

Understanding Biological Cross-Contamination: Trainer Lesson Plan

Learning Objective: Discuss the concept of cross-contamination and learn about important variables to consider when assessing biological contamination risks on-farm.

Outcome(s): After completing the hands-on activity, trainees will be able to assess how the environmental conditions on their farm should influence the establishment of “no-harvest” or buffer zones to avoid biological cross-contamination.

Recommended Materials:

- 3 [poop emoji pillows](#) (to represent the biological contaminant)
- Written descriptions of example crop production scenarios (OR printed images, if possible), for example:
 - Overhead-irrigated broccoli on a windy day
 - Drip-irrigated romaine lettuce on the edge of a field near an unmanaged forest
 - Drip-irrigated Roma tomatoes being grown on black plastic

Things to keep in mind when designing crop production scenarios: irrigation method, crop type, proximity to harvest, weather conditions, etc.

Background Info for Trainer:

Biological contamination, particularly due to animal intrusion, is a common food safety issue on produce farms. If not dealt with properly, instances of contamination can spread easily and quickly during harvest and post-harvest activities. Lack of understanding about how biological contamination spreads (also known as “cross-contamination”) and failing to take adequate precautions after contamination events can lead farmers to harvest compromised produce and thus incur higher food safety risks than they might be aware of.

Read through the following resources to understand how to assess animal contamination risks and how to prevent contamination during harvest by establishing “no-harvest” and/or buffer zones.

[Decision Support Tool for Assessing Wildlife and Animal Contamination](#)

[Preventing Produce Contamination: Identifying Animal Intrusion](#)

Instructional Delivery:

Opening Activities/Motivation: Most farming occurs outside and in direct connection with wildlife and nature. Farmers must monitor their crops for signs of animal contamination. When they find evidence of animal contamination (e.g. animal feces on or near a crop), they must determine what risks are present in that situation and respond accordingly. This role-playing exercise helps farmers think through various types of risks from biological contamination.

Activity 1: Ask the group of farmers/trainees to stand up. Identify one trainee who will be role-playing as the "farmer" doing the risk assessment on the simulated "crop field." Read out the first crop-production scenario, then ask the "farmer" to step outside the room (if activity is being done indoors) or away from the group (if being done outside). The rest of the group will be role-playing as the "vegetables" in the crop field. Have the remaining trainees line up in 3-5 rows, with 4-10+ people in each row. There should be some space in between each "vegetable" -- roughly a 3-foot radius around each person.

Give one poop pillow each to three trainees in different parts of the "field." When you say "go," these three people will gently throw their pillows up in the air. Instruct the "vegetables" that if a pillow comes close to them, they should *not* catch it, but gently bat at it so it stays in the air and goes toward another "vegetable." Around each person that was holding the pillow there should be 3-5 people that also touched the pillow. Then tell everyone to remember if they touched the pillow or not. Give the pillows back to the original three "vegetables." *Note: if this method doesn't work well (e.g. the pillow falls straight to the ground), instead of having the farmers throw the pillow have them hand it to someone directly next to them and then that person hands it to someone directly next to them and then the third person hands it to one more person directly next to them.*

Invite the volunteer "farmer" back and ask them to identify which "vegetables" they would not harvest due to the risk of cross-contamination. They will likely identify the people holding the pillows and maybe an additional person standing close by. Then ask everyone that ended up touching a pillow to raise their hand. Usually, there will be around 30-50% more people who have touched the pillow compared to who the farmer initially identified to not harvest. Discuss as a group how it can be difficult to determine how far biological contamination has spread from a visible source. This is why it is so important to establish sufficient "no-harvest" or buffer zones that account for the weather conditions, the season, the location of the edible portion of the crop, the irrigation method being used, the topography of the farm, etc.

Assesment/Evaluation:

Key Takeaways: It can be difficult to visually determine exactly how much biological cross-contamination has occurred in a crop field -- and it all depends on the circumstances of the crop production. Farmers should think through all the possible variables (crop type, irrigation method, feces type, etc.) affecting a contamination situation in order to determine the best response.