ADEC/USDA

REPORT ON FOOD SAFETY TRAINING

FEBRUARY 2009

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Scientific and Technical Exchange Report

People’s Republic of China, November 17-27, 2008

Goal:
Discuss with Chinese officials and educators the issues surrounding food safety and the opportunities for collaborative training.

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Team Makeup

The team members included three food scientists (Todd, McGorrin, and Thippareddi) and two online and new media experts (King and Gleason.) This combination allowed for integrated discussions on both food safety issues as well as online training opportunities. All team members represent university members of the American Distance Education Consortium (ADEC) under which the original proposal for the exchange was drafted.

Country visited and dates of visit

The team assembled in Beijing, People’s Republic of China on November 16, 2008. Meetings had been scheduled beginning in Beijing on November 17 and running through November 27. Locations included Nanjing, Changzhou, Jintan, Shanghai, as well as Beijing. Most of these locations are due south of Beijing and generally west of Shanghai.

Summary

Food safety is one of the most critical issues impacting international trade in food products and food processing technology. It is also one of the issues that could be potentially impacted through improved learning modules and training. This exchange built on a previous USDA-funded scientific exchange grant that reviewed digital learning technologies in China.

This exchange drew together an integrated team of US experts in food safety and distance learning technology to explore opportunities to move to the next level. The team’s expectation was to look for areas of common concern for which Internet and digital learning modules could help address critical issues of food safety training in China.

Two members of this team (King and Gleason) had visited China previously as part of a USDA Scientific and Technical Exchange Team and had developed an understanding of the technology-based opportunities for training, especially in light of their membership and experience in the American Distance Education Consortium (ADEC).

During this 2008 Scientific and Technical Exchange trip to China, the integrated ADEC /USDA science and technology team focused on locations and potential partners for food safety training. The goal was to identify opportunities to collaborate in developing quality distance education on food safety while opening up the opportunity to create learning materials for Chinese students, rural residents and professionals. Food safety is a multi-faceted issue even in its simplest form. Exploring food safety in the relative short 10-day period of this exchange brought to the surface obvious issues that impact ultimate success of any exchange such as this. Since this exchange was sponsored and supported by the Chinese Ministry of Agriculture, much of what we saw and the people we talked with came appropriately from the agriculture arena. In China, as in the USA, other ministries and organizations have significant impact on on-going research, remediation and training in the general area of food safety. Included in that group are the Ministry of Health, the Ministry of Education, and the Ministry of Technology.
The Scientific and Technical Exchange team focused on possible opportunities for future mutually beneficial collaborations in the area of training and cooperation to help insure a safer food supply for both the PRC and the USA. The team visited regional and local inspection facilities that focused specifically on residues and contaminants of food. They also met on a variety of university campuses, in most cases with the food science faculty. In some cases they were hosted by the campus international relations representatives. Finally in Beijing, they met with governmental organizations—e.g. China Center for Disease Control and Prevention—and with Beijing-based USDA representatives.

In the area of training, the team continued discussions with the Central Agricultural Broadcasting and Television School (CABTS) in Beijing, an organization that USDA and several members of the team have worked with in the past. In fact, an active memorandum of understanding related to reciprocal training and exchanges exists between the ADEC and CABTS. The team concluded there are outstanding opportunities for new collaborators related to food safety training in several regions of China, especially those with significant Internet access.

General discussion

**Objectives and issues of mutual benefit**

- To increase understanding within the American scientific community of the food safety and labor force training issues China faces.

- To explore more formalized future scientific relationship with the Ministry of Agriculture.

- To offer one or more scientific technical presentations at some international venue.

- To create collaboration between U.S. and Chinese instructional designers and developers of online food safety training modules.

- To pave the way for Chinese students and professionals to attend ADEC member universities for degrees or further professional training in food safety and food processing technologies.

- To explore and test advanced networking for distance education and conferencing in food safety, archiving video libraries for training purposes, testing prototype learning modules and animation.
November 17, 2008

National Farmer’s Science and Technology Training Center (NFSTTC)
Central Agricultural Broadcasting and Television School (CABTS)
Building 20, Maizidiangie, Chaoyao District, Beijing

The National Farmer’s Science and Technology Training Center (NFSTTC) and the Central Agricultural Broadcasting and Television School (CABTS) are both a part of the Ministry of Agriculture. And they work in concert with at least 20 additional Chinese Ministries including the Ministry of Education. CABTS has 25+ years of experience in agricultural training activities with the NFSTTC national training center in Beijing and CABTS’s 39 provincial schools, 339 prefecture (city) schools, 2,182 county schools, and 12,000 township teaching stations. This training is accomplished by more than 46,000 tutors who contribute to training programs in most if not all villages in China.

The technology supporting this effort includes 335 satellite reception sites, 4,000 agriculture science/technology libraries for farmers, as well as CABTS-produced VCDs, videotapes, books, newspapers, magazines, satellite TV, and radio. CABTS produced a daily half-hour agricultural program broadcast nationwide with the potential to reach 70% of population. They produce MP3 audio used for loudspeaker programs in villages. They are interested in using text messaging to send information to farmers (given large market penetration of mobile phones).

CABTS reported that some farmers access the Internet through learning centers in rural areas. The programs include diploma and non-diploma education - secondary, post-secondary. Non-degree programs include: green certificate, vocational skills, professional qualifications, agriculture applicable tech training.

The team noted that CABTS and NFSTTC have a highly efficient training system in place and would be an outstanding partner for future USDA/China joint training operations targeting rural and production agriculture audiences.
China Agricultural University (CAU) – Beijing

This University has 110 faculty members in the College of Food Science and Nutritional Engineering, with associations with both Nestlé and Mars. There are 800 students, 200 MS candidates, and 500 postdoctoral students. One reason for the high number of students at the graduate level is that they are more easily employed in the food industry.

The team observed that CAU has a strong relationship with dairy and meat processing operations, e.g., fresh and processed meats operations (mostly ham processors). Their facilities are relatively modern, with a skilled faculty and staff.

The team heard presentations from CAU researchers about their work in food additives, biotechnology, biomass utilization, vegetables (GMO tomatoes and sweet peppers), safety evaluation of GMO foods, functional compounds and Chinese herbs. An example of a food processor-CAU partnership is the one with CAU and Meng Niu, a large local dairy processing operation.

Training Issues:

Options for possible collaborative training appear limited to foreign expert visitation programs sponsored by CAU and on-going exchanges with visiting scholars. They are predominantly focused on academic (non-extension) exchanges.
Nanjing Agricultural University (NAU) – Nanjing

November 18, 2008

This is a large university with a commitment to food safety, as relayed by representatives of International Exchange Division. The focus of NAU’s presentation to the team was its creation of the Sino-US Center for Food Security and Sustainability in 2007 in collaboration with the USDA-ARS Meat Animal Research Center, Clay Center, Nebraska.

NAU’s Vice-President Zhou is a Professor of meat science and chief editor for the peer reviewed journal Meat Science. The NAU Meat Processing Laboratory appears to offer outstanding facilities for meat processing, and conducts predictive modeling research/shelf life issues (E. coli), and has links to the industry.

The team noted the strong links between provincial laboratories, agricultural universities and research facilities, and would benefit from time to explore the full potential of Nanjing Agricultural University’s food safety research staff.

Training opportunities:

NAU has a social extension program, called 100 professors/100 villages in which professorial staff spend time working with producers and farmers in villages. On campus, the library was demonstrated to us as the center of possible distance education expansion. They are building a wireless network from the library out, and are just developing an initial course management system as the underpinning for new efforts in distance education. They also focused on predominantly academic (non-extension) efforts initially in distance learning.
November 18, 2008

Changzhou Agriculture and Forestry Bureau Regional Testing Center—Nanjing

This Regional Testing Center has developed standards for 751 products. The lab provides testing services for enterprises, to evaluate the quality of the products and compliance with organic, green, and “safe” (regular) standards for products, and also regulatory compliance.

The team learned that, according to the testing center staff, their findings (test results) are not necessarily publicized, and only submitted to the requesting agency, such as the farmer or the regulatory agency for action.

The Agro Quality Law implementation organization is responsible for a variety of activities. These include:

Feed, seed and soil testing for quality
a. Cross-testing among the various laboratories for verification of the testing protocols as well as the product standards
b. Conducting regular testing and monitoring of products (agricultural products, fishery products and animal-based products) for quality standards such as organic, green and safe
c. Environmental testing – water for pesticides, agricultural effluent to the environment, and environment inputs to agriculture crops
d. Microbiological testing – the capabilities were in place, but minimal testing was being conducted

When questioned specifically about their food safety monitoring and testing program, the Regional Testing Center staff indicated food safety monitoring is conducted by the Ministry of Health or the local equivalent. The team observed that the current food safety regulatory system seems to be prescriptive, with inspection for compliance with existing standards (such as pesticides and heavy metals), rather than a preventive system based on risk.

The team felt confident that if an emergency issue occurs, the laboratory could address the problem, such as detecting high antibiotic residue levels or melamine in milk. The team was told that consumers, producers (farmers) and/or processors have access to a wide-ranging scientific expertise through a telephone service. The testing methodology is prescribed and the laboratory tests against existing food safety standards, although perhaps fewer positive detections are documented than might normally be expected from the type of samples tested.

