measurement and testing infrastructure is needed to support the use of *Codex* standards, therefore, measurement/ testing should be included in the training programs.
- A “needs assessment” should be conducted to ensure that the training meets the need, delivers consistent messages and builds upon existing knowledge and understanding.

Delivery Mechanisms

- Training materials should be adapted to meet local needs, preferably through the use of local public-private partnerships. Training should be in the local language or dialect, and use local case examples.
- Delivery of the materials should be adapted to suit to the audience. The training needs of farmers, manufacturers, food handlers and regulators vary greatly. Materials should be developed to target multiple cohorts along the supply chain.
- A variety of approaches to training is appropriate and desirable, throughout the region. Face to face training is most effective, but large audiences can be reached using online methods with significantly less cost and at their own availability.
- Development of “train the trainer” modules can also help to more quickly disseminate information.
- Use of a business model can ensure the sustainability of training programs. This should consider establishing a demand for training, and creating well designed programs to meet the demand, which are self-financing.
- Outreach to communicate information on training needs to be improved. An online repository of training information could help to address this need.
- Further collaboration among experts from industry, government and academia is needed to increase the quality, accessibility and use of training materials in both the public and private sectors in the region.
- Embedding training in local institutions ensures greater effectiveness and sustainability. The need for mentoring was noted and the use of an extension service was offered as an effective means of providing long term training.

Evaluation

- Evaluation of training to determine its effectiveness is essential. Evaluation should include mechanisms to measure the extent to which sustained changes in behavior resulted from the training.
- Development of specific criteria to evaluate existing and new courses and training providers could be useful in determining the suitability of the training for the specific conditions in each economy.

Key Recommendations from Each of the Break-Out Sessions

Risk Analysis

The “gold standards” for risk analysis training were considered to be the FAO/WHO publications and training manual and JIFSAN courses. These training materials may need to be adapted for each target audience. Adaption is best done in conjunction with a local partner, and includes translation into the local language, as well as the inclusion of local examples, terminology, and variations in dialect. The working group did not endorse specific training courses but identified criteria for evaluating them.

Supply Chain Management

This working group noted the complexity of the supply chain and suggested an 8-step approach to identifying training modules, based on stages, core practices and commodity subsectors. They specifically recommended that modules should start with the basics and build on international best practices, such as Codex Good Hygiene Practices and HACCP standards focusing on preventative measures. This working group also noted several existing training programs developed by universities, governments and the private sector. The supply chain management group agreed that training in best practices in aquaculture and fresh produce were priorities for the APEC PTIN.

Managing Food Safety Incidents

Training materials on managing food safety incidents are minimal; therefore, materials should be developed that include guiding principles and real scenarios as examples. The module to be developed should include roles and responsibilities, protocol development and guidance on risk analysis of the incident.

Laboratory Capacity

Training materials must be appropriate to the level of development of the laboratories and testing facilities, and the underpinning technical standards and conformance infrastructure, including the human and institutional capacity with respect to metrology, legal metrology, laboratory accreditation, analytical standards and certification activities in each economy. Training and other capacity development efforts can be effective and sustained in the medium/long run only if these efforts also include the relevant infrastructure such as access to a sound metrology system, stable funding, availability of international reference materials and analytical standards and access to appropriate facilities, instrument servicing (funding for ongoing operations, maintenance and regular calibration), water, and electricity. This working group also recognized existing training programs developed by

universities, governments, the private sector and the APEC Specialist Regional Bodies (SRBs)¹, and identified areas where training still needs to be developed.

Overview of Meeting

Introduction

The purpose of the expert working group was to bring together a core group of food safety and training experts from the APEC economies to create a strategy for developing and implementing a food safety training program for this region. Working group members were tasked with developing a road map for identifying and/or developing a generic set of training materials that could be adapted to meet the critical food safety training needs identified by the APEC Economies, throughout the entire food supply chain, from production through consumption. In addition, working group participants were to identify best practices for delivery/ dissemination of the training materials, and mechanisms for evaluating the effectiveness of the training. (See Appendix 1 for agenda.)

Presentations

Welcoming remarks were made by Mr. Iain Shucker, World Bank, and Michael Landa, Center for Food Safety and Applied Nutrition, USFDA.

Mr. Steve McCutcheon and Dr. Zhao Zenglian, as Co-Chairs of the Food Safety Cooperation Forum, provided background information on the APEC PTIN, and the results of a survey to obtain information on food safety training activities in the APEC Region, that had been carried out before the workshop

Dr. Renata Clarke from FAO provided a keynote address on “Food Safety Training, Achievements and Challenges” including a description of FAO’s food safety training courses, including some of the challenges associated. All FAO capacity building materials are downloadable from the FAO website, http://www.fao.org/ag/agn/agns/capacity_en.asp.

Dr. Robert Brackett, Grocery Manufacturers Association, and member of the PTIN Steering Committee outlined the objectives for the meeting.

Prior to the working break-out sessions, there were four presentations to set the stage for the discussions in each of the four focus areas. Slides from all presentations can be accessed at the following website: <http://jifsanapps.umd.edu/uploads/>.

The speakers were:

- Dr. Bob Buchanan, University of Maryland on Risk Analysis;
- Dr. Mark Moorman, the Kellogg Company, on Food Supply Chain Management;
- Mr. Stewart Jones, National Measurement Institute, Australia, (NMIA) on Managing Food Safety Incidents; and
- Dr. Maya Pineiro, FAO/ Regional Office for Latin America and the Caribbean, on Laboratory Capacity

¹ Five APEC “Specialist Regional Bodies” (SRBs) coordinate regional standards and conformance activities, including capacity building/ training in the Asia Pacific Region. These are the Asia Pacific Laboratory Accreditation Cooperation (APLAC), the Asia Pacific Legal Metrology Forum (APLMF), the Asia Pacific Metrology Program (APMP), the Pacific Accreditation Cooperation (PAC) and the Pacific Area Standards Congress (PASC).

