Date and Venue

The workshop took place on February 2 to 10, 2017 at the University of Horticulture Science in Bangalore, India.

Workshop participants

The participants of the workshop were Drs. Mohammad Alam Ghoryar and Dr. Mohammad Mehdi Moheghi faculties of Herat University Faculty of Agriculture, Shoaib Ahmad Shakhes dean of veterinary faculty of Herat University, Drs. Paul Ebner, Amand Deering, and Helay Oliver faculties of Purdue University, Ahmad Shafiq Foushanje, Abdullah Masoumi, Basir Ahmad Rahimi, and Nasir Ahmad Sahel MSc students, Abdul Walid Riaz program assistant in food technology, and Iqbal Habibi food technology program manager, and Dr. Krishna a professor of University of Horticulture Science.

Agenda

Agenda is attached as annex.

Background and program approach

Purdue University a sub-contractor of FHI360 provides technical assistance to the USWDP’s agricultural programs. Purdue-USWDP through its partnership with Herat University, Faculty of Agriculture works towards establishment of a model and quality food technology bachelor degree program. The bachelor degree of food technology program along with its policy document and curriculum is approved by the MoHE, and its first class is expected to be inaugurated in March 2017. As the first semester of the food technology is approaching and all the four courses that will be taught in the first semester are new and were required to prepare teaching modules and plans, therefore for this purpose the Teaching Methodology Workshop was conducted.

Objectives of the workshop

The specific objectives of the workshop were as follows;

- Introduce the Food Technology industry-validated curriculum and its objectives and goals;
- Facilitate opportunities for all participants to become more familiar with current food processing technologies (both traditional and modern);
• Develop methods to best teach these technologies and related principles in the new Food Technology curriculum;
• Work as a team to finalize course designs and lesson plans for initial Food Microbiology, Food Processing, Biochemistry, and Dairy Processing courses.

Expected outcomes
• Concrete, sustainable examples of practices (e.g., lab practices, site visits, internships) that will be incorporated into classes to allow students to become experienced with relevant technologies;
• Decisions as to which types of learning strategies are most appropriate for different aspects/classes of the curriculum; and
• Finalized course/lesson plans for Food Microbiology, Food Processing, Biochemistry, and Dairy Processing courses

Workshop process and flow

The workshop was organized based on the following segments;

1- Industry visit: In the industry visits participants had the opportunity to practically see different fresh food industry including commercial, traditional, and local. In each one of these markets participants observed different process of fresh fruit processing, packaging, grading, and storing.

a. Safal Market: Safal market is a wholesale market that has an auction center for fresh fruits and vegetables. Farmers sell their fresh produces in the auction center which is equipped with electronic bidding system and the produce is being put on the big screen for the buyers. The market also had a warehouse for fresh fruits and vegetables with temperature and humidity control system. Safal market also had a

![Figure 1: Ripening room manager explain how they ripe banana through using ethylene](image-url)
ripening room for banana where they were using ethylene to ripe banana. In addition to that, Safal market also had a cold storage facility where fresh produces can be kept for several months. Safal market was established in 2002 and started operation in 2004 and is being operated by farmers’ cooperative organization. The market bring farmers produces from farm and do grading (A, B, and C) and then sell the fresh produces through retails, wholesale, and auction center.

In Safal market participants had the opportunity to watch a real auction where one buyer purchased vegetable and also asked question from the manager of the auction as well as the cold storage and ripening room operators.

b. Mother Dairy Fruit and Vegetables processing unit:
Participant also have practically seen a cold storage, refrigerated ripening, and natural ripening using water system.

c. Food Market India: This was a collection of different food processing companies and was built based on the government and private partnership. The industry was being supported by the government through providing land and other financial support. For example, if a small company had good products or idea for good product but can’t afford it economically so the company could use the facilities of this industry and
promote his business. Participants had the opportunity to see practical processing of Papaya peeling, washing, canning, and packing. In addition, participant’s also have seen the cold storage where some vegetables such as green matter, okra and etc. that could be kept for two years. Participants have also practically seen the food safety measurement applied to the facility through clear visible board sign in each section of the processing unit. Participants also had look to the spice packaging.

d. Local market (Alenka farmers market)
   - Participants were taken to the local market early in the morning at 6 am for the purpose to see how farmers sell their fresh produces. The market place was provided by government to the farmers and the farmers were paying very less amount of rent. An interesting thing was that all the prices were set up by the government. In this market everything was very fresh and each farmer was trying to make their produces the way to get buyer’s attention. Participants walked in the market and observed how farmers sell their produces and how the local market is functioning.