Training Opportunities:

This facility has a relationship with the Ministry of Agriculture that includes access to CABTS-based training and information dissemination. Because of their involvement with producers (as testing service customers), they focus in part on improved farming issues. They estimate that 85% of the farmers in Jiangsu Province (south of Beijing, west of Shanghai) have computer access. They also contribute to the CABTS-based cell phone distribution system that provides timely information directly to farmers via cell phone.
November 18, 2008

Ministry of Agriculture testing laboratory for Jiangsu Province – Nanjing

This laboratory has the mandate to evaluate various commodities for chemical hazards. These commodities include inputs for crops, such as the germination ability of seeds of rice, winter wheat and canola, fertilizer content, and pesticide quality and purity. Feed, production environment, water, and soil are checked for veterinary drugs and/or pesticide residues.

In addition, herbal medicine is tested for its suitability for the treatment of animals. Heavy metal testing for lead is performed for vegetables and other foods. Irrigation water for these crops is checked for the potential for pathogens by *E. coli* levels. Irrigation water *E. coli* levels of $\geq 30$ CFU/liter would render the water unsuitable for use. *Salmonella* testing was claimed to be done for some commodities, including eggs, but had never been isolated from shell eggs.

The AOAC International methods are used in this facility for chemical analyses and there is some system for checking laboratory competence by sending samples from one laboratory to another in another city and verifying that all the samples spiked with pesticides were detected at the right concentrations.

Product samples are randomly selected and purchased from the market by the regulatory agency, and the test results passed to the unit requesting the testing (e.g., provincial government, farmers, food/feed companies). However, the laboratory is not involved in enforcement in case the samples exceed the regulatory limit for chemicals or microorganisms.

The team observed that this lab was well equipped and has advanced capabilities for chemical testing.

Training Opportunities:

Here, as at other sites, the team discussed how the multitude of laboratory technicians in this and other testing centers were trained to use the advanced testing equipment and facilities that are available. Many are graduates of Nanjing University and some come from China Agricultural University in Beijing. They also participate in on-site training developed by the Ministry of Agriculture and other ministry sources. Internet access within the testing facilities was typically available at levels that would support online training.

Possible topics for collaborative training include:

- Testing technologies
- Food quality control systems
- HACCP
- Improved sampling processes
- Food safety project management
The major function of this School is to conduct more than 70 courses of training courses for the farmers. In the last four years the School has accomplished this, in part, through the computer-training center where they teach farmers to use the Internet for better information to raise crops and animals. Farmers are also taught how to use the Internet to obtain the latest marketing information. (See Appendix II for training posters.)

The School centers also have 2,500 volumes of production and reading material. Specifically, the scientific and technical training program includes the quality and safety of both dominant crops grown in the region and unique crops they can consider. The training is intended to improve the farmers’ capability in terms of knowledge of new techniques and varieties in terms of crop functionality.

The team learned that the training program also covered food quality and safety (crop planting, animal housing and leasing enterprises), different standards for organic, green and safe produce. The School reported that the basis for their training programs is developed, in conjunction with professors at universities, local expert farmers or other technical experts.

There are 157 Administrative Villages in the Region. All these receive distance education (audio and video) at the Jintan city level. The School has the capacity to create programs based on the needs assessment from farmers, county level and sometimes from the State Government.

The National Agricultural Broadcasting School reported that major food safety risks are related to pesticides, veterinary drugs and environmental pollution. Agricultural products testing work includes inputs for crops such as environment, soil (NPK) and water (pH and E. coli). The Bureau of Agriculture and Forestry will contract monitoring of feed and veterinary drugs.

The microbiological testing is done on frogs and shellfish, environmental testing, and irrigation water testing. Quality testing methods are from the State government, but other inputs are allowed from other government agencies and farmers themselves. The laboratory runs the routine testing according to the protocols specified. The ingredients going into a food are also monitored and production records kept. Other testing is done at the County Level, but no microbiological testing is done there. The farmers do not use and detection kits, but the local inspectors do.

Training Opportunity

This site had the most robust Internet access of any of the rural sites we visited, and used Internet access for both training as well as market information. Learning modules developed at central locations such as CABTS or CAAS in Beijing could be of value in locations such as this.
Shanghai Jiao Tong University

The Department of Food Science and Technology was established 1993, conducts its research responsibilities with 25 tenure-track faculty, 50 graduate students, and 40 undergraduate students. The Food Science and Technology Department has seven academic exchange programs with US, Australia, and Europe.

The team learned that a multidisciplinary enterprise was formed consisting of The Department of Food Science & Technology, The SJTU-Bor S. Luh Food Safety Center and The Institute of Natural and Health Foods, located within the School of Agriculture and Biology (Minhang Campus). The former Department head (Dr. Yanfei Li) is now Deputy Director of the Center. Although the Center is listed as within the Department, it is semi-autonomous with a Board of Directors (BOD) responsible for a $3 million foundation. The BOD includes world-class scientists for policy oversight over the Center through the Dean and Vice Dean for both local and international issues.

One of the present tasks of the Center is to learn from world-renowned universities’ researches and manage to become an important institution both national and international. Some faculty belong to both groups and so there is regular communication in the food safety area among faculty.

There are six main units in the Center: The Food Physical and Chemical Lab, The Food Processing Lab, The Microorganism Lab, the GM Food Safety Lab, the Food Safety Education Office, the Food Safety Web and Information Office, as well as a Center Office.

The team was informed of the following specific research thrusts:

- **Post Harvest Handling:** Critical technologies for extending shelf life of ready-to-eat (RTE) foods; improving technologies for the production and distribution of produce; cold chain technology and facilities for the preservation of fresh produce; study on CA storage for specific varieties of vegetables.

- **Food Safety and Food Biotechnology:** Development and application of surveillance technology for dairy quality and safety; aflatoxin detection and detoxification; Evaluating specifications for tests and reagent kits; determination of the enterohemorrhagic *Escherichia coli* O157 in meat products for export, functional foods; preparation and analysis of soybean saponins (soyasaponins); bioactive components preparation from alfalfa *Medicago* sativa L.; *Grifola frondosa* polysaccharides extraction, chemical modification and its medical activities; post-harvest handling and storage; non-destructive methodology to detect key food components; edible coating or packaging; vacuum impregnation; food safety and food biotechnology; development of gene chips for food-borne pathogen detection; research on detection techniques for key pathogens in animal feed; research on detection techniques for the safety control of livestock products; application of electrochemical methods to detect food contaminants, such as bioamines in traditional fermented food.
Dairy Science and Processing:

This includes development and application of key monitoring techniques for dairy quality and safety. The groups of most interest for food safety are the Group of Post-Harvest Handling and Storage with an associated laboratory with the same name, and the Group of Food Safety and associated laboratory of Food Safety and Microbiology.

One of the main thrusts is research on pesticides and other environmental contaminants, and the laboratory equipment for the detection of these is up-to-date. Faculty also evaluates the prevalence of the foodborne pathogens in the natural environment. However, the microbiology group has more limited capabilities, but they do PCR work and have clean air rooms to carry out RNA and DNA experiments. Salmonella and Vibrio (seafood) are the pathogens of most concern. The researchers collect pathogen strains, e.g., Vibrio parahaemolyticus from Chinese CDC and other collections (mainly clinical sources) and conduct molecular biology comparisons of these strains such as through PFGE analysis. However, they have added L. monocytogenes to milk and V. parahaemolyticus to oysters to research its recovery rate.

The team concluded that the Department does Salmonella testing of poultry on farms and poultry waste but did not have any results to share. As far as food consumption is concerned, the scientists reaffirmed the position that Chinese people always cook their foods that are freshly obtained because of the risk of infections. The State Government reminds consumers to thoroughly cook food. However, there may be an opportunity for recontamination in the home, and recently there appear to be some changes in consumer habits.

Upon further questioning about consumption of fresh foods, the team was told that Chinese do consume some tomato and cucumber as fresh products, and in 2002, 20,000 people were sick, probably from lettuce or a similar leafy green contaminated with *E. coli*.

During follow up discussions, the team and researchers agreed that: 1) future research might consider more surveillance data and quantification of chemicals and pathogens in foods research to conduct risk analysis; 2) managing the risks is one possible component of a grant which would also contain some basic research and 3) any potential collaboration areas should be funneled through Dr. Zhao, who will communicate with his faculty. (See Appendix IV for presentations.)

Training Opportunities

As a major university in China, Shanghai Jiao Tong has many of the training facilities and capabilities that our major US institutions have. The major interest here was in graduate student exchanges and possible research grant collaboration.
November 24, 2008

Chinese Academy of Agricultural Sciences (CAAS) – Beijing

There are 36 CAAS individual institutes with a total of 10,000 employees. Within the Division of International Information, which communicated with us, there are 300 employees. The expertise of most of the staff within this Division we met was in agricultural economics, rather than food science or food safety. CAAS is somewhat similar to USDA Agricultural Research Service, but it is an autonomous body, under the supervision of the MOA. CAAS will conduct research for any agency willing to fund it although most money comes from MOA.