Break-out sessions

Each break-out session reported out on the second day (reports can be found in Appendix 2.) and the outcomes were summarized by Mr. John Lamb from the World Bank. In his summary, Mr. Lamb noted that improving food safety training for the APEC region will be a major undertaking and it will be important to have clear objectives for the training activities, which should be achievable with the resources available. He noted the importance of a needs assessment including an evaluation of existing materials. Subject matter experts and educators will need to maintain and update the training materials. Resources will be needed to ensure the sustainability of the training.

Other speakers focused on training experiences and learning modalities for the APEC region.

Dr. Ali Badarneh from UNIDO presented a case study from a training program that UNIDO established in Sri Lanka intended to reduce foodborne disease outbreaks. A public/private partnership adapted training to the local culture, and created a significant demand for training from food handlers working in restaurants.

A series of presentations on delivery of training materials was followed by a panel discussion with the following speakers. The report from this is in Appendix 2.

Dr. Marjorie Davidson, FDA, spoke on adult learning modalities. She discussed various adult learning styles and emphasized that training modules should vary for learning needs as well as learning styles, in order to achieve food safety training objectives. She also suggested that training should be learner centered and be presented by knowledgeable and skilled trainers.

Dr. Djordjija B. Petkoski, Lead Specialist from the World Bank, spoke on the challenge of ensuring sustainability of training and the World Bank's approaches to address the challenge, including key elements of a capacity building framework.

Case Studies on Operation Experiences were presented by:

Dr. Les Bourquin, Michigan State University, has been working with the Global Food Safety Initiative to develop basic training modules for the manufacturing sector, and presented details of that effort.

Dr. Joe Shebuski, Cargill, spoke on Cargill's food safety training modules which are based on *Codex* principles. He also spoke on delivering face-to-face training to food safety and quality personnel in most of the APEC Economies. With additional training in the area of "Train the Trainer" these personnel in turn train employees at the operational level. Cargill also created food safety DVD using a "story" format for foundational training for all employees.

Dr. Bob Gravani, Cornell University, spoke on Cornell's modules developed on Good Agricultural Practices primarily for delivery in the United States.

Dr. Peter Embarek, WHO China, spoke on WHO experiences in food safety training. He gave an overview of the Global Foodborne Infection Network, and presented WHO experiences, including examples of training courses on microbiological risk assessment and consumer/food handlers education.

Conclusions

Mr McCutcheon and Dr. Zenglian facilitated a wrap-up session to assist participants to formulate key outcomes and recommendations (summarized on page 1 of this report) to be used to create the intended road map toward the development and implementation of food safety training programs for the APEC region. Mr McCutcheon and Dr. Zenglian provided the following observations:

Long term success will require enhancing public awareness of all stakeholders, especially at the most senior political levels, of the need to create a food safety culture and to build a better understanding of the importance of food safety training to reduce foodborne illnesses and to facilitate trade. It will require a sustainable funding mechanism and a broad team of experts to evaluate and identify gaps in training materials. The presentations and discussions indicated that the goal of producing a road map for the development and implementation of food safety training programs for the APEC region would need to recognize that foundational work would need to be conducted to raise awareness and understanding.

There is a large amount of training materials available, therefore, efforts are needed to increase the availability, accessibility and use of existing training materials across all supply chain participants, rather than development of new materials. While both government and academia play critical roles in setting expectations and providing technical expertise, the private sector, including national and international industry associations, is the most active in developing and implementing training programs in pursuit of commercial objectives.

Certain sectors, such as fresh produce, lag behind other more heavily traded products, such as aquaculture, in the depth and availability of even the most basic training materials. Experts noted that, for the sectors lacking adequate training material, collaborative efforts to develop such materials could be a driver for greater commercial trade in those products. Further analysis of the available materials will be necessary to match them or adapt them to the needs of the economy.

Effective training will be responsive to the audience and trainers with local experience and appropriate language skills will likely be the most successful. A measure of the effectiveness of training is a sustained change in behavior by the recipient of the training. Training needs should progress from basic to more sector specific. Particular population segments, including smaller producers aspiring to supply into global value chains, are currently underserved by existing training materials and programs. In these cases, efforts to develop public-private partnerships and promote greater collaboration among industry, academia, governments and donor organizations could be mobilized to address underserved areas.

In order to catalyze greater collaboration along the lines envisioned above, and to set the foundation for future work, the organizers of the Experts Working Group, in consultation with the FSCF Co-Chairs Mr McCutcheon and Dr. Zenglian, agreed to the road map of work shown in Appendix 1.

**Appendix 1:
World Bank and the APEC FSCF/PTIN Work Plan 2010-2011**

Deliverable	Group(s) responsible	Issuer(s)	Timing
<u>Meeting Report</u> <i>Expert Working Group on Food Safety: Training Modules and Delivery Methods</i>	FSCF/PTIN and WB	FSCF and WB	July 2010*
<u>Supply Chain Management Training</u> <i>Module on developing food safety plans for the supply chain, with focus on the aquaculture sector</i>	FSCF/PTIN with WB	FSCF	Oct/Nov 2010* Beijing
<u>Briefing Note</u> <i>“Ensuring Reliable Sources of Safe Food as a Critical Element of Food Security Initiatives”</i>	FSCF/PTIN	FSCF	Oct/Nov 2010 Beijing
<u>Concept Note</u> <i>For White Paper (below)</i>	FSCF/PTIN and WB	FSCF and WB	Oct/Nov 2010 Beijing
<u>Country Projects</u> <i>Collaboration on WB agribusiness projects related to food safety</i>	WB (EAP) with FSCF/PTIN	WB	Starting October 2010
<u>White Paper</u> <i>“Conceptual Framework and Strategy for Improving Food Safety in and across APEC”</i>	FSCF/PTIN with WB	FSCF (with appropriate credit given to the WB)	May 2011 Big Sky
<u>Economic and Sector Work</u> <i>“Scalable Approaches to Improving Food Safety Systems”</i>	WB (ARD) with FSCF/PTIN	WB (with appropriate credit given to the FSCF)	May 2011 Big Sky
<u>Lab Capacity Training</u> <i>Needs assessment survey and workshop to strengthen lab proficiency on food safety in key emerging markets</i>	FSCF/PTIN with WB	FSCF	Oct/Nov 2011