2- Learning strategies and post industry visits discussion and how we can bring these technologies into classrooms: In this section Purdue’s professors Paul and Amanda and Dr. Krishna a professor at University of Horticulture Science talked on a different learning strategies;

   a. Dr. Paul: Paul has talked about the industry validated curriculum of food technology, bridge program, and industry advisory board for the purpose to update all the participants particularly the 4 MS students who are pursuing their MS in food science. He also talked about the experiential learning in Afghanistan and added that this method is the way how to teach students to learn something
practically. For example, making a yogurt is a simple thing but student should know the science behind this.

b. Dr. Amanda: She also talked about the learning strategies and explained the inquiry base learning strategy. In this strategy she used a peanuts packed and coated with chocolate in different colors as an example. A package of peanuts was distributed to every participant. Participants counted and provide a number of each color present in a pocket and the total number as well. She then did the calculation on the board which was a very good method of teaching.

c. Dr. Krishna: Krishna talked that how we can bring technology into classrooms? He explained three ways;

   i. Teaching
   ii. Research
   iii. Extension

In each of the above three ways he provides good examples and also talked that how university can get fund to support its lab and provide reagents. Also how to get fund from food industry? In this regard he said that the university should show up themselves that we can do something and of course this take time to build relationship with industry. For example, the industry gives equipment to university to test it and the university in return get free fixation of the equipment if get damaged. He said that the industry here in India trust and know the knowledge of the university.

3- Team course development
In this section of the workshop, participants were divided into four groups to develop a teaching plan for their respected course. Each group was consisted of faculty of Herat University Faculty of Agriculture (HUFA), faculty of Purdue University and MS student. Text books were provided to all of them that they can use it while developing a teaching plan. Each group developed a teaching plan for their subject along with the lab work activities and the equipment that can support the subject teaching. The teaching plan of each course was consisted of lectures, lab work, industry visit, assignment, and midterm and final exam. This team course development provided a good opportunity for the 4 MS students to actively engage as they will be the main responsible for the leadership of the food technology department after they finish their MS degree.

4- Individual course development: In this segment each faculty of HUFA were given a day to work on their course for further improvement and any other thing they would want to add. Each faculty worked on their course teaching plan.

5- Presentation and feedback: Each faculty then presented their course teaching plan to the participants. During the presentation a good discussion took place on each course’s teaching plan and the faculty brought necessary change if was needed in each course.

6- Purdue’s professors worked with four MS student on their field of research. The 4 MS students were picked the following area for their research but were not finalized yet. The four research area are as follow;
   a. Dehydration- fruit and vegetables
   b. Storage and packaging- grapes
   c. Fortification
   d. Food microbiology

Purdue professors discussed the research area with the 4 MS students and the three first areas are very good but for the last one Food Microbiology they said this might not be fitted in the Afghan context. Dr. Krishna said that these areas are not the final one and just student selected and it can be changed and he will work...
with the 4 MS student once their research area is finalized. In this regard decision was made that the 4 MS students will have to send their area of research to Purdue professors and they will work on it.

Outcome of the workshop

The workshop outcomes were very good and its goals were met. The achievements of the workshop include developing of lessons modules for the four courses food microbiology, food processing, biochemistry, and dairy processing that will be taught in the first semester of the food technology bachelor degree program. The teaching plan of each course consisted of lectures, lab work and equipment needed to support the lab work, industry visit, assignment, midterm and final exam for the period of 16 weeks of the semester. In addition to that, the food technology industry validated curriculum was also introduced to the participants particularly to the 4 MS student who pursue their MS in food science.

Certificate distribution ceremony and final remarks

At the final day of the workshop, Dr. Kevin McNamara talked on the program overview followed by a presentations presented by Dr. Amanda and Dr. Ghoryar. Dr. Amanda talked about the industry visit and its objects and Dr. Ghoryar presented his teaching plan/module for the dairy processing subject he developed. Dr. Ghoryar described how he will be teaching his class, what methods can be used, what lab activities will be conducted and what lab equipment and reagent will be needed to teach this class. At the end of his presentation he also putted on the screen the equipment needed to support his course’s lab work along with the justification. Right after finishing his presentation, a short discussion took place that how to source the equipment and reagent. In this regard decision was made that each faculty will send their list of equipment and reagent along with the justification to Iqbal Habibi and he will compile and make one list and then will see if the locally available companies can provide such equipment considering the USAID policy while purchasing equipment and chemicals.
After an MS student pursuing MS in food science was asked to talk about the program on behalf of the three others. He talked about the program and added that this was a wonderful opportunity for us and we would suggest to have similar program in the future. After that certificates were distributed to participants.