Although the responsibility of the MOA ends at the farm, CAAS is involved in research and training from farm to distribution, divided into seven stages and within these seven stages, they monitor 35 procedures. The State government sets the list of priorities and the universities or CAAS can apply for the grants for research; the same applies at the provincial level where any of the Academies of Agricultural Sciences can apply for provincial funding. The research focus is mostly on development of better crop varieties.

Agricultural universities, such as CAU and NAU were at one time under the direction of MOA, but now report to the Ministry of Education (MOE.) The extension structure is different from that in the US that is run entirely from Land Grant Universities. In China, extension policy and implementation can be set at central (State), provincial, county and local levels; the last has a technician to relate the information to the farmers.

There is a green food development center, within the MOA which guides farmers in the ways to have their crops certified as organic, green or safe to be within the standards for soil, water and chemical usage. Most of the research is focused on pesticide use and safe drinking and irrigation water, but no surveys for the prevalence of food-borne pathogens is conducted.

The team observed that the CAAS works with the State government’s national food safety strategy to improve food safety and improve communication with the farmer. However, training through distance learning may be difficult since <15% of farmers particularly in the western part of the country own a computer, and the GDP is lower in these provinces compared with those more industrial regions in the east.

Training Opportunities

CAAS has been conducting analyses of food safety issues across the country, however primarily from a statistical point of view. As far as online and other distance training, the interaction among the groups we visited in rural areas and the CAAS was minimal.
General Administration of Quality Supervision, Inspection and Quarantine of the PRC (AQSIQ) – Beijing

AQSIQ has 500 offices, 30,000 staff involved in import and export and 280,000 staff members for domestic food processing/production. The agency is responsible for all foods imported to or exported from China. It also monitors feeds and pet food if these are involved with export. Two types of collaboration with potential partners were mentioned: (1. Research on technologies required by Chinese food industry and (2. Technical training.

China is the chair for the Asian-Pacific Economic Cooperation (APEC) and agrees with its objectives which are:
1. Communication and cooperation in food safety
2. Capacity building in food safety
3. Sharing the results of food safety within the APEC countries

The Partner Training Institute Network project (PPINet) is a conceptual project to be started soon to train APEC countries in a variety of areas. AQSIQ sees the needs for training as:
1. Preparation of policy and regulations;
2. Risk analysis and international standing;
3. Testing technologies for microorganisms, pesticide residues and veterinary drugs;
4. Food safety (RFID) technology use for:
   a. Risk analysis;
   b. Traceability;
   c. Recall technologies.

The issue of training in food safety was brought up by the US trade representative to the APEC to strengthen the case for more effort in this direction.

Discussion on costs of different modes of training was raised. Some funding may be available from Chinese government sources, but AQSIQ expects supplemental funding from U.S. sources, since it is considered a developing country. The AQSIQ is looking to US providing training such as short courses and workshops in the near future, and eventually having online training modules through the web.

They currently have linkages with a variety of institutions including Joint Institute on Food Safety and Applied Nutrition (JIFSAN), University of Maryland. AQSIQ also mentioned the All American Institute of Science and Technology (AIOSAT; http://aiosat.us/about_us.html) for contract for training. AIOSAT is a global educational institution operating under the AIOSAT Advisory Board. The Board consists of ten members and has the responsibility for policy and control. The president reports to the Board and has the principal responsibility for implementation of policy and administration of the institute.

Training Opportunities

The team members concluded there was an excellent opportunity for future cooperation and joint training programs with AQSIQ. The team recommends that USDA maintain contact with Mr. Shiwen Wang in the Import and Export Food Safety Bureau on technical aspects of potential research and training ideas or proposals. The programming for workshops on the different topics was also discussed. The funding cycle is from October of each year and needs to plan ahead for 2010 to propose workshops/short courses.
November 25, 2008

China Centers for Disease Control & Prevention (China CDC), – Beijing

The Chinese Center for Disease Control and Prevention is under the jurisdiction of the MOH. However, it also has links to the Chinese Academy of Preventive Medicine. The agency responsible for monitoring food-borne disease is the National Institute for Nutrition and Food Safety (NINFS), which has 7 Divisions: Food Science and Technology, Foodborne Diseases Surveillance, Food Composition, Standard and Inspection Technique, Biological Contamination Surveillance, Chemical Contaminant Monitoring, Toxicological Safety Assessment, Food Additive Evaluation and Health Risk Assessment. Funds were at one time only from the Ministry of Science and Technology (MOST) and MOH, but now some funds are given to provinces and local government for monitoring feeds and food products, as well as research in food safety and toxicology.

The NINFS has 239 personnel (77 professors and associate professors; 70 research assistants; 63 technicians; and 50 staff.) There are 78 scientists working in the area of food safety. They have developed 451 standards, 136 for pesticides and 17 for contaminants. There are also standards for Aerobic Plate Count (APC), some food-borne pathogens, e.g., Listeria and Salmonella; generally Codex standards are followed, but some need updating. They are aware that current zero tolerance standard for Salmonella in poultry is not achievable.

The main pathogens of concern are Vibrio parahaemolyticus and Salmonella spp. National surveillance for food-borne disease outbreaks is not carried out on an annual basis like the US and other countries. However, some data are collected from provinces and reports are prepared but not released to the public. They plan to improve national surveillance over the next couple of years.

The team heard reports on the following research projects:

• Dr. Ning works with deoxynivalenol (DON) and other mycotoxins for methods development, and conducts toxicological risk assessments.

• Dr. Wu works with acrylamide, melamine and cyanuric acid to develop analytical methods for these compounds in foods as well as in blood and urine.

• Dr. Bin works with risk assessment and toxicology, GMO and cloned corn containing lactalbumin and lactoglobulin and performs allergy assessments on these.

• Dr. Li is the director and is involved in toxicology research, allergy assessment, and functional foods, such as tea.

• Dr. Liu is the chief scientist of food safety, and her research topics are foodborne pathogens and gene typing and quantitative risk assessment of Salmonella spp. and Listeria monocytogenes in RTE foods.

The Center for Disease Control and Prevention (China CDC) has 10 PhD student advisors (32 students), 38 Masters student advisors (44 students).

The team observes that the scientists mentioned that they are willing to collaborate with members of the delegation, and would continue the dialogue to pursue potential research and education/training opportunities.

(See Appendix V China CDC Mission Statement)
Mark Petry with the USDA-FAS, Agricultural Affairs informed the team about the food safety oversight system in China, indicating that the focus for inspection is on the finished product, rather than monitoring during the process or at intermediate stages. China’s oversight system is convoluted because of the many agencies involved in food safety.

He told the team that the MOA is responsible for the agriculture component (crops/animals), but once they are processed after harvesting/slaughtering, the Department of Commerce takes over the inspection control. However, any time the products are in transit, it is the responsibility of the Ministry of Transportation. The AQSIQ is solely responsible for import and export of food products. Products delivered to foodservice operations are monitored by the MOH and the State FDA. Those products at retail, however, are under the State Administration for Industry and Commerce, and the wet market under MOH.

The standards are not set by CDC, but by the State Council. The MOA sets the standards for pesticides whereas the MOH sets the standards for food-borne pathogens. All export and import food is inspected under the supervision of AQSIQ. The majority (70%) of food processing in China is done by 10 processors/companies, while the other 30% of food processing is done by several hundreds of other processors.

Mr. Petry reported that the melamine in milk episode was found to be intentional contamination of the product for economic reasons, as the farmer or the consolidator is paid based on the solids content. He suspected that the milk was deliberately contaminated by several players in the food chain, but most likely in the early stages such as middlemen and distributors. He also mentioned that the large food companies operate by international standards regardless of any national standards. The small operators/processors do not require any checks by local authorities. This means there are many opportunities for errors to occur. There is a need to bring the rest of the food industry to the levels of safety and quality consciousness as the multinational companies and a handful of the Chinese companies.

Most standards are currently voluntary and the industry is not bound by law to use any of those standards. The one company that survived the melamine issue was SanYuan, a vertically integrated company. The reason was that they did not rely on other suppliers for the milk, but only used their own resources.
In the increasingly global marketplace, China’s potential to maintain and expand trade in agricultural and food products with United States and Europe has been weakened by consumer concerns voiced in popular news about the questionable sanitation and safety of Chinese food and agricultural products.


This integrated scientific/technology exchange team worked to initiate new relationships between American and Chinese food safety scientists and distance education experts that may lead to educational opportunities that could mitigate some of China’s animal and plant health issues that impede trade. The integrated science and technology team gained a better understanding of the sanitary and phyto-sanitary (SPS) food safety issues China faces as well as the opportunities for future cooperative work (see Recommendations For Continuation Cooperative Activity below.) The team concluded there is a great opportunity for future cooperation with China in the area of food safety.

### Type of Information Shared With Foreign Counterparts

(See Appendix IV for PowerPoint presentation)

Prof. David King presented a discussion on the expectations of the distance learner, which included learning modules, interactivity, and learner-driven approaches.

Dr. Ewen C. D. Todd offered a discussion of his multidisciplinary research programs in food safety and his consumer studies. He also provided insight on the management of food supply and international linkages to food safety programs.