Appendix 2: Meeting Agenda

AGENDA

THE WORLD BANK

Expert Working Group on Food Safety Developing Training Modules and Delivery Methods for the APEC Region

6:30 PM -8:30 PM **Opening Reception**
World Bank Main Complex, Front Lobby
1818 H. Street NW
Washington, DC 20006

Expert Working Group
World Bank Conference Center, Building I, Room 2-250
1850 I Street, NW
Washington, DC 20006

8:00 **Registration**

8:30 **Welcome:** The World Bank and FSCF
Mr. Iain G. Shuker, Sector Leader, Agriculture and Rural Development Department, The World Bank
Mr. Michael Landa, Acting Director, Center for Food Safety and Applied Nutrition, U.S. Food and Drug Administration

8:45–9:15 **Overview of APEC FSCF PTIN and Results of the FSCF Survey of APEC Economies' Existing Food Safety Training Courses and Delivery Mechanisms**
Mr. Steve McCutcheon, FSCF Co-Chair, Australia and Mr. Zhao Zenglian, China

Mr. McCutcheon will provide an overview of APEC as well as information on the background and objectives of its FSCF and PTIN. The presentation will also explain the FSCF's food safety capacity building priorities, and how the FSCF PTIN envisions using the outcomes of this Expert Working Group meeting to contribute to addressing those priorities. Mr. Zenglian will present the results of the survey of APEC members on their existing food safety training activities and programs.

9:15–9:45 Keynote Address: Food Safety Training, Achievements and Challenges
Ms. Renata Clarke, Food Control and Consumer Protection Group, Food and Agriculture Organization (FAO)

Ms Clarke will highlight FAO accomplishments in delivering food safety training. She will present lessons learned in overcoming challenges and issues encountered in delivering successful training in food safety. The experiences of FAO will provide the springboard for the day's discussions of training materials, modules and delivery mechanisms.

9:45–10:00 Objectives for the Workshop

Dr. Robert Brackett, Grocery Manufacturers Association

10:00-10:30 Tea/Coffee Break

10:30–12:15 Training Modules and Course Material

Facilitators: Mr. Steve McCutcheon and Dr. Zhao Zenglian

Four concurrent working groups will be held **after** speaker presentations to all participants. Individuals will be pre-assigned to working groups to ensure a balance of industry, government, academia and geographic location. The facilitator will outline the specific goals for the working group.

Speaker Presentations:

Risk Analysis	Dr. Bob Buchanan, University of Maryland
Food Supply Chain Management	Dr. Mark Moorman, Kellogg Company
Managing Food Safety Incidents	Mr. Stewart Jones (Australia)
Laboratory Capacity:	Dr. Maya Pineiro, FAO (Chile)

Each working group will be asked to address the following questions, regarding food safety training for seafood and produce:

- What training materials are currently available in the APEC Economies for various target audiences throughout the supply chain?
- What training materials need to be developed?
- Who will develop these training materials?

The outcome from the working group meetings should include:

- A list of food safety courses that could be used by the APEC PTIN to facilitate the provision of training addressing the priority needs identified in food supply chain. This list should indicate the appropriate sequencing of training courses to have the greatest impact on food safety while the PTIN and other potential organizations work to develop and regularize funding sources.
- A list of individuals able to develop or revise these courses as needed, and adapt them for local needs in each economy.
- A list of expert trainers in the various APEC Economies able to deliver training.

a) Working Session on Risk Analysis

Facilitator: Dr. Boon Yee Yeong, ILSI South East Asia Region, Singapore

Rapporteur: Dr. Isabel Walls, USDA

b) Working Session on Food Supply Chain Management

The outcome from the panel discussion should include:

- Recommendations for most effective training delivery mechanisms for the target audiences.
- Recommendations for sustainability of the training to ensure it is disseminated, replicated, and repeated as needed.
- Metrics and methods to evaluate the impact of the training activities (long term evaluation plan)
– do they demonstrate real change in food safety practices in the economies?

a) Presentation on Adult Learning Modalities

Speaker: Dr. Marjorie Davidson, FDA

b) Presentation on Ensuring Sustainability of Training

Speaker: Djordjija B. Petkoski, Lead Specialist, World Bank

c) Case Studies on Operational Experiences in Global Food Safety Training (including sustainability of training, evaluation of effectiveness of training)

- a. Dr. Les Bourquin, Michigan State University
- b. Dr. Joe Shebuski, Cargill

12:00-1:15 Lunch Sponsored by Waters Corporation

1:30-2:30 Panel discussion on challenges to delivery of food safety training throughout the APEC Region (continued)

Case Studies on Operational Experiences in Global Food Safety Training (including sustainability of training, evaluation of effectiveness of training)

- c. Dr. Bob Gravani, Cornell University
- d. Dr. Peter Embarek, World Health Organization (WHO), China

2:30-3:30 Panel Discussion

Facilitator: Mr. Steve McCutcheon

Executive Rapporteurs: Ms. Megan Crowe and Ms. Sonia Bradley

Panelists:

Dr. Marjorie Davidson, FDA

Dr. Les Bourquin, Michigan State University

Dr. Joe Shebuski, Cargill

Dr. Bob Gravani, Cornell University

Dr. Peter Embarek, World Health Organization (WHO), China

The discussion will address the following questions:

- Can we identify the target audiences for whom training will have the greatest impact? Can we prioritize training so that we reach the most important target audiences first? Can different types of training be rolled out to different audiences over time?
- What are the best delivery methods for the local conditions and for the target audience?
- How will the training be implemented and evaluated?
- How can the training be made sustainable?
- How does the PTIN ensure that the training is effective in changing food safety practices, that it is really having an impact in improving food safety?
- Estimate of costs associated with training.

