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The number of backyard farms have been on the rise recently in the United States. With more backyard farms the topic of biosecurity and backyard farms is becoming increasingly important. Biosecurity encompasses the practices one takes to prevent disease from entering their farm and spreading to their animals. Biosecurity has both internal and external components. External biosecurity encompasses the actions taken to prevent disease from entering the herd or flock from areas off the farm. Internal biosecurity refers to preventing disease from spreading to different areas or groups of animals inside your facility. In animal agriculture, most large commercial facilities have strict and regularly enforced biosecurity practices such as all-in-all-out, shower-in or shower-out for employees, as well as quarantine and isolation pens for new or sick animals. However, such practices can often be significantly more difficult for small farms or backyard owners to implement given the extreme variability in their size, practices, available resources, and motivations for raising livestock. Ensuring that both backyard and small farms have adequate biosecurity programs is important not only to keep their herds and flocks safe, but it also protects livestock owners from diseases that can potentially pass from poultry and livestock to humans, otherwise known as zoonotic diseases.

In the summer of 2022, Dr. Pires (UC Davis Vet Med Extension faculty) and collaborators in two other states conducted interviews and on-farm visits of small and backyard farms to identify what biosecurity practices are currently implemented in these operations. Each farm varied widely in size, species raised, production type, and farm management practices. While a backyard owner may only have six chickens, a small farm could have hundreds of birds, and possibly other species such as small ruminants or swine. This variation creates several challenges when it comes to implementing preventative biosecurity practices, and what works well for a commercial facility can be impractical for these smaller farms to effectively utilize. For example, there are many biosecurity practices that are species specific and become more complicated when multiple species are housed on the same property.

We found that suggesting small practical changes to the currently implemented biosecurity practices, and working within their current system of production was the most beneficial. Identifying specific key areas that posed the largest risk for the introduction and transmission of diseases. Then working together to fill those gaps in their current practices. No biosecurity plan is perfect, but prevention and reducing overall risk was our goal with this project. Some areas often highlighted in these discussions included adding an isolation pen, record keeping, reducing visitor contact with livestock, and limiting access of wildlife to feed and water sources.
This project highlighted to us the importance of communication between farmers, veterinarians, and extension educators. This has also been shown in another study which identified the need to address the complexity of small farms and individual farmers when developing biosecurity plans\(^1\). This communication is vital to developing these biosecurity plans that benefit farmers, their livestock, and their veterinarians.

For more information on IAWATI and VERT, please visit https://iawti.vetmed.ucdavis.edu/iawti-training/emergency-preparedness.

Overall, this project (FARM PPE) allowed for the delivering of several webinars. It also allowed for the consolidation of resources for backyard and small farms for use in developing farm specific biosecurity plans. This template [adapted from Healthy Farms Healthy Agriculture (https://www.healthyagriculture.org/)], is a free resource and may be accessed here. With the growing number of backyard farms we hope this resource will aid farmers, extension specialists and veterinarians in developing their own individualized biosecurity plans to help protect livestock and farmers against disease.

\textit{Funding for FARM PPE (Capacity Building Using Train-the-Trainer Approach to Improve Biosecurity and Reduce Disease Spread in Small-scale and Backyard Livestock and Poultry Premises) was made possible by the U.S. Department of Agriculture’s (USDA) - NADPRP through Cooperative Agreement # AP21VSSP0000C034. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the USDA.}

Website : https://farmppe.netlify.app/

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Globally approximately 1.3 billion tonnes of food are lost or wasted each year. We may define wasted food broadly as food that was taken to retail but was not for some reason consumed, either being discarded at retail or post retail. We may further define food scraps as potentially edible organic portions of food that are not typically eaten by humans such as rinds, peels, bones, pits, and cores. Food wastage represents a loss of agricultural labor, natural resources, and energy expenditure. Moreover, the negative environmental impacts of food production such as greenhouse gas production and ecotoxicity are incurred without creating a useful product. As such strategies to reduce wasted food are increasingly considered by governments around the world. One such strategy is termed “food waste valorization” which redirects wasted food away from landfills towards use in livestock feed. While feeding discarded wasted food and food scraps is frequently used in backyard livestock production – the practice is more complicated when considering a wide scale redirection of entire cities’ or nations’ wasted food to industrial livestock production facilities. Wide scale wasted food valorization is regularly practiced in nations such as South Korea and Japan and while redirection of wasted food towards animal feed is part of United States Department of Agriculture’s Food Recovery Hierarchy, regular practice of using wasted food in animal feed in the US and many other nations remains relatively rare. Obstacles to regular incorporation of wasted food into livestock feed is that wasted food’s nutritional profile is variable; what type of food is wasted may vary from household to household, store to store, and city to city. Moreover, raw wasted food and food scraps may contain pathogens such as Salmonella, Avian Influenza Virus, trichinella, as well as toxins like microplastics, heavy metals, stones, glass; and so on.