Dr. Harshavardhan Thippareddi discussed the land-grant university work at the University of Nebraska, including research work on development of predictive models for growth of foodborne pathogens during processing, assisting ready-to-eat meat and poultry processors control *Listeria monocytogenes*, and the development of voluntary HACCP plans for feed industry. He also discussed his Extension work on HACCP / food safety activities.

Dr. Robert J. McGorrin presented information on current research issues in food safety, including causes and approaches to deal with food-borne illnesses, food import violations into the United States 1998 – 2004, foods required to be labeled in the United States for possible allergic responses, Oregon State University research with lysozyme (1992-2008), reducing *vibrio parahaemolyticus* in Pacific oysters, and high hydrostatic pressure processing.
Dr. Jeanne Gleason shared samples of food safety media training programs her team has prepared to reach a wide range of national and international audiences. Her presentation focused especially on Chinese-language materials prepared at NMSU for use in the USA with recent Chinese immigrants and with the use of animations and cartoons for use with low literacy audiences.

Recommendations for Continuation (Or Discontinuation) Of the Cooperative Activity, Including Follow-Up or Reciprocal Visits

Three primary concepts emerged during the meetings with various Chinese officials and organizations.

1) There continue to be individual opportunities for collaboration on training and research that must be developed based on individual relationships between faculty at U.S. and Chinese universities. The scientists on this exchange explored these opportunities at several university-based locations, however the most likely to generate possible joint initiatives were at College of Food Science and Nutritional Engineering at the China Agricultural University in Beijing, the Sino-US Center for Food Security at the Nanjing Agricultural University, and the variety of food science and technology related centers and institutes at the Shanghai Jiao Tong University—these include Food Science Department, the Borh Luh Food safety Center, and the Institute of Natural and Health Food.

These potential collaborations will best develop through individual contacts made faculty-to-faculty members at the universities. They could include recruiting graduate students, joint grant proposals, possible scientific staff exchanges, and other relatively traditional possible collaborations. Each of the scientists on the exchange has made individual contacts that can be pursued on this level.

2) Second, there continues to be additional opportunities for collaboration on multiple-institution levels. These include working at the Ministry level with segments of the Ministry of Agriculture, such as the Central Agricultural Broadcasting and Television School (CABTS) or with segments of the China Academy of Agricultural Sciences (CAAS.) Working toward collaborations at this level requires some central aggregation such as among the multiple member institutions of the American Distance Education Consortium (ADEC) who can identify which universities and departments can provide the most competitive advantage and have the most likely opportunity for success. Opportunities at this level could be most successful in multiple institution joint–grant proposals, and other joint efforts such as publishing and conferences which bring significant numbers of individual faculty members from the U.S. and China in contact so they can initiate and develop effective working relationships.

ADEC continues to develop a working relationship with CABTS that is bringing multiple member institutions to the discussions about joint projects through and in-place Memorandum of Understanding that calls for on-going
work on staff exchanges, a joint publication on international distance education, and a joint conference in Beijing (tentatively scheduled for Beijing in 2011.)

Additional opportunities exist with the Information Analysis group at the CAAS, and possibly in developing training with Ministry-level groups such as AQISQ. ADEC will need to promote possible interaction with member-universities.

3) The third area of interest exists at more local and municipal levels in China. A good example is the Jintan area east of Shanghai. While many of the areas we have visited in Yun-nan and Hebei Provinces had keen interest in Internet connectivity and the possible training and information that can be developed and made available because of this access, aside from some of the central locations such as the campuses, governmental offices and other similar locations, Internet access was spotty. However, as we moved farther south and west in China there are smaller municipalities such as Jintan near Changzhou that have very robust Internet access and are aggressively using it.

Internet access in Jintan is available through a wide area network in the community. Local representatives of the Ministry-level organizations such as the local offices and computer equipped classrooms of the CABTS have been conducting computer training for four years, with 71 course offered to more than 2,500 trainees. Topics include computer use, production processes, and commodity marketing.

Jintan is an example of the ground level audiences that can be reached through online learning modules that might be jointly developed by U.S. university faculty members working in concert with developers in China, such as those at CABTS. These modules could be developed in both English and Chinese at the same time. This would make them more valuable in rural China, but also with possible Chinese-speaking audiences in a variety of international locations include the U.S.

To pursue this will require on-going relationships and projects development with groups such as the CABTS and others with responsibilities for on-going learning, training and education in rural communities.

Impact and Benefit for U.S. Agriculture (Research Materials, Data or Technique, Savings for Producers)

American agribusinesses attempting to remain competitive in the global food marketplace could cut their production costs and increase profits by using Chinese food ingredients in their production chain. However, without confidence that the Chinese originated food products and the Chinese supply chain are supported by internal controls and guaranteed quality standards, the U.S. agricultural industry
can not benefit from the potential lower costs from using Chinese food supplies. Exploring the opportunities to develop digital learning modules and establish repositories of digital information about food safety can lead to possible changes in the overall perception and response to food safety issues if the learning programs are successful.

**Plans for Disseminating the Information Gathered On the Exchange**

This report will be shared with all ADEC members, hosts in China, and the USDA. In addition, it will be shared on the Internet and with selected members of the Association for Communications Excellence in Agriculture, Natural Resources and Live and Human Sciences.

**An Assessment of the Value of This Exchange Visit and This Topic to the Country Visited**

This exchange team attempted to explore opportunities to provide U.S. developed digital learning modules and information for the Chinese educational market. ADEC member institutions, part of America’s Land Grant University system, can provide opportunities for Chinese educational developers on the return exchanges to work with U.S. faculty in translating digital learning modules into Chinese language and incorporating cultural appropriate references.

Exploring and possibly creating more channels for U.S. developed learning materials in a variety of educational outlets in China will pave the way for other opportunities beyond food safety.

This scientific exchange was primarily an exploratory interaction that aims at continuing to establish working relationships and opening educational channels with CABTS one of the world’s largest distance learning training systems—but in one of the most critical specific content areas, food safety. Once these communication and training channels are established, there is the potential for the ADEC-member food safety-based programs such as the NMSU Center for Animal Health, Food Safety and Bio-Security as well as others to use these educational channels to link potential experts across America who can contribute to training modules in sanitary and phyto-sanitary measures with the appropriate potential learners in the Chinese food production system.

This scientific exchange is willing to explore ways to open the doors to interactive and collaborative relationships with top ADEC-member, land-grant university experts in food safety and digital learning module development. The possible collaborations can lead to an increased awareness of sanitation and food quality not only with Chinese food production professionals, but also with rural educators across China in a “train-the-trainers” program, a highly successful method of information and innovation adoption used by U.S. land-grant universities for decades. The ultimate impact can be with the rank and file workforce who will be implementing the food production processes day in and day out.
Appendix I
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Import & Export Food Safety Bureau, Inspection and Quarantine of the People’s Republic of China (AQSIQ)

USDA-FAS, Agricultural Affairs Office -- November 25, 2008

Mark Petry  USDA-FAS, Agricultural Affairs
Appendix II
Training Posters from Jintan City

“Teaching farmers how to get online and enabling them to have better educational opportunities with the use of technology.”
Appendix II
Training Posters from Jintan City

“Aquire Internet skills, Step into the high-tech world.”
China Daily News Items on Food Safety and Security

Wen urges support for small firms

(China Daily)
Updated: 2008-11-17 07:34

Premier Wen Jiabao on Saturday outlined a series of proposals for local governments to support small- and medium-sized enterprises (SMEs).

Visiting SMEs in the southern province of Guangdong, Wen said SMEs would play a crucial role in promoting economic growth, increasing fiscal revenue, providing jobs and maintaining social stability.

Wen visited Shenzhen, Dongguan and Foshan cities and told local governments to formulate policies to support the healthy and rapid growth of SMEs.

Measures should include easier access to credit extension as well as preferential tax policies, and more loans to ensure SMEs grow faster in the fourth quarter, Wen said.

Financing priority should be given to SMEs that meet industrial and environmental protection standards and have access to technologies and markets, he said.

Wen said SMEs in Shenzhen performed better than those in other parts of the Pearl River delta because they upgraded earlier and were more innovative.

On Friday afternoon, while inspecting export-oriented and labor-intensive SMEs in Dongguan, the premier said the key to survival and growth was to develop new products, expand the range of products, improve quality and diversify markets.

Beijing shows the way

Beijing has been vigorously pushing ahead with measures to solve SMEs’ financing problems. Yesterday, the country’s first regional re-guarantee company, Beijing SMEs Credit Re-guarantee Corporation (BCRG), was set up to enable more local SMEs secure bank credit.

According to Li Aiqing, BCRG’s chairman, the company - with a capital of 1.5 billion yuan ($220 million) - will mainly support the culture industry, hi-tech companies and agriculture-related enterprises. To that end BCRG has signed agreements with six banks and three leading guarantee institutions in Beijing.

Currently, 99 percent of companies in Beijing are SMEs, with the number totaling 300,000 and employing more than 80 percent of the local workforce. Although about 60 credit guarantee organizations in Beijing mainly serve SMEs, their average guarantee leverage ratio is only 2.6.