3:30 – 4:00 Break

4:00 – 5:00 Panel Discussion

Facilitator: Mr. Steve McCutcheon

Executive Rapporteurs- Ms. Megan Crowe and Ms. Sonia Bradley

The discussion will seek to establish specific recommendations on a path forward to identify the training modules and delivery mechanisms. The participants may consider establishing a sub-group to draft a white paper or publication summarizing the discussions and outcomes of this Expert Working Group meeting.

5:00 Evaluations

5:15 Wrap-up and Conclusions (Mr. Steve McCutcheon and Dr. Zhao Zenglian)

Appendix 2: Reports from Working Sessions

Report from Working Session on Risk Analysis

Facilitator: Mrs. Boon Yee Yeong, International Life Sciences Institute South East Asia Region (ILSI SEA);

Rapporteur: Dr. Isabel Walls, US Department of Agriculture National Institute of Food and Agriculture (USDA NIFA)

Question 1: What training materials are currently available in the APEC region?

The group acknowledged the initial list of courses provided from the survey document, and that both face to face and distance learning materials are available. Additional information on existing training courses is needed, beyond that collected in the survey. The group recommended collecting the following information: target audience, description of course, duration, language, geographic location of course; who is conducting the training; a contact point and website; the date the training will be held; feedback from those who have taken the course; cost, financial support; any pre-requisite training, software needed; whether it is accredited and by whom. They noted the need for a central location for a calendar of courses, to help reduce redundancy among different training organizations.

Rather than endorse any specific courses, criteria were developed for use when evaluating training courses:

Criteria for evaluating training courses:

- Is the course suitable for the intended audience and application/ purpose?
- Has the course been peer reviewed or accredited and deemed adequate? Who made the determination?
- Are people willing to pay to take the training?
- How effective is the training? Are individuals tested before and after taking the training? What if people fail the training?
- Are the training materials presented in a manner that is easily understood, in the local language, with culturally relevant case examples?
- Has the trainer been “certified” or otherwise shown to be knowledgeable?
- Does the course state the minimum knowledge required before taking the training?
- Is the context in which courses are being delivered described?
- Is there continuous improvement / updating of material?

The “gold standards” for risk analysis training were considered to be the FAO/WHO training manual and JIFSAN courses. However, for any course, the training manual needs to be adapted for the target audience, it should be translated into the local language and needs to be developed in conjunction with a local partner, and include local examples, a clear understanding of terminology, and consider variations in dialect (ILSI, 2002) .

Question 2: What training materials are needed, to be evaluated, developed or updated?

The group noted that the overall goal is to improve the safety of the food supply, to reduce illnesses/deaths, and to facilitate trade. Therefore, a series of courses is needed for different audiences. Target audiences and core competencies were identified for some of the courses:

1. Introduction to risk analysis

- a. Target audience: Government regulators/ risk managers; scientists in government and academia; industry CEO, general managers, risk managers, scientists; consumers
- b. Core competencies: how to do risk communication, risk assessment, and risk management and how they are interlinked;
2. Communicating food safety information: intelligence and knowledge management dissemination
 - a. Target audience: General population; government communicators, managers; industry managers, communicators; academia; journalists/ media; health professionals
 - b. Core competencies: Where to find food safety information; who are the regulatory authorities; who to complain to if you get sick; understanding labels on foods;
3. Communication in crisis situations
 - a. Target audience: Government communicators, managers; industry managers, communicators; academia; journalists/ media; health professionals
4. Risk communication among risk assessors and risk managers
5. Risk analysis for communicators
6. Role of risk assessment in risk management decision making
 - a. Target audience: Government regulators/ risk managers; Industry CEO, general managers, risk managers;
7. How to do a risk assessment:
 - a. Target audience: Scientists in government/ academia/ industry; industry/ government managers
 - b. Core competencies: Codex principles, qualitative, quantitative, expert elicitation, uncertainty analysis, including how to collect exposure assessment data, dose-response data, mathematical modeling, sensitivity analysis, could include probabilistic modeling
8. How to do cost – benefit analysis
 - a. Target audience: Economists in government, industry, academia
9. How to do risk management
 - a. Target audience: Government regulators; industry risk managers; scientists in industry, government, academia
 - b. Core competencies: when to do a risk assessment, what is a risk profile, feasibility, monitoring, review, verification of decisions – were they effective, are they still effective, consideration of unintended consequences of decision making
10. Risk management metrics
11. Peer review

Question 3: Who will develop new training materials?

The group noted that existing materials should be used where available, adapted to local needs. New training courses should be embedded in existing local institutions in each economy to provide local support. A team of “professionals” is needed to develop the training materials, including subject matter experts, educators, and individuals with local knowledge, local language, communicators, and someone to provide follow up for up to 2 years. Training materials may need to be copyrighted, as there needs to be a return on investment.

A fourth question was proposed, “Who should be doing the training?” Trainers could be from government, industry, academia, international organizations, but there should be some criteria for evaluating the competency of the trainers, for example: is the trainer qualified to do the training? Are they certified? What does “certification” entail? Is there an incentive for being certified?

Report from the Working Session on Food Supply Chain Management

Facilitator: Mr. Albert Chambers, Monachus Consulting;

Rapporteur: Dr. Yuhuan Chen, Grocery Manufacturers Association

The Working Group addressed the following three questions:

1. What training materials are currently available in the APEC Economies for various target audiences throughout the supply chain?
2. What training materials need to be developed?
3. Who will develop these training materials?

