

FEED THE FUTURE INNOVATION LAB FOR LIVESTOCK SYSTEMS

**SAFE FOOD FAIR FOOD FOR CAMBODIA PROJECT:
SUMMARY OF ACHIEVEMENTS AND INTERVENTION PLANS TO
IMPROVE PORK AND POULTRY SAFETY IN TRADITIONAL MARKETS**

Introduction

The Safe Food Fair Food for Cambodia (SFFF) project aims to improve the safety of animal source food (ASF) in Cambodia. The International Livestock Research Institute implements the project together with the National Animal Health and Production Research Institute and the Livestock Development for Community Livelihood Organization in close partnership with the Cambodian Ministry of Health's Department of Communicable Disease Control and the National Institute of Public Health.

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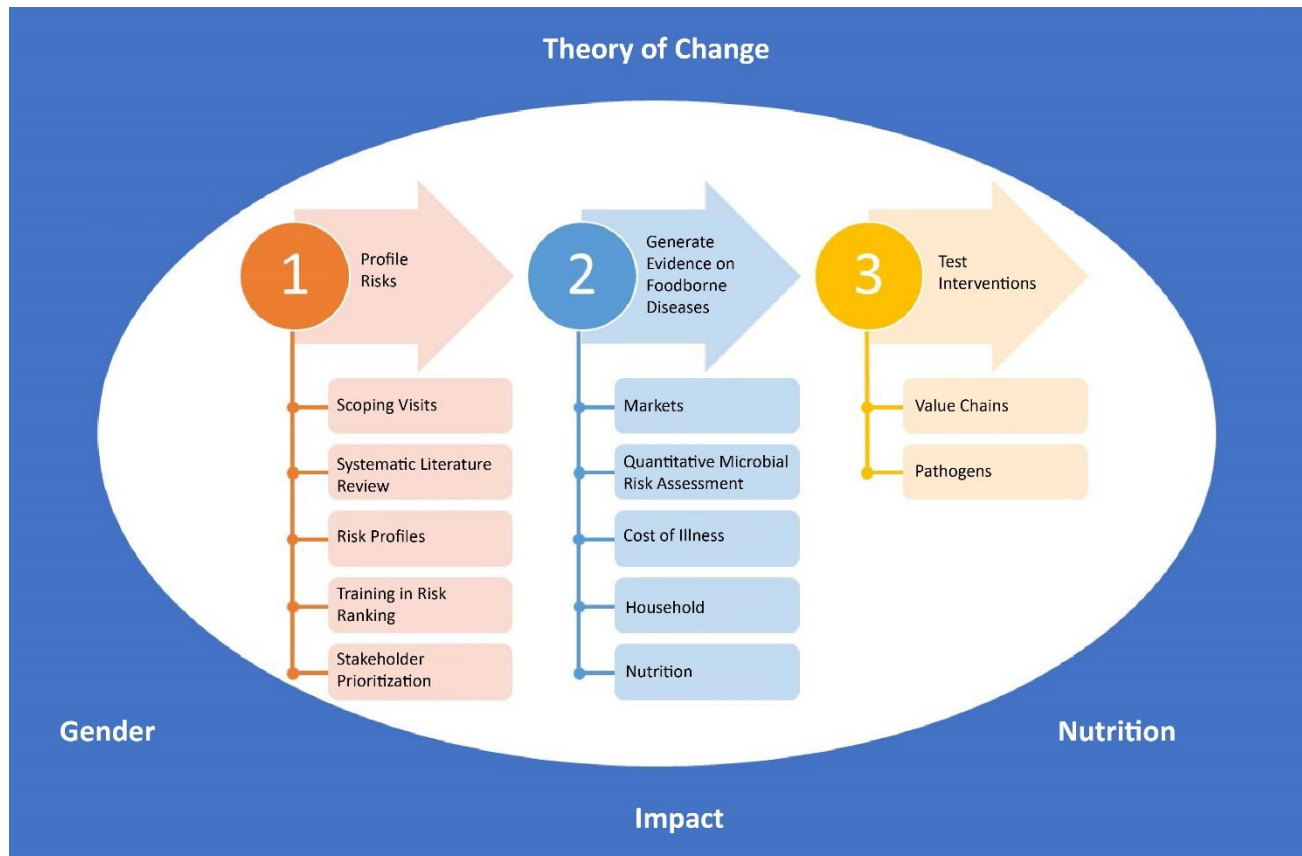