According to the Beijing Credit Guarantee Association, about 80,000 SMEs in Beijing need guarantees for loans every year, but less than 10 percent of the requirements can be met.

"With the support of BCRG, the average guarantee leverage ratio of local credit guarantee originations (for SMEs) is expected to reach 5-8 percent in three years and the city's guarantee balance is expected to reach
100 billion yuan ($14.6 billion) from the current 40 billion yuan,” said Li, who is also the chairman of the Beijing State-owned Assets Management Corp Ltd.

China Daily-Xinhua

Food safety procedures tightened

By Zhu Zhe and Alexis Hooi (China Daily)
Updated: 2008-11-19 07:43

The government yesterday unveiled major initiatives to ensure that imports, exports and domestic consumption of food conform to the highest standards.

To keep a stringent check on imports from the United States, China will send food and drug quality control officials to the country - following the US Food and Drug Administration (FDA) opening its offices in China, senior officials said.

To ensure the safety of domestic consumption, the government plans to set up three State-level food safety committees and two nationwide monitoring networks.

Health Minister Chen Zhu said the move to dispatch officials to the US was based on the "principle of equality".

"Following the opening of the three US FDA offices in China this week, we will also station our quality officials in the US in the near future," Chen said in Beijing at a joint press conference with his US counterpart Mike Leavitt, Secretary of Health and Human Services.

The officials headed to the US will come from the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) and the State Food and Drug Administration (SFDA), Foreign Ministry spokesman Qin Gang said at a separate briefing.

"We believe such arrangements (sending quality control officials to each other's country) will improve cooperation and communication in food and drug safety issues," Qin said.

No timetable has been set for the Chinese officials' posting, Chen said.

Yesterday's announcement came a day before the FDA opens its Beijing office, the first of three in China. The offices are the first outside the US, with two more planned for opening in India next month and two others in Latin America the month after.

The FDA's operations in China are expected to involve working directly with the AQSIQ, the SFDA and the Ministry of Health to build capacity, ensure standards and share inspection information.

"We're two different countries with two different regulatory systems, but we have one common goal to ensure the safety of our food for our citizens, whether it's domestic or imported," said US FDA Commissioner Andrew von Eschenbach, who was also at yesterday's press conference.

"We're looking forward to a sharing of resources, a way of leveraging resources that will benefit not only our two countries but, as we have other international partners engaged, that we really will create a worldwide network that will essentially improve systems in all countries."

On the domestic front, Chen said the authorities will set up at least three State-level committees on food safety - for risk analysis, setting standards and food science studies - to complement other efforts.
Similarly, a national monitoring network on food production, distribution and consumption, as well as another at the county level to oversee food-borne diseases nationwide, will be set up, the Ministry of Health said in a statement released yesterday.

The central government is also mulling a coordination mechanism among various ministries to improve efficiency in food safety supervision. At least six departments are involved with food safety at present, causing an overlap of responsibilities and creating problems for law enforcement, the ministry said.

In a related development, the Foreign Ministry's Qin expressed dissatisfaction after the US issued an import alert last week against Chinese food and feed products that contain dairy ingredients. The US ordered the products to be stopped at its borders unless importers certify them to be either free of dairy products or melamine.

Qin said the Chinese government has been successful in its crackdown on melamine contamination and hoped the US could take "an objective and calm" approach to the issue.

"We feel deep regret that the US insists on unilaterally taking these steps," Qin said.
As part of the recent 4-trillion-yuan fiscal stimulus package, the money is expected to spur a further 165.4 million yuan in local investment, the website of Xinhua News Agency reported on Monday.

Quoting an unnamed source with the Ministry of Agriculture, the report said the money will be spent on "are to further enhance China's capabilities and levels in inspecting the quality and safety of its agricultural products".

An earlier statement on the ministry website (www.agri.gov.cn) said the money will help set up 18 ministerial quality inspection centers, 15 at the provincial and 117 at the county level. Seven regional quality inspection projects will also be launched.

The funds are the first to beef up the quality and safety of the country's agricultural products, following the recent tainted milk scandal, which resulted in the resignation of Li Changjiang, chief of the country's top quality control agency.

Legislators have suggested establishing food safety commissions at different levels of government, and the draft of the food safety law is due to be passed next month.

The ministry has received a total of 5.15 billion yuan from the stimulus package, which it said will be used to improve rural infrastructure and the living conditions of farmers in the country.

The ministry source was quoted as saying that it plans to spend 3 billion yuan on rural methane projects. The goal is to offer household biogas to 2.25 million families in 1,212 counties, build more than 30,000 rural biogas service outlets in 1,496 counties, and launch methane projects for some 7,500 breeding farms in 675 counties.

The projects will be concentrated in areas south of the Yellow River, Xinhua said.

By year's end, these projects will have helped push the number of rural households that use biogas to 35 million, or 25 percent of the total.

Similarly, 1,600 breeding farms, or 13 percent of the total, will have become biogas users.

(China Daily 11/19/2008 page3

Tasks for food safety
(China Daily)
Updated: 2008-11-19 07:46

Food safety has long been a big - and often contentious - global issue. The opening of the first office of the US Food and Drug Administration in Beijing today is therefore a big step forward toward tackling it. It gives both China and the US a new opportunity to step up their regulatory cooperation in food safety.

We hope the new FDA office will enhance efforts to protect consumers in both countries and make them more effective.

China will also dispatch its food safety officials to work in the US to the same end, thereby promoting the exchange of information on food quality and safety between the two countries.

Food safety, especially in relation to exports, has become a global issue with a substantial increase in food production speed and the amount of food consumed across national borders.

The recent cases of tainted food products in China have raised safety concerns in both countries. China reacted by taking a series of measures to tighten regulation and supervision and thus ensure consumers at home and abroad have safe food.

To that end, China is also closely cooperating with the international community. This was evident from the agreement China signed with the EU on Monday to exchange information on tainted food and other problematic goods more quickly.

Unilateral action will only hurt trade and consumer interest.
However, blame games are no solutions for food safety problems. The US decided last Thursday to ban Chinese-made dairy products. But the move clearly did not take into consideration the fact that China's measures to contain the melamine problem have achieved concrete success. The decision is really regretful. The issue could have been resolved through coordination under the framework of food and fodder safety agreement between the two countries.

Such unilateral action smacks of protectionism in this time of global financial crisis, which requires fair trade to be promoted, not dampened. This is an unnecessary halt to the momentum of cooperation China and the US has been building up in food safety. It should be stopped immediately.

The US authorities should try to better understand what is really happening in China and seek solutions through communication and coordination with their Chinese counterparts. We hope the opening of the three FDA offices in China, the other two in Guangzhou and Shanghai, will greatly facilitate that process.

The US food authorities have much to offer in this area. They have more expertise than their Chinese counterparts in process management, which tracks agricultural products from field to dinner table, while China focuses more on the inspection of end products.

The FDA, through its offices in China, can have first-hand information on food safety here and monitor the production process of commodities before they arrive in the US. They will also make it easier for the FDA to communicate and coordinate with the Chinese food authorities and other concerned parties when problems arise.

We believe that concerted efforts and candid exchanges of information are key to solving food safety problems. Unilateral action will only hurt trade and consumer interest.

(China Daily 11/19/2008 page8)

Govt shows milky way to troubled dairy firms
By Zhu Zhe (China Daily)
Updated: 2008-11-20 07:46

The central government yesterday unveiled a robust plan to clean up and revive the dairy industry, which was hit hard by the recent milk contamination scandal.

The plan, jointly prepared by 13 departments and made public on the website of the National Development and Reform Commission (NDRC), sets three targets for the industry's development.

By the end of the year, milk supply, processing and sales should return to normal.

By the end of October next year, sound legislation and a standardized system on dairy products should be in place.

By the end of October 2011, the entire dairy industry must be standardized. About 30 percent of cows should be raised in big farms housing more than 100, and at least 70 percent of raw milk processed by a dairy company should come from its own farms instead of from individual farmers.

It is the first initiative spelling out clear development goals for the industry. Since mid-September, a number of dairy products from multiple producers were found contaminated with melamine, an industrial chemical blamed for killing at least four babies and sickening 53,000 others. The scandal has caused a nationwide, and even global, panic over Chinese-made milk products.

A statement about the plan, also published on the NDRC website, attributes the contamination to poor supervision, lack of standards, unscientific cattle raising, and uneven profit distribution between dairy farmers and firms.
"The contamination reflects long accumulated conflicts and problems. This plan is to solve these problems," it says.

The statement says the contamination case has caused a drop in sales of a large number of dairy products and forced suspension of production at many companies. Dairy farmers across the country have dumped vast quantities of raw milk and some even killed their cows, it says.

To solve the problems, the plan requires governments at all levels to subsidize farmers and provide favorable loans to dairy firms.

It says the authorities should support eligible dairy companies to issue bonds and raise capital from the stock market.

Another focus of the plan is to develop large, modern farms and regulate milk-collecting stations, which many experts believe to be the root of melamine contamination.

Figures from the China Dairy Association show that for the 19 million tons of dairy products produced in the first half of the year, milk was provided by 2 million farmers, who raise about 14.3 million cows.