The Working Group identified several challenges for developing food safety training programs for food supply chain management. First, the supply chain is highly complex in several dimensions:

- A) Segmentation. For example, there are input suppliers, service providers, transporters, primary production, packers/processors, storage, distributors, retailers/markets, foodservice, and exporters.
- B) Scale. There are very small, small, medium, large suppliers at each segment of the supply chain. There is a need to provide training for supply chain management of food safety along/within the supply chain.

Given these challenges, the Working Group found that it would be possible to identify a process to identify training materials (road map), but not possible to identify all the training materials for the entire supply chain at this workshop.

The Working Group suggested an 8-step approach to identifying training modules for supply chain food safety management:

1. Break a supply chain into typical stages (production, packing, processing, transportation, storage, distribution, retail/food service or more detailed if preferred)
2. Each stage needs a core set of generally accepted practices (e.g., international best practices)
3. For each stage, apply main elements of a food safety management system (including HACCP-like approach, prerequisite programs, hazard identification, risk analysis, preventative controls, record-keeping, and verification of controls)
4. Define for each stage the main actors and core competency each one must have, including at the management level system concerns
5. Define minimum supply chain-wide linkages, such as traceability
6. For each of steps 1-5 above, define minimally accepted standards in the context of a staged approach
7. Define training need (content/competencies) for steps 2-6 and associated modules and level of sophistication
8. Segregate APEC agri-food system into major commodity sub-sectors and repeat steps 1-7 for highest priority sub-systems with appropriate degree of customization

The Working Group recommended that collaborative efforts among industry, government and academia are essential to identify, develop and deliver effective training for supply chain food safety

management. The process to further define and prioritize training needs and corresponding modules for APEC agri-food systems should also take into consideration a combination of economic importance, degree of risk, and potential for mitigation.

Training Modules

The Working Group determined that training modules need to build on international best practices, e.g., Codex GHP and HACCP documents, and food safety management system approaches. They should be based on identified hazards and focus on preventive controls. Training modules should start with basics and aim for step-by-step improvement. The Working Group recommended that a generic course (or courses) be developed, which can be adopted for different economies. Perhaps a set of criteria can be developed for self benchmarking by APEC Economies or course developers.

Target Audience

The Working Group determined that training materials should be tailored to the target audience and scalable. “Best practices” contents usually stay the same, while methods for delivering the information may vary depending on the economy. Individual economy may be in the best position to determine how best to deliver the core contents, taking into consideration language and cultural needs. In general, industry should drive food safety requirements for access to market. Government may invest in having the tools and training in place to prepare for market signals. There is a special need for identifying/developing training materials for smaller farmers, small processors and small enterprises at other stages of the supply chain. For these audiences (which accounts for a large proportion of suppliers in some APEC economies), training materials may need to address both food safety and quality attributes, and management systems, as well as demonstrating advantage with economic incentive so that food safety is not just added costs to the farmers.

The Working Group suggested that, to identify/develop appropriate training materials, there must be collaborative efforts among industry, including industry associations such as farmer groups, academia and government. Available training materials and resources include those identified in the APEC economy survey prior to the Expert Working Group meeting. The Working Group identified several well-recognized training resources, such as the International HACCP Alliance, the International Seafood Alliance, ISO, etc.

Training Materials for Seafood and Produce

The Working Group identified several sources of training materials for the seafood and produce sectors. In addition to the resources identified in the APEC economy survey prior to the EWG meeting, examples of training resources and guidance documents include: FDA aquaculture training courses; Seafood HACCP Alliance courses; Cornell University GAP courses; and Michigan State Basic Level I course for processors. It was also noted that there were training materials associated with the national fresh produce food safety programs developed by industry in many economies within APEC, as well as several international schemes that could be utilized.

The Working Group developed a draft outline for an aquaculture training module, as follows:

Aquaculture Training Module

- Feed, Hatchery Supplies, etc.
- Hatchery
 - Chemicals/pesticides

Antibiotics

Parasites

- Grow-out – From the environment, workers, equipment, source water supply
 - Chemicals (Used around farm, used in ponds, etc)
 - Antibiotics (Chloramphenicol, Nitrofurans)
 - Probiotics (Unregulated)
 - Parasites
 - Human pathogens (*Salmonella*, pathogenic *E. coli* ...)
- Harvest – workers, equipment, water (ice, water mixed with ice)
 - Chemicals
 - Antibiotics
 - Parasites
 - Human pathogens (*Salmonella*, pathogenic *E. coli*...)
 - Temperature abuse

Cross cutting with systems in place

Sanitation

Pest control

Time/temperature control

etc.

- Transportation from farms to processing facilities
- Processing/packing/storing
- Cold storage
- Transportation from processing facilities to whole sale or retail establishments
- Whole sale
- Retail

Report from the Working Session on Managing Food Safety Incidents

Facilitator: Dr. Sarah Geisert, General Mills;

Rapporteur: Dr. Julie Moss, US Food and Drug Administration, Center for Food Safety and Applied Nutrition (FDA CFSAN)

I. The discussion began with an explanation by Australia about their capacity building activity in China titled *Managing Food Safety Incidents*. Other than the materials developed by FSANZ on Managing Food Safety Incidents, it was recognized that training materials in this area are minimal or piecemeal currently, hence FSANZ initiating their course. All session members thought the FSANZ course sounded great and were interested to hear of the outcomes of the course.