Proper wasted food management infrastructure may remove or reduce such hazards through mechanisms like heating, manually sorting, minimizing exposure to air or uv radiation; as well as improving the digestibility of the food through addition of things such as antioxidants. To ensure that feed augmented with wasted food meets the proper nutrition for livestock is a bit more complicated. Research has indicated that for some livestock, such as broiler chickens, wasted food may be incorporated into the diet at up to 20% with no negative effect. However, optimal inclusion rates vary based on species with swine tolerating a higher inclusion rate of approximately 50%. Principally, research has demonstrated that wasted food incorporation is safe and may be used to offset some of the cost of feed production along with reducing the negative environmental and economic consequences of wasted food. However, wide scale adoption of incorporating treated wasted food into livestock feed requires dedicated infrastructure and logistics for transporting wasted food, properly treating it, and assessing that feed augmented with wasted food is regularly meeting nutrient requirements for the feed’s intended animal. As such developing this infrastructure remains the major obstacle to widespread adoption of wasted food valorization into livestock feed. At the University of California, Davis the Pitesky laboratory is currently working with Dr. Chris Simmons in the food science department and have recently published research modeling optimal inclusion rates of treated residential wasted food and food scraps for broiler and layer chickens.* In the future, we aim to expand on this research with our food science colleagues to develop methods of properly treating and incorporating wasted food and food scraps into poultry feed in resource limited developing nations.

*"Assessment of the variation in nutritional composition and safety of dried recovered food from United States households and prospects for use in chicken feed"
UC Davis Cooperative Extension traveled to Iowa State University (ISU) to participate in the Integrated Poultry-Vegetable Field Day. Taking place on September 7 and led by Dr. Ajay Nair of ISU, this field day brought together collaborators from UC Davis, ISU, the University of Kentucky, and the National Center for Appropriate Technology. The event offered the opportunity for new farmers to see integrated poultry-vegetable crop production in action at the ISU Horticulture Research Station in Ames, Iowa.

The field day was accompanied by presentations on the results of recent field trials conducted in IA, CA and KY. Researchers shared findings on questions such as how meat quality differed between pastured chickens in the integrated systems vs. those raised indoors (presented by Dr. Dong Ahn) and how yields of different vegetables were impacted by chicken integration (presented by Anne Carey, Phd candidate) amongst many other topics including outcomes related to stocking density, insect populations, food safety, and animal welfare in integrated poultry operations. Practical takeaways for farmers were also emphasized—with Dr. Maurice Pitesky presenting disease models for avian influenza, and how to best reduce the risk of an outbreak on a farm and Dr. Liz Bobeck emphasizing the business implications of finding higher feed conversion ratio in outdoor raised vs. indoor raised birds.

Her advice to farmers: measure your chickens’ feed intake and pay attention to their feed conversion ratio. Feed costs are higher for outdoor birds, so you should be charging more for them. The field day and research findings were funded by the Organic Agriculture Research and Extension grant titled “Integrating vegetable, poultry, and cover cropping practices to enhance resiliency in organic production systems” led by Dr. Ajay Nair and also made possible by funding from USDA's Beginning Farmer and Rancher Development Program.

Join the mailing list to be notified of when videos from the field day become available and to hear about upcoming webinars and workshops on integrated poultry-crop production for beginning farmers!

Above: Chicken tractors at ISU Horticulture Research Station
Below: Cabbage crop at ISU Horticulture Research Station
Photos courtesy of Celin Montoya
Dr. Cluck’s Vacation
Can you find all 10 differences in these 2 pictures?

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