"It's indeed easier for companies to oversee the quality of raw milk if it's from big farms," Zhao Yuanhua, spokeswoman for the dairy giant Mengniu, said.

She told China Daily yesterday that the company plans to build 20 modern farms, each with more than 10,000 cows, in the next few years. "About 30 percent of raw milk that we process now comes from our own farms, but we're confident of meeting the 70 percent self-supply target by 2011," she said.

Zhao also said the plan will help upgrade the dairy industry. "It's good news for us big companies."

She added that sales of Mengniu products have recovered to about 80 percent of the level before the melamine scandal, and are likely to return to normal by the year-end.

(China Daily 11/20/2008 page1)
The US Food and Drug Administration opened its first overseas office in Beijing yesterday to better ensure the safety of increasing Chinese food imports.

"A permanent FDA presence in China will help us address the challenges presented by globalization," FDA commissioner Andrew von Eschenbach said at the opening ceremony.

"We look forward to working with the Chinese government and manufacturers to ensure that FDA standards for safety and manufacturing quality are met before products are shipped to the United States."

The FDA will open two more offices this week, one in Shanghai and the other in Guangzhou.

Christopher Hickey, the FDA's country director, said eight staff will be stationed in China. They will include inspectors and senior technical experts on regulation, policy, food, medicines and medical devices.

They will work with their Chinese counterparts to build capacity, and offer their experience and expertise, he said.

Their responsibilities will include inspecting local facilities, providing guidance on US quality standards, and eventually training local experts to conduct inspections on behalf of the FDA.

Shao Mingli, deputy health minister and head of China's State Food and Drug Administration, said the opening of the FDA office "provides a very clear signal to the whole world".

"As food and drug regulatory agencies, our first priority is to protect public health and life," Shao said.

"This is our top responsibility."

The opening of FDA China offices comes amid a huge milk contamination scandal that saw four babies die and 53,000 fall ill this year. The industrial chemical melamine was found in a number of dairy products.

The FDA last week issued an "import alert" for Chinese foods that may contain "dairy ingredients", urging importers to certify the products to be either free of such ingredients or melamine, otherwise the products will be denied entry.

Eschenbach said use of the import alert is a regular practice within the FDA's regulatory framework.

But the US would like to continue to work closely with China to resolve the issue, he said.

FDA associate commissioner for foods, David Acheson, said there was no timetable for the lifting of the alert, as it depends on how quickly the problem can be resolved.

Acheson said the United States will continue to import food from China and that trend was "going to increase".

Of the $320 billion in products the United States imported from China last year, about $4.4 billion comprised food, half of which was seafood such as shrimp, according to data from the US Census Bureau.

Also on Tuesday, Health Minister Chen Zhu said that China will send food and quality control officials to the US in the future.

Experts welcomed the potential partnership, but said it cannot solve all the problems.

Chen Junshi, a senior researcher with the Chinese National Institute for Nutrition and Food Safety, said the setting up of quality control offices in each other's country could improve mutual understanding and facilitate information sharing.

Agencies contributed to the story
As world leaders struggle to halt the crisis spreading across the global financial markets, analysts and economists are attempting to gauge the magnitude of this meltdown. Will it rival or surpass the Great Depression of the 1930s, the Black October of 1987 or the Asian Economic Crisis of 1997?

In fact, it has the potential to be far worse, and the reasons are high food prices and food shortages, and the steady erosion of agriculture and rural economies. Food availability and affordability are the bedrocks of any society.

During the Great Depression, Black October and the Asian Economic Crisis, food prices were at historic lows. No matter how dire the situation, food was still plentiful and cheap. Today, the story is different. Food is in shorter supply; prices have been steadily climbing since 2001, and have escalated dramatically since 2006.

According to the tracking of our Food and Agriculture Organization, food prices rose by 9 percent in 2006, 24 percent in 2007, and surged 51 percent in the past 12 months. Although we saw some price drops for certain food commodities in the past months, average prices are still much higher than normal, and the international markets remain volatile.

During normal times, that level of "sticker shock" would spell hardship for most working people and the poor. Coupled with an economic crisis of the enormity taking place today, the impact could be catastrophic.

The role of food security in wider events should not be underestimated. Food shortages and runaway food price inflation have a history of leading to social unrest and political upheaval. The current crisis has already sparked riots and social turbulence in over 30 countries and regions, and contributed to the fall of at least one elected government.

In 2007 alone, the food crisis threw an additional 75 million people into the ranks of the malnourished. Hard-won gains by many nations in their battles against hunger and poverty may be reversed. The ability of countries to meet the Millennium Development Goals will be ever more doubtful. Over 60 countries are receiving support and assistance from the international community to boost food production.

World leaders have been aware of the growing threats to food security for several years. Recently, they began taking steps to address these looming perils. In June 2008, more than $11 billion was pledged at the Rome Food Security Summit, attended by representatives from 181 nations including more than 40 heads of state.
The money is to be used for immediate food aid for those who need it, and for investing in and revitalizing the agricultural sector to boost crop production. Considering the array of needs to be addressed, it was not an enormous sum, but it was a good start.

The danger today is that those commitments will not be kept. Governments have few choices except to set aside hundreds of billions of dollars to rescue ailing financial institutions. But that may leave them with hard choices. Some may have to cut funding from other programs to pay for this bailout.

One of the least politically popular areas of government expenditure is foreign aid. Citizens naturally ask: when times are tough at home, why should we be giving money to poor farmers in developing countries? It is a legitimate question. Let us be clear about the answer:

This is not just a problem of poor farmers in developing countries. This is everybody's problem. In the modern world few if any nations are self-sufficient when it comes to food security. Even the wealthiest countries import massive amounts of food.

Countries that ship rice overseas may still need to source wheat from outside their borders. In this respect, the world truly is interconnected and interdependent. For that reason, this is a problem that can only be addressed at a global level, and so the pledges made in Rome must be fulfilled - and fulfilled on time.

For food prices to come down, food supplies will have to increase. And for food supplies to meet the growing demands of the world's population, an infusion of investment in agriculture is essential. Climate change may already be a factor behind increasing droughts and flooding in fertile, food-producing regions. The lure of quick cash from growing crops suitable for bio-fuels has reduced the amount of land devoted to growing food. Subsidies and trade barriers distort markets and reduce efficiency in production and distribution.

A critical factor in the shortfalls in food supplies is that in much of the developing world farmers are not anywhere near as productive as they could be. They have the potential to grow a greater variety of crops and increase the number of harvests each year. Unfortunately, many lack the technical knowledge, tools and infrastructure to achieve this. With investment and support they can remedy these problems and begin producing enough food for us all at prices we can stomach.

A thriving agricultural sector provides another benefit for many societies; it serves as a social safety net. As factories closed and jobs disappeared in the wake of Asia's meltdown during the late 1990s, substantial numbers of rural people who had migrated to cities to work returned to their farms and villages.

Resources were still plentiful and food was there to be shared. But with governments focusing investment on industry, the lives of those engaged in agriculture have become ever more hard. There are 583 million hungry people on farms and in villages across Asia and the Pacific; 75 percent of the region's poor live in rural areas. These days, there may not be much in the village for the jobless to return to. The social safety net has been frayed.

Governments of developing countries, therefore, must also do their part. The bulk of investment to improve infrastructure and boost productivity must come from the developing countries themselves. Policies that support agriculture, making it sustainable, rewarding and sufficiently productive to support us all must be adopted with urgency.

As a result of the convergence of financial, food and fuel crises, a global tragedy is rapidly unfolding. In our efforts to prevent this, we must not be placed in a position of having to choose between bankers and farmers when it comes to resources. As costly and painful as the mistakes of those engaged in finance have been and will be, we must not short-change those engaged in agriculture. For our own sake, we must provide them with the tools for achievement and the seeds for success.

The author is assistant director-general and the FAO Regional Representative for Asia and the Pacific, based in Bangkok

(China Daily 11/20/2008 page9)

Land erosion 'threat to food supply'
By Xie Yu (China Daily)
Updated: 2008-11-22 07:53
Land erosion is a growing threat to China's food supply and increasing the risk of floods, a report published on Thursday by the Ministry of Water Resources has said.

The report, which followed a three-year government survey, said China now has more than 3.5 million sq km of eroded land, of which 1.6 million sq km is due to water and 1.9 million due to wind.

About three-quarters of the country's poorest people live in areas affected by land erosion, it said.

In northeastern China, crop output could fall by as much as 40 percent over the next 50 years, if the erosion continues at its current rate.

In the southwest, over the next 35 years, about 100 million people will be at risk of losing their land, if desertification continues at the same rate.

The risk of flooding is also increasing, as rivers and lakes fill with earth from land erosion, the report said.

Between 1950 and 1999, 9.2 billion tons of soil spilled into the Yellow River, raising its bed by as much as 4 m, it said.

E Jingping, vice-minister of water resources, said on Thursday: "China has a more severe soil erosion problem than India, Japan, the United States, Australia and many other countries."

Chen Lei, minister of water resources, was quoted by Xinhua News Agency as saying that "in recent years, China has been losing 15,000 sq km of land per year to erosion".

"Economic and social development will be severely damaged if effective measures are not taken," he said.