The group identified characteristic principles that make a response work well:

1. Accuracy of data
2. POC in the government
3. Convene key stakeholders and communicate often
4. Have a framework/plan to follow
5. Educating stakeholders, for example, explain what epidemiological data are and how/why they are used
6. Scoping to make informed decisions (e.g., the dose makes the poison)
7. Co-locate people to improve communication outreach (include social media)
8. Stakeholders knowing their role, daily communications if needed
9. Recognize that media is a stakeholder, train them too (e.g., teach them the anatomy of an outbreak)

II. What training materials are currently available in the APEC economies for various target audiences?

1. U.S. FDA/CFSAN, Anatomy of an Outbreak
2. FSANZ, Managing Food Safety Incidents (Australia offered to link this course to the PTIN website)
3. University of Maryland, Risk Analysis course
4. See list from survey

III. Gaps/what training materials need to be developed?

1. Case studies for lessons learned, provide real scenarios with varied perspectives
2. Existing program that include incident management *portions*
 - a. GMA webinars
 - b. Michigan State University, among other academic sources
 - c. IFT short course
3. Generic course to consist of:
 - a. Overall model plan (simple and logical)
 - i. Include guiding principles, e.g., transparency
 - b. Component pieces/modules (dependent on stakeholder responsibility within an economy)
 - i. Glossary of terms
 - ii. Role/responsibilities
 - iii. Obligation of your economy (e.g., laws, regulations, WTO)

- iv. Triggers
- v. How to scope
- vi. Protocol development
- vii. Risk analysis (include assessment, management, communications)
 - 1. for example, exposure assessment, epidemiological surveillance, recalls
- viii. Applicability and severity for small vs. large scale emergencies, ownership among stakeholders, key contact
- ix. Identify key contact in each economy (informal network)
- x. INFOSAN

IV. Who will develop the training materials?

- 1. Industry, develop a generic 1-pager of steps from their perspective
- 2. Utilize FSANZ course
- 3. Continue to collect materials in this area and store on PTIN website
 - a. Note: Someone needs to review and triage

Outstanding questions: who is the audience?

Report from the Working Session on Laboratory Capacity Building

Facilitator: Dr. Paul Young, Waters Corporation;

Rapporteurs: Dr. Juliana Ruzante, Joint Institute of Food Safety and Applied Nutrition (JIFSAN) and Dr. Shannon Cole, Grocery Manufacturers Association (GMA)

Before engaging on the development of a road map for training in the area of laboratory capacity it is essential to ensure that APEC Economies have some basic infrastructure so capacity development efforts can be sustained and effective in the medium/long run. Below are the infrastructure issues of relevance to ensure sustainability.

- Access to sound metrology systems: Laboratory personnel need to be trained and have access to appropriate facilities and equipment to perform analyses, which are calibrated on a regular basis using internationally recognized reference materials to ensure their accuracy and the validity of the results.
- Stable funding: A stable source of funding is crucial to ensure ongoing viability of the laboratory operations including procurement of laboratory consumables, ongoing training and development of personnel and ongoing operation, maintenance and regular calibration of equipment.
- Availability of analytical standards and reference materials: Restrictions and delays in importing/accessing analytical standards and reference materials can severely affect the ability of economies to properly conduct quality assurance and validation protocols.
- Availability of/access to appropriate facilities, instrument servicing (funding), water, electricity: Access to basic facilities, infrastructure and instrument servicing is essential for maintaining the routine operations of a laboratory.

Having ensured the infrastructure prerequisites described above, the training needs in the area of laboratory capacity were identified. The sequence listed below is a suggestion of the order that the material/modules should be delivered – it is not a ranking or priority list. Different APEC Economies will have different needs and these modules would stand alone and can be combined in different ways to meet the demand of the different Economies. It was agreed that the delivery method should be a combination of both face-to-face and online formats.

1. Global context of food safety

It is important that laboratory personnel as well as policymakers understand the role of laboratory activities in the food safety system, how the activities carried out by laboratories fit into the overall picture of risk management and risk assessment, the regulatory framework, public health and the global economic market. Raising awareness of the importance of strong laboratory systems to improve both local and global food safety as well as the importance of sharing data among laboratories is essential in building support for laboratory activities within APEC Economies. Courses should focus on the importance of quality systems (including relevant accreditation) and efficacy of building international recognition. The group envisions that a brief introductory course could be developed to cover these issues.

2. Needs assessment

It is important that laboratories are empowered to prioritize their activities/analysis. It is unlikely that every laboratory will be equipped and staff trained to conduct all analyses. A

needs assessment is essential to guide resource allocation and training that will maximize the benefit to the particular APEC Economy. The needs assessment could be done for one laboratory; however it should also consider the economy as a whole – partnerships and networks, (e.g., linked to the APEC SRBs) must be explored in order to maximize efforts and increase capacity.

3. Safety

Training on laboratory worker safety is essential. There are several training courses available, from Universities, government and OSHA.

4. Laboratory Quality Assurance

A laboratory needs to yield reliable results that are comparable and internationally accepted. For this to happen, laboratories need to have in place quality assurance protocols and validate their methods according to internationally accepted standards such as ISO 17025. Adopting reference methodologies is not sufficient, since they still need to be validated in each laboratory.

5. Metrology

Effective training in scientific measurement techniques (e.g., measurement uncertainty, method validation) is essential for laboratories to ensure the accuracy and validity of results. This needs to be linked with a sound, internationally credible national metrology system to enable assessment of laboratory methods using higher level reference materials or methods. National Metrology Institutes, such as the NMIs that are members of the APEC SRB in this area (the Asia-Pacific Metrology Program, APMP) and/or expert institutes that form part of the national measurement system are a key resource for laboratories seeking to develop these capabilities.

6. Sampling

Laboratory personnel may or may not be involved in collecting samples, nonetheless they may need to put together guidelines or train those responsible for sampling. Different methods require different sampling and preservation techniques that are essential to maintain sample integrity and ensure accurate analytical results. Storage and transport should also be part of a sampling plan. The basis for sample size calculation and interpretation of results based on that calculation also needs to be part of the training in this topic, as well as ensuring sample integrity and an audit trail during transportation.

7. Laboratory management

Training in how to run and manage a food safety laboratory is important. Topics related to managing both financial and human resources must be included.

8. Accreditation

Training in laboratory accreditation (ISO standard 17025) needs to be highlighted as a separate part of the training. The APEC SRB that could provide support in this area is the Asia Pacific Laboratory Accreditation Cooperation (APLAC).