Figure 1: This project is structured around the three major tasks of risk profiling, generating evidence on foodborne disease, and test interventions, each with a set of subthemes and subtasks.

Key achievements to date

Setting the scene, prioritization, and stakeholder consultation: There is limited evidence on the health and economic impacts of foodborne diseases in Cambodia. Only 25 articles on food safety in Cambodia were found in international, peer-reviewed journal publications between 1990 and June 2017. A 2010 regional World Health Organization (WHO) study, which included Cambodia, suggested a high foodborne disease burden per capita¹.

The project identified food safety impacts and barriers in urban settings of Cambodia by system effect modelling. A Theory of Change to improve food safety was developed to map out the pathway and indicators of food safety interventions and validated through an expert consultation. The modelling analysis and the Theory of Change guided the project to focus activities on the pork and poultry value chains, and to target two key pathogens, *Salmonella* and *Staphylococcus aureus*. The project conducted activities in traditional markets in 25 provinces nationwide.

Microbial contamination levels in pork and poultry: The project implemented a multi-hazard survey in all 25 provinces of Cambodia to identify the presence of priority hazards in poultry and pig value chains. Between December 2018 and March 2019, a total of 496 samples of pork, chicken and cutting board swabs were collected in traditional markets. Between July and August 2019, additional samples were collected from four provinces (Phnom Penh municipal, Siem Reap province, Sihanoukville, and Battambang). The overall prevalence of *Salmonella* and *Staphylococcus aureus* in pork and chicken meat was found to be 43% and 31%, respectively. These levels are quite high, and similar levels have been found in other low- and middle-income countries. These findings support our hypothesis that foodborne disease is a major public health issue in Cambodia.

Financial and health burden of foodborne diseases: A Cost-of-Illness assessment was conducted with data from 266 cases of foodborne illness in Phnom Penh and Siem Reap that were collected from four types of health care facilities: national hospital (44 cases), provincial hospital (60 cases), regional hospital (100) and community health center (62 cases). Among the 226 foodborne disease cases reported, the main diagnoses were 65 cases of food poisoning (24.4%), 198 cases of acute diarrhea (74.4%), two cases of typhoid (0.8%), and one case of chronic diarrhea (0.4%). While the proportion of acute diarrhea cases is by far the largest in this survey, no information exists from the hospital records to determine whether these were transmitted via food or which hazards were responsible. On average, the cost of foodborne illness was USD \$62.76 per case, but cost varied depending on type of medical center that the patient attended. Per episode of hospitalization and day of treatment, the cost of illness was USD \$185.88 at the national hospital, USD \$24.16 at a provincial hospital, USD \$65.07 at a regional hospital, and USD \$7.57 at a community health center.

The project is also conducting a quantitative microbial risk assessment (QMRA) to understand the health impact of pork and poultry consumption in Cambodia. Additionally, the project is collecting household data on self-reported diarrhea, which will help understand the frequency of illness treated in the hospital system as opposed to other routes such as self-treatment or traditional healers.

¹ Havelaar, A. H. et al. 2015. World Health Organization Global Estimates and Regional Comparisons of the Burden of Foodborne Disease in 2010. *PLoS Med* 12(12): e1001923.