In 2000, economic losses of a total of 200 billion yuan ($29 billion), 2.25 percent of the country's GDP, were attributed to land erosion, the report said.

In contrast, the level of investment in stopping it is too low, with just 1.63 billion yuan, 0.012 percent of GDP, spent in 2004, it said.
Sun Honglie, a member of the Chinese Academy of Sciences and part of the survey team, was quoted by Xinhua as saying that "agricultural and forestry exploitation, and highway, railway and urban construction projects are the major causes of land erosion, accounting for 78 percent of the total".

The problem of erosion is worst in hillside areas, E said.

On the Loess Plateau, for example, for each kilogram of crops produced, between 40 and 60 kg of earth is lost, he said.

China has about 200,000 sq km of hillside land, 17.5 percent of its total arable land area.

Most of it is in the upper reaches of the Yangtze River, on the Loess Plateau and in the northeast of the country.

(China Daily 11/22/2008 page2)
Appendix IV
USA Food Safety Team PowerPoint Presentation

MOA – USDA – ADEC
Scientific Technical Exchange

USDA Team Six
- Dave King, Oregon State University
- Jeanne Gleason, New Mexico State University
- Ewen Todd, Michigan State University
- Harshavardhan Thippareddi, University of Nebraska
- Robert McGorrin, Oregon State University

Team Focus
- Food Safety and Training
- Meeting the critical participants
- Understanding the issues
- Looking for collaborative opportunities

Research and Education

Ewen Todd
Advertising Public Relations and Retailing
Michigan State University

Dr. Todd’s Multidisciplinary Research Programs
- Improving hygienic and food preparation practices in childcare centers.
- Establishing systems approach to minimize microbial food safety hazards associated with fresh- and fresh-cut leafy greens, to determine the risk of E. coli O157:H7 contamination of packages.
- Developing a risk-based approach to determine “Best Consumed By” dates to control exposure to Listeria monocytogenes.
- Enhancing United States poultry exports to the European Union through improved production practices.
- Helping to ensure safe consumption of ready-to-eat meats through RFID technology.

Dr. Todd’s Consumer Studies
- Consumer perceptions of food safety at restaurants.
- How consumers learn about major food safety outbreaks through the media.
- Research into consumer home handling practices for produce compromise the microbiological safety of fresh produce, and mitigation strategies.
- Consumer recall notification strategies.
- The Fight Bac! Campaign reaching school children with food safety messages.
- Development of highly effective food safety communication and education programs.
Work to Help Management of the Food Supply

- Helping agricultural and food safety agencies reduce the burden of foodborne illness in developing countries.
- Providing training in microbiological risk assessment.
- Conducting extensive reviews of the impact of food workers' impact on causing outbreaks.
- Advising organizations on the importance and techniques for implementing traceability of food.

International Linkages

- Chinese Academy of Agricultural Sciences, Jiangsu Academy of Agricultural Sciences for general food safety issues including analytical methodology, risk assessment and consumer studies.
- Uganda’s Makerere University for safer aquaculture products.
- Spain’s Cordoba University for collaborative research into microbiological risk assessment and produce management.
- UAE’s Dubai links for food safety policy and education.
- Lebanon’s MEFOSA and American University of Beirut with research into Salmonella contamination of hummus, tahini and other sesame seed products.

Key Roles in Conferences & Educational Programs

- Future conference to understand and reduce the risks of disease associated with raw milk and raw milk cheese.
- Future conference promotion controlling Listeria by working towards international harmonization.
- Past conferences on the role of food irradiation and the safety of organic food.
- MSU Online Master of Science in Food Safety Program http://www.online.foodsafety.msu.edu/

What do I do at UNL?

- Land grant system
  - Teaching, research & extension
  - Extension (70%), Research (30%)
- Conduct applied food safety research
- Assist food processors
  - Microbial Food safety
  - Microbial quality / shelf life
  - Regulatory issues
UN-L Applied Food Safety Research Activities

1. Development of Predictive Models for Growth of Foodborne Pathogens during Process Deviations
   - Develop predictive models
     - Heating and cooling process deviations
     - *E. coli* O157:H7, *Salmonella* spp., *L. monocytogenes*, *S. aureus*, *C. perfringens*
     - Turkey, beef and pork products
   - Develop distance learning modules and HACCP workshops to address Process deviations

2. Assist Ready-to-Eat Meat and Poultry Processors Control *Listeria monocytogenes*
   - Develop predictive models for *L. monocytogenes* growth on RTE meat and poultry processors
   - Evaluate antimicrobial agents and antimicrobial processes to kill and/or control *L. monocytogenes*
   - Develop distance learning modules on control of *L. monocytogenes* on RTE meat and poultry products for “traditional” and “outreach” uses

UN-L Applied Food Safety Research Activities

3. Development of Voluntary HACCP Plans for Feed Industry
   - Conduct hazard analysis
     - Microbiological evaluation of feeds and feed ingredients for *Salmonella* spp.
     - 3,600 samples from different feed manufacturers in KS, OK, NE and TX
   - Develop HACCP plans
   - Develop distance learning modules and HACCP workshops for feed industry

UN-L Applied Food Safety Extension Activities

1. HACCP / Food Safety Activities
   - Conduct HACCP workshops
     - Introductory HACCP
     - Advanced HACCP
     - HACCP Plan Reassessments
   - Pre-requisite Programs
     - Sanitation SOPs
     - Good Manufacturing Practices

Traditional Methods for Assuring Food Safety

- Thermal processing
- Heat Pasteurization
- Sterilization
- pH control
- Fermentation
- Water activity
  - Drying, Salting, Sugar addition
- Storage temperature
  - Refrigeration

Nonthermal Processing

- Novel techniques to inactivate microorganism without heating
- Methods
  - Pulsed electric field processing
  - Dense-phase carbon dioxide
  - Ultraviolet
  - Ultrasound
  - High pressure processing
UN-L Applied Food Safety Extension Activities

2. HACCP / Food Safety Activities
   - Validation Studies
     - Meat and poultry processors across the state
   - Food Safety Assistance
     - Evaluate safety of food production/processing operations
     - Provide process authority and related scientific assessment documentation

Thank You
and
ANY QUESTIONS?

Robert J. McGorrin
Jacobs-Root Professor of Food Science & Technology
Oregon State University
Causes and approaches to deal with food-borne illnesses

**Chemical Hazards**
(pesticides, mycotoxins)

**Microbiological Hazards**
(salmonella, listeria, clostridium botulinum)

**Physical Hazards**
(broken glass, metal)

Food Import Violations into the United States
1998 - 2004
U.S. Department of Agriculture
Economic Research Service
September 2008

- **Violations**
  - Vegetables: pesticides
  - Seafood: sanitation
  - Fruits: sanitation
  - Canned foods: unregistered process

- **66% Adulteration** (food safety, sanitation, leaking packages)
- **34% Misbranding** (incorrect food labeling)

Current research issues in food safety

- Allergens in the food chain
- Fruit and vegetable safety (E.coli in fresh spinach; irradiation)
- Seafood safety (Vibrio parahaemolyticus in oysters, shellfish)
- Chemical adulterants or contaminants (bis-phenol A, melamine)

**Bis-phenol A**
Plastic component in food packaging
Mimics human estrogen response

**Melamine**
Typically used in plastic laminates
Used to inflate protein values in food, feed

Fruits and Vegetables
Antimicrobial technologies for decontamination of foods and food contact surfaces
(Prof. Mark Daeschel and Yanyun Zhao)

- Electrolyzed water, Ozone
- Edible coatings

Antimicrobial technologies for preservation of foods and beverages (Prof. Mark Daeschel)

- Bacteriocins
- Wine

Allergens
Foods required to be labeled in the United States for possible allergic responses

- Control of Malolactic fermentation in wines
- Sensory effects of lysozyme in bear
- HPLC analysis of lysozyme in wines
- Antimicrobial activity of partially denatured lysozyme
- Adsorption of lysozyme onto food contact surfaces
- Comparative study of activity of recombinant human lysozyme and egg lysozyme in food and beverages
- Interaction of lysozyme with tannins in wine
- Lysozyme as a component in edible packaging films

Oregon State University Research with Lysozyme (1992–2008)

- Inhibition of spoilage bacteria in wine
- Sensory effects of lysozyme in wine
- Inhibition of spoilage bacteria in beer
- Lysozyme to control contamination of yeast products
- HPLC analysis of lysozyme in wines
- Antimicrobial activity of partially denatured lysozyme
- Adsorption of lysozyme onto food contact surfaces
- Immobilization of lysozyme to polystyrene beads
- Comparative study of activity of recombinant human lysozyme and egg lysozyme in food and beverages
- Interaction of lysozyme with tannins in wine
- Lysozyme as a component in edible packaging films

Daeschel et al.
**Seafood**

Reducing *Vibrio parahaemolyticus* in Pacific Oysters

*Prof. Mark Daeschel*

**High Hydrostatic Pressure Processing**

- **2.2 L / 90,000 psi**
- **20 L / 90,000 psi**

*Prof. Yi-Cheng Su*

**Vibrio parahaemolyticus**

- Leading cause of foodborne infections associated with seafood consumption in U.S. (nausea, headache, abdominal cramps, diarrhea)
- Certain oyster producers have utilized freezing technology to deliver high quality frozen oysters to consumers for raw consumption.
- Freezing has been reported to be capable of achieving certain degrees of reductions of *V. parahaemolyticus* in oyster meat homogenates (Muntada-Garriga *et al.*, 1995).
- Long-term storage (4-6 months) of half-shell Gulf oyster at -20°C
  - reduced low levels of *V. parahaemolyticus* in oyster (<1,000 cells per gram of oyster) to non-detectable levels (Andrews 2004)
- Study was conducted to determine effects of frozen storage at -10, -20, and -30°C on reducing *V. parahaemolyticus* in Pacific oyster.