9. Analytical methods

Training in different methods for measurement of both microbial and chemical contaminants is needed. Development and validation of these methods to the requirements of the ISO/IEC 17025 standard should ideally be undertaken in consideration of the link with the national measurement system described under “Metrology” above. This is an extremely broad area,

since training is likely to be needed in a very large range of combinations of food matrices and food hazards/analytes. In addition to the ongoing requirement for hands-on training for these specific methods of analysis, it is suggested that some central repository (web portal) housing method details could be useful in acting as a point of reference.

10. Data analysis and interpretation

Laboratory personnel must be able to interpret the data that are produced. It is important that laboratory personnel understand the relevance of screening techniques (no false negatives/presumptive positives) vs. confirmatory techniques (unequivocal positives), understand when each technique should be applied and understand the criteria that should be employed for each technique. Basic trend analysis of the data is also very important. In addition, laboratories and agencies should set up mechanisms to share data between entities – this will enrich the country's surveillance system.

11. Maintenance and troubleshooting

Training in basic principles of equipment maintenance and troubleshooting that laboratory personnel could carry out by themselves would be extremely helpful in Economies where access to equipment manufacturers is difficult, expensive or response is slow. This training need not be vendor specific, but may more likely offer training in troubleshooting of basic principles of frequently used laboratory techniques.

The first steps are to collate available training material and translate where necessary. We will need to identify:

- Individuals who can revise the material and
- Individuals who can deliver the training

Funds to conduct the required activities will need to be sourced.

It would be valuable to create a WEB PORTAL to use as a repository of analytical methods – JIFSAN manages FoodRisk.org an online resource in food safety and risk analysis that can be further explored as one of the places to host such a repository.

APEC must take advantage of the experience and existing materials on laboratory analyses/methods already developed by two major institutions and networks:

- [FAO/ PAHO Red Interamericana de Laboratorios de Análisis de Alimentos \(RILAA\)](#) or [Inter-American Network of Food Analysis Laboratories \(INFAL\)](#): training online and face to face. Languages: Spanish, Portuguese and English. Rich resource on lab capacity training.
 - o E-learning link: <http://www.panalimentos.org/rilaa/ingles/training.asp>
- [Global Foodborne Infections Network \(GFN\)](#): A network of institutions and individuals committed to enhancing the capacity of countries to detect, respond and prevent foodborne and other enteric infections.
 - Training courses: <http://www.who.int/gfn/training/en/index.html>
- Codex Committee on Methods of Analysis and Sampling (CCMAS)
- Asia-Pacific Metrology Programme (APMP): <http://www.apmpweb.org/>

- Asia Pacific Food Analysis Network (APFAN)
- Asia Pacific Laboratory Accreditation Cooperation (APLAC): <http://www.aplac.org/>
- Report of the International Workshop on Metrology in Food Microbiology: Strategies to Improve Food Safety in the Asia Pacific: Traceability of Food Microbiology Measurements – report given by Stewart Jones (NMI, Australia)

Table 1. Training availability/ needs in each of the areas identified above

Training needs	Training available?		Target audience	Delivery methods
	Yes - where	No - Who		
Global context of food safety		No - ?		
Needs assessment	FAO: Two guidelines to assess capacity building needs (laboratory chapters) PAHO: PVS tool to identify lab infrastructure			
Safety	Several available, Universities, OSHA, Government			
QA (validation)	APMP/FAO/PAHO/AOAC			FAO: Both face to face and online. Others: Face to face
Metrology	APMP/SIM/FAO/PAHO			Face to face and online not for all
Sampling	FAO/ICMSF	IFSTL*		
Laboratory management	APMP through providers such as NMIA			
Accreditation	FAO/PAHO/APLAC			
Analytical methods	Some. AOAC (ref. methods for disputes not for every day analysis). Codex, APMP, SIM	IFSTL		
Data analysis and interpretation		FERA/SARAF	Lab people, industry, regulators	
Maintenance and troubleshooting	Manufacturers/ACS			

* IFSTL: International Food safety Training Laboratory (JIFSAN/Waters)

Report from Day 2: Target Audiences, Delivery Methods, Evaluation of and Sustainability of Training

Facilitator: Mr. Steve McCutcheon

Executive Rapporteurs: Mrs. Megan Crowe, US Department of Commerce (DOC), Dr. Sonia Bradley, Australia, Food Standards Australia New Zealand (FSANZ), and Dr. Liu Hanxia, General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ)

Prior to this session, a series of questions were posed, and the rapporteurs consolidated relevant information from the speaker presentations. Information was presented for discussion among the participants who provided additional input, as presented below.

Can we identify the target audiences for whom training will have the greatest impact?

There was a wide variety of responses to this question with no consensus reached on any one priority audience. Reducing foodborne illness, facilitating trade, and improving economic outcomes should all be considered when identifying target audiences. Industry, laboratory staff, academics, and regulator audiences are all important in targeting training. Combining all audiences in common training can encourage dialogue and exchange of perspectives.

Generally, those with the greatest responsibility for ensuring food safety, from the highest to the lowest levels of an organization are appropriate for targeted training. Within industry, this could encompass workers in operations, on farm quality assurance (targeting relevant commodity area for country/region), processing workers, front line workers, top management, inspectors, auditors, brokers, and traders. Within government, this could include high level policy makers, regulators, inspectors, auditors, and top management.

Specialized training needs should be considered for certain groups, including women and small scale producers. In some economies, most of the farmers are women, often farming small scale farms, but they lack access to education and tools to improve food safety. Targeting education to these groups can help improve the safety of the food supply, which can lead to improvements in public health as well as enhancing economic growth.

What are the best delivery methods for local conditions and for the target audience?

A number of delivery methods were identified with many advocating use of a variety of methods adapted to the particular needs of the audience or the use of a systems approach when designing training.

