

## **SURVEYS OF PRODUCE GROWERS AND VENDORS IN CAMBODIA LAY GROUNDWORK FOR TAILORED FOOD SAFETY OUTREACH**

*FEED THE FUTURE INNOVATION LAB FOR FOOD SAFETY*

Vegetables play a key role in the Cambodian diet, but these nutrient-dense foods are also a common source of foodborne illness. Farms and informal markets, one of the main sources of produce for many Cambodians, are key points for preventing contamination with foodborne pathogens. To develop tailored outreach programs to promote the adoption of new food safety practices, researchers funded by the [Feed the Future Innovation Lab for Food Safety \(FSIL\)](#) conducted surveys to better understand current perceptions about foodborne illness — including its health impacts and where contamination occurs — among growers and vendors working with informal vegetable markets. They identified crucial gaps in knowledge about microbial food safety risks and health impacts.

“Informal markets by definition don’t have a lot of oversight,” said Paul Ebner, professor of animal sciences at Purdue University and project co-lead principal investigator (PI), who co-authored the study with colleagues at the [Center of Excellence on Sustainable Agricultural Intensification and Nutrition \(CE SAIN\)](#) at Cambodia’s Royal University of Agriculture (RUA), Kansas State University and The Ohio State University.



Consisting of a loose network of vegetable farmers, collectors, distributors and vendors, the open-air markets often enforce few or no food safety standards. Ebner noted that the markets regularly have challenges — including co-mingling of fresh produce with animal-sourced foods and lack of cold storage — that can lead to contamination with bacterial pathogens. Because the produce is often eaten raw, it puts consumers at high risk of bacterial illnesses that cause diarrhea, which has particularly negative impacts on the health and nutritional status of young children. At the same time, the Cambodian government has been proactive in promoting the production and consumption of vegetables as a nutrient-dense source of food.

“So, in this project we’re looking to identify which interventions or technologies can improve food safety in the Cambodian context,” Ebner said.

Because improving food safety often involves adopting new behaviors, the researchers needed to first understand the perceptions and potential barriers to change among people growing and selling vegetables. To collect these data and strengthen local research capacity, they offered a quantitative survey development course aimed primarily at Cambodian graduate students.

“The dual purpose was to get the information that we need to create effective outreach programs, but also to give Cambodian students an experiential learning platform so they can practice how to do this in the future, or maybe even in their own graduate school projects,” Ebner explained.

The students completed surveys with 69 vegetable growers in the provinces of Battambang and Siem Reap and

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31 vendors in Phnom Penh. The quantitative questionnaire asked participants about their perceptions of the importance of vegetable safety, frequency of vegetable contamination, and health impacts of consuming contaminated vegetables as well as about where vegetable contamination primarily occurs and who is most responsible for preventing it.

The majority of respondents reported being at least moderately concerned about produce food safety. However, as the researchers had hypothesized beforehand, most participants appeared to be more familiar with the risks and impact of chemical contamination, likely due to several high-profile outbreaks of foodborne illness caused by chemical contaminants and programs that address the proper use of pesticides. In contrast, they were less likely to associate microbial contamination with serious health effects, which can include severe malnutrition, organ failure or death.

“Generally, people have to understand that something is a problem and why before they are highly motivated to fix it,” Ebner said. “So, we really have to work with these different groups on bridging the gap of how things get contaminated and what the consequences are of consuming foods with microbial contaminants.”

Most respondents identified farms as the primary site of vegetable contamination, despite the risks of cross-contamination with uncooked meat at informal markets. The study also indicated that respondents generally believed that food safety could be improved at different stages of growing and selling vegetables.

“That’s good news, because one of the biggest barriers to implementing food safety practices is the belief that you can’t do it, or you don’t know how,” Ebner said.

Members of FSIL’s Cambodia project are now creating food safety curricula that strategically target gaps in knowledge or motivation that were identified in the different groups, for example raising awareness of market-based contamination risks among vendors and tapping into growers’ existing strong feelings of personal responsibility for preventing contamination.

“This education programming will incorporate findings from this survey, our [behavior theory research](#) and gender analyses and can be delivered well beyond the project,” Ebner said.

The paper, [Describing Food Safety Perceptions among Growers and Vendors in Cambodian Informal Vegetable Markets](#), was published September 20, 2023, in [Frontiers in Sustainable Food Systems](#). In addition to Ebner, coauthors included Sabrina Mosimann (Purdue University), Keorimy Ouk (CE SAIN/RUA), Nora M. Bello (The Ohio State University), Malyheng Chhoeun (CE SAIN/RUA), Leah Thompson (Purdue University), Jessie Vipham (Kansas State University) and Lyda Hok (CE SAIN/RUA).

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