*Assoc. Prof. Yi-Cheng Su*
Survival of V. parahaemolyticus in Frozen Oysters

Effect of frozen storage temperatures (-10, -20, and -30°C) on reducing V. parahaemolyticus in half-shell Pacific oysters. Data are means of five determinations ± standard deviations. Oysters frozen in liquid nitrogen (-95.5°C, 12 minutes).

Liu, Lu, and Su (2008)

Conclusions

- Frozen storage can be used as a post-harvest process for reducing V. parahaemolyticus in raw oyster.
- Storing half-shell Pacific oyster at -21±2°C for five months was capable of achieving greater than 3.52-log (MPN/g) reductions of V. parahaemolyticus.
- Greater than 4.0-log (MPN/g) of reductions of V. parahaemolyticus in oysters could be achieved by extending the storage at -21°C to six months.

Dr. Jeanne Gleason
Director-Media Productions
New Mexico State University

- Create commercial-quality educational products for state & national partners.
- Videos, cartoons, animation, games, & songs
- Focus on non-classroom learning
- Multilingual productions

Specialize in Food Safety Training for Industry, Consumers & Children

- Produced media for 20+ national food safety projects
- Cover food safety from farm, through processing, to table and child’s lunch.
- English, Spanish, Navajo Chippewa, Zuni, German, Arabic, Dari, Pashto

Science Pirates: The Curse of Captain Brownbeard

- Teaches scientific understanding
- Tremendous potential for classroom use
- Cutting edge gaming
- High-end graphics and musical score
Science Pirates: The Curse of Captain Brownbeard

Food Safety for Chinese-Speaking Americans in Food Service
- Similar to ServSafe Curriculum
- PowerPoint, songs, on-line activities
- Games for participants
- English, Chinese

Open of Mandarin Chinese Food Safety Video

Sample of Sanitize Song

Dr. Jeanne Gleason
New Mexico State University
jgleason@nmsu.edu
Appendix IV

Shanghai Jiao Tong University Presentation

Introduction to the Dept. of Food Sci. & Tech. In SJTU

Dr. Dayun Zhao, Department Head
Associate Professor in Food Chemistry
Department of Food Science and Technology, School of Agriculture and Biology, Shanghai Jiao Tong University
Minhang Campus, Agricultural Building
21 November 2008

The Department of Food Science and Technology, Shanghai Jiao Tong University opened its door in 1993.
A multidisciplinary enterprise consisting of The Department of Food Science & Technology, The SJTU-Bor Luh Food Safety Center and The Institute of Natural and Health Foods.
Located within the School of Agriculture and Biology (Minhang Campus).
The Department of Food Science and Technology (FST) offers undergraduate and graduate programs of study supported by 25 normal and tenure-track faculty, a number of adjunct faculty, and 90 graduate students.
Most facilities are housed on the first and second floor of the middle side building attached to the main Agricultural Building. Off building facilities include the Instrumental Analysis Center in Minhang Campus, Shanghai Jiao Tong University.

About the Center

The center is run by the Foundation of Dr. Luh and Shanghai Jiao Tong University. The $3 million foundation was sponsored by alumnus (1938th graduate), Dr. Bor S. Luh (later professor in Food Science and Technology of U.C. Davis).
The center practices director responsibilities system under the charge of BOD. BOD of the center is the highest institution of rights and policy-making.
The center bases on Shanghai, serves for whole country and faces to the world.
The center will learn from world-renowned universities’ researches and manage to become an important institution both national and international.

The missions of the center

Mainly focuses on research of the food safety science and technology
Training of proficient technicians in food security fields for our country;
Providing advice to the related government departments for their policies issuing among food safety;
Food safety knowledge popularization;
Determination and analysis service of food security quality.
Groups and Research Fields

- Post-harvest Handling and storage
- Food Safety and Food Biotechnology
- Functional Foods (Nutraceuticals)
- Dairy Science and Processing

Researching Projects

- Study on Critical Technologies for Extending Shelf Life of Ready-to-Eat Foods
- Key Technologies of Farm Produce Logistic and Distribution
- Cold Chain Technologies and Facilities for preservation of fresh produce
- Study on CA Storage for Vegetables of Special Varieties
**Research Achievements Recently**

**Food Safety and Food Biotechnology**
- Development and application of the key surveillance technology on dairy quality and safety.
- Study on aflatoxin detection and its biological detoxification.
- Basal research on test specification rules and reagent kit.
- Determination of the Enterohemorrhagic *Escherichia Coli* O157 in meat products for export.

**Functional Foods**
- Preparation and analysis of soybean saponins (soyasaponins).
- Bioactive components preparation from alfalfa (*Medicago sativa* L.).
- *Grifola frondosa* polysaccharides extraction, chemical modification and its medical activities.

**Ongoing research projects**

**Post-harvest Handling and Storage**
- Non-destructive determination of key food components;
- Edible coating or packaging;
- Vacuum impregnation.

**Food Safety and Food Biotechnology**
- Development of gene chips for food-borne pathogen detection;
- Research on detection techniques for important pathogens in animal food;
- Research on detection techniques for the safety control of important livestock products.
- Application of electrochemical methods to detect food contaminants, such as bioamine in traditional fermented food.

**Functional Foods**
- Surface activities investigations between structure and functionality of natural and synthetic biosurfactants and their complexes.
- Adjuvanticity investigations between structure and functionality of soybean saponins (soyasaponins) and alfalfa (*Medicago sativa* L.) saponins.
- Application of Molecular Imprinting Technology (MIT) to determine food contaminants, such as patulin of mycotoxin in fruit juice, carbamate pesticide in fruits or vegetables.
- Large quantity preparation of “phytosterols” (plant-derived sterols) from oil byproducts and evaluation of their health benefits.

**Dairy Science and Processing**
- Development and application of key monitoring techniques for dairy quality and safety.
We have international academic exchange programs with:
- The Department of Food Science and Human Nutrition, Colorado State University;
- The Department of Food Science, University of Arkansas;
- The Division of Food Sciences, School of Biosciences, University of Nottingham;
- The Department of Food Science, Cornell University;
- The Department of Food Science and Technology, U.C. Davis;
- The Food Chemistry Group, Department of Agrotechnology and Food Sciences, Wageningen University, The Netherlands.

Thank You!
Appendix V
China Center for Disease Control
Mission Statement

To provide scientific and technical support for developing policy, law, standards and regulations on nutrition and food safety. To conduct research on developing control and preventive strategies nutrition-related and food-borne diseases.

To identify nutritional, safety and functional factors affecting the people's health and provide evaluation reports.

To establish and strengthen the surveillance systems for foodborne diseases and food contaminants. To conduct the monitoring and early warning for foodborne diseases and food contaminants. To provide technical support for emergency responses for foodborne diseases and food contaminants.

To be responsible for organizing and implementing China Nutrition and Health Survey. To set up the surveillance systems for food composition, nutritional and health status of the Chinese population. To take the monitoring and control measures on nutrition-related diseases.

To be responsible for organizing and developing the national standards, detection methods and technical protocols for nutrition and food safety.

To develop and strengthen the control techniques for nutrition and food safety control, and to spread their applications.

To implement the test and appraisal of the nutrition, function and safety of common foods, healthy foods, novel foods (including genetically modified foods), foods for special dietary uses, food additives, food packing materials, containers, instruments and equipments, disinfectants and other related products. To issue the certificates of the products.

To establish and strengthen the quality control system for nutrition and food safety laboratories. To be responsible for lab quality control at national level.

To take the responsibilities for professional instruction, guide and training national-wide.

To set up national information system of food and nutrition and improve information exchange and resources sharing.

To conduct applied research in the field of food and nutrition, and to facilitate the application of research findings.

To strengthen international cooperation and communication in the field of nutrition and food safety.

To implement other tasks and obligations assigned by the government agencies.
Appendix VI
Available Websites

General Administration of Quality Supervision,
Inspection and Quarantine of the People’s Republic
of China (AQSIQ)
http://www.aqsiq.gov.cn

Agricultural Information Institute (AII)
Chinese Academy of Agricultural Sciences (CAAS)
http://www.caas.net.cn

Shanghai Jiao Tong University
Division of International Cooperation and Exchange
http://icae.sjtu.edu.cn

Changzhou Agriculture and Forestry Bureau
http://www.czagri.gov.cn

Nanjing Agricultural University
http://www.njau.edu.cn

College of Food Science and Nutritional
Engineering, CAU
http://spxy.cau.edu.cn