- **Face to face training** was identified as an important delivery method due to its interactive and hands on approach. Some key issues to consider when designing face to face training included establishing expectations prior to training, using mentors, and having qualified and local trainers to deliver the training. All agreed on the importance of adapting the training to each audience to take into account the language, culture, and skill level of the audience as well as economy specific, sector specific, industry specific and target audience specific needs. Standard training modules can be designed under an overall model plan supplemented by additional materials such as trainer guide, exercises, assessment, reference booklets, and DVDs. Development of “Train the Trainer” modules can also help to more quickly disseminate training.

- **Online training** was also identified as a method to allow for wider dissemination of training although drawbacks are that it is not as interactive as face to face training. This can be addressed by making online training robust with community building, social networking, podcasts, e-discussions and games. E-Learning tools and storyboards can also engage participants. Face to face training sessions can be captured digitally to provide subsequent online training.

Other types of delivery methods include slides/films, video presentations, storytelling (oral and print), flyers, radio and television broadcasts, one-on-one training and home visits, and case studies.

- The importance of building online knowledge platforms or repository of training information was also noted so trainees can continue to reference training information.
- Specific suggestions for the FSCF PTIN were that they collaborate with existing training institutions and agencies, including the APEC SRBs, and provide expert consultative services as needed.

How will the training be evaluated?

Participants identified a number of ways training can be evaluated, including quizzes, assignments, testing, and exercises given during training to evaluate understanding.

Assessing baseline knowledge before and after training can also be effective. For example, Michigan State uses assessment tools to determine baseline knowledge and skills of participants in training programs before and after the training in their work with the Food Safety Knowledge Network. Others suggested identifying target output and indicators to determine achievement of training objectives before developing the training itself.

Participants agreed that universities can play a major role in designing evaluation of training outcomes. Additionally, linking training outcomes to an organization's larger objectives, such as passing an internal audit program or government inspection can also give an evaluation of training outcomes. Regular follow up in the longer term with continuing impact evaluation is also helpful.

How can the training be made sustainable?

The Expert Working Group defined two types of training sustainability, funding sustainability and sustainability of training outcomes.

An important way to support **funding sustainability** is to establish partnerships and have the appropriate organizations be advocates for training. Operating the training from a business perspective, and showing the effectiveness of training to the funding organizations, including a direct connection between training outcomes and economic returns on investment is also desirable.

There are a number of ways to facilitate **sustainability of training outcomes**. Participants suggested providing periodic retraining or refresher training to keep knowledge current. They also suggested having continued access to documentary standards and references in a repository for training information such as a web portal that is actively promoted, managed, and maintained to ensure material is current. Making user friendly training modules that can be easily accessed and revisited is also effective.

Participants also noted the importance of properly motivating training participants either by enforcing and rewarding proper behaviors, or using proven training models that encourage sustainable outcomes and behavior changes. Audience involvement in the preparation of training materials can ensure participants have ownership and understanding of the material. Sustainability of training outcomes can also be increased if the training is linked through ongoing formal programs under existing international and regional agencies and/or the five SRBs.

Estimate of costs associated with training, and identifying funding sources

A long and detailed discussion ensued from the topic of estimated costs associated with training. There are many costs associated with establishing training, including the cost to maintain a knowledge platform as a repository for training information. Demand needs to be created at the public and private sectors.

Participants identified a number of potential funding sources. This included partnering with other organizations, including industry members or other organizations that have existing training and information sharing programs in the APEC region. In kind contributions can also be sought. In cases where regional training is provided, the host economy can often cover the cost of items such as lodging, meeting rooms, and course materials.

The World Bank noted that fundraising is an important consideration. Significant staff work and core financial resources are needed to move forward with an assessment of food safety capacity building needs in the APEC region, mapping of resources, and work with industry. The World Bank recommends doing economic studies before starting a project. The Bank does a number of regional studies with 15% of their budget going towards regional analysis. The Bank is currently doing a study on trade barriers among APEC economies.

The World Bank differentiates lending rates based on economy income levels. The Bank has a three year lending cycle. Most projects are economy focused but some are regional. With regional projects, there is often a maximum of 3 economies addressing a common issue represented together since including additional economies beyond 3 becomes unmanageable. The World Bank requires the funding source to participate directly in the training process so they can gain ownership of the training. The World Bank works with bilateral donors and can set up trust funds to implement training. The World Bank can also provide parallel financing, whereby the World Bank sets up the project and bilateral donors provide technical assistance to support it. Funding can be channeled through the World Bank or the Asian Development Bank.

The U.S. Agency for International Development (USAID) also described how their funding works. They provide funding on a bilateral basis and have missions in Bangkok and Central America, although their priorities are set in Washington. USAID works closely with their host country counterparts. A few initiatives and priorities are being developed globally.

There was significant discussion on the relationship of food safety as a subset of food security and the many funding sources that are currently available for food security initiatives. The global food safety acts currently in Congress clearly identify food safety under food security.

USAID described the L'Aquila Food Security Initiative which was agreed to in July 2009 and calls for a \$20 billion investment over three years by G8 members. The plan is endorsed by a coalition of other

leaders from more than 25 countries, as well as representatives from major international organizations such as the UN, IMF, and WTO. Although geared mainly towards Africa; Asia, Latin America, and the Caribbean are also referenced. Since food safety is a subset of food security, it may be possible to link food safety training efforts into funding from the L'Aquila Food Security Initiative.

The World Bank has established a food security trust fund, which includes food safety. Regional organizations can apply for funding if they have a legal statutory existence. There is also a trust fund established by FAO, OIE, WB, WHO, and WTO called the Standards and Trade Development Facility (STDF) which is a joint initiative in capacity building and technical cooperation aiming at raising awareness on the importance of sanitary and phytosanitary (SPS) issues, increasing coordination in the provision of SPS-related assistance, and mobilizing resources to assist developing countries enhance their capacity to meet SPS standards (<http://www.standardsfacility.org>). The request has to come directly from the country or implementing agency.