Food safety and nutrition for women and children: A cross-sectional survey was conducted with 205 women living in Phnom Penh (n=100, highly urbanized) and Siem Reap (n=105, somewhat urbanized) on their food insecurity experience, perceptions of food environment and food safety, dietary diversity and food consumption frequency. The results show that the women interviewed in Siem Reap have relatively lower education levels than in Phnom Penh, have fewer household assets, experience more food insecurity, and have lower intake frequency of meat, fruits, and vegetables. In urban Phnom Penh, most women responded with neutral perceptions about the safety of such foods, while in Siem Reap there were larger variances in response with more women having positive and negative perceptions. Overall, negative perceptions are significantly and strongly associated with low intake frequency of meat, fruits and vegetables in both children and mothers, particularly in Phnom Penh. In addition, a qualitative nutrition study of female caregivers of children under five in Phnom Penh showed that chemical contamination is of a larger concern than foodborne pathogen contaminations, and that women resort to growing or catching their own food. While respondents are more concerned over chemical than biological hazards, the best evidence is that the latter are much more important in terms of burden of disease.

Policy translation, capacity building and networking: The project developed a taskforce for food safety risk assessment comprised of policy makers and researchers from different research institutes and universities. They utilize the project findings and translate them into actions to improve food safety. SFFF trains graduate students (PhD and MSc) from Cambodia and USA with technical skills in risk assessment, lab techniques, gender, and system effect modelling.

Intervention plan

Approach: Based on the findings and consultations with food safety stakeholders in Cambodia, we have developed a set of interventions to improve hygienic practice and pork safety at the traditional markets in Cambodia. Those interventions will be introduced and tested at retail in six selected provinces using Randomized Controlled Trials (RCT). To ensure compliance of targeted actors (e.g., retailers) participatory methods were used to validate interventions.

The intervention package has three components:

1. The capacity-building component comprises:
 - Training on hygienic practice for meat sellers;
 - Introduction of appropriate cleaning and disinfection of display areas and storage surface prior and after selling;
 - Distribution of trays to separate raw pork, intestines, and cooked food to reduce cross contamination;
 - Distribution of washable aprons, gloves, and masks;
2. The demand-led component is based on increasing consumer ability to detect and demand safe food:
 - Hygiene scores, awards, training certificate for butchers;
 - Each pork shop will provide information on the name of the business and information about pork safety measures in place;
 - Messages through posters, booklets, and a short video that will be displayed at markets and shown on local television stations and via social media.

3. The enabling environment component comprises:
- Training of provincial veterinarians and market managers;
 - Setting up a “scores on doors” scheme.

Province selection: Six provinces were selected: Phnom Penh, Siem Reap, Takeo, Kampong Cham, Kampot, Kampong Speu based on the following selection criteria: i) the number of markets in the province; ii) prevalence of *Salmonella* (above 40%); iii) population density, urban to rural spectrum; iv) distance from laboratory; and v) compliance of market board and traders, and local animal health workers. Phnom Penh had *Salmonella* prevalence less than 40% but it was included as this is the big capital city.

Market selection: for a 15% improvement of Total Bacteria Count in pork at the markets, RCT sample size calculation requires 12 markets for intervention and 12 control markets. Therefore, four markets per selected province are required. Each market will need to have 15 pork shops.

Implementation: the planned duration is three months to implement interventions in 12 markets. The interval sampling after intervention will be 1 month. It includes sampling led by NAHPRI; a knowledge, attitude, and practice (KAP) study; and an observation checklist for both intervention and control markets. The 360 meat samples will be analyzed for Total Bacteria Count as hygienic indicators. A subset of 60 of the intervention samples will be analyzed for *Salmonella*.

Resources: in addition to the current SFFF team, for the interventions we have recruited a research assistant for six months as well as a MSc student from the InterRISK program for four months who will be based at NAHPRI.

Timeline:

- May-June 2020 Conduct the intervention pilot
- June - July 2020 Start market RCT/intervention, and sampling, KAP, checklist
- July-August 2020 Conduct sampling, monitoring and evaluation after intervention
- September 2020 Summarize and publish findings

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