



Good Agricultural Practices (GAPs): A consumer discovery tool for learning about risk-reducing behaviors on commercial farms and in school gardens

James Hollyer^{1,3}, Lynn Nakamura-Tengan², Donna Meyer³, Vanessa Troegner¹, Luisa Castro⁴

¹Agricultural Development in the American Pacific; ^{2,3,4}CTAHR departments of ²Human Nutrition, Food and Animal Sciences, ³Plant and Environmental Protection Sciences, ⁴Natural Resources and Environmental Management

Good Agricultural Practices, or GAPs, have been part of the U.S. produce industry since 1998 and are due to be updated in 2012. GAPs were developed by the U.S. Food and Drug Administration (<http://tinyurl.com/3ot8bz5>) with the help of the produce industry and university scientists. GAPs' "preventive controls" are science- and experience-based risk-reduction guidelines for produce production and handling; some are even mandated by federal law for other purposes. GAPs are, in essence, the food safety protection standard for produce grown in the U.S. and provide validated practices to reduce or eliminate physical, chemical, and microbiological risks on farms. Some of these risks, such as a lack of toilets and hand-wash sinks for workers or the presence of animals roaming freely in a field/garden/packing area or packing fresh produce in a dilapidated garage tightly surrounded by non-food-related "stuff," are obvious. *Salmonella*, *E. coli*, or conventional or organic pesticide contamination, however, are impossible to see, and therefore must be guarded against by other means. Reducing production risks with GAPs is a rational, responsible behavior on any farm or garden.

In the absence of mandatory government requirements for GAPs use, leading produce industries have in recent years taken it upon themselves to write more detailed crop-specific GAPs (<http://tinyurl.com/3fmxsbj>). They have also implemented various third-party auditing systems to provide regular oversight at the farm and packing house/shed.

On-farm GAPs reduce risks up the food chain for consumers in homes, restaurants, schools, day care cen-

ters, hospitals, cruise ships, etc. Following GAPs may raise consumer confidence in the U.S. and Hawai'i food systems and often increases the market share for farmers who are annually audited for *daily GAPs compliance*.

For the most part, GAPs are "size neutral"—they fit all sizes of farms and most food crops, including farms where pet food ingredients are grown. Smaller farms may have fewer GAP-related recording activities than larger operations. For example, smaller farms may not have employees, may not use pesticides, and may not have commercial refrigerators. Such farms (or school gardens) would have fewer records and yet still follow the same basic risk-reducing production and handling behaviors as their larger counterparts.

On the next page is a basic list of GAPs. Take our self-test to learn more about GAPs and gauge your own feelings on the use of GAPs on large and small conventional and organic farms and in school gardens that wish to serve their student-raised produce in their cafeteria, as allowed by federal and State of Hawai'i regulations.



Additional information

UHM CTAHR's Farm Food Safety Web site contains information for school gardens under "client services":
<http://manoa.hawaii.edu/ctahr/farmfoodsafety>

UHM CTAHR's 2011 school garden food safety fact sheet:
<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-45.pdf>

USDA - Food and Nutrition Service FAQ page on Farm-to-School food safety:
http://www.fns.usda.gov/cnd/f2s/faqs_safety.htm

Some basic Good Agricultural Practices (GAPs) for growing produce

Which farm or garden practices do you think will help reduce the risk of food-borne illnesses in humans and in what production systems should they be used? (Directions: In the columns at the right, place an "X" to indicate that you believe these GAPs should be used on farms/school gardens selling/serving produce)	Large farms	Small farms	School garden (produce served in cafeteria)
1. Have well-maintained toilets and hand-washing facilities with potable (drinkable) water, unscented liquid/powdered hand soap, single-use paper towels, and a covered trash can. <i>Note: Farm worker toilets and hand-wash systems are required by the U.S. Occupational Health and Safety Administration (OSHA).</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Ensure that employees/family members/students ALWAYS wash their hands before harvesting and handling produce, regardless of what they were doing before these activities.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Make sure that sick or injured/bleeding employees/students are reassigned to non-food tasks and that any blood-tainted produce is thrown away and all food-contact surfaces sanitized. Have a well-stocked first aid kit easily available at all times.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Make sure that no drinking, eating, chewing (gum, tobacco, betel nut, etc.), or smoking occurs in the production or packing areas. Have a separate place for workers to take their break.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Use ONLY pesticides legally labeled for use on a crop, and appropriate fertilizers and composts (non-organic or organic) according to their labeled (legal) directions, and record every use. For pesticides, this includes following the pesticide's Restricted Entry Interval (REI) and Pre-Harvest Interval (PHI) precisely in order to protect workers/consumers from pesticide residues that exceed EPA-allowable limits. <i>Note: Using pesticides in a manner inconsistent with their labeled instructions or making "homemade" pesticides for use on a commercial farm or school garden is a violation of the EPA Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Also, remember that pesticides, including organic ones, carry this notice: KEEP OUT OF REACH OF CHILDREN.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Train and protect workers/students who handle or are exposed to pesticides based on the EPA Worker Protection Standard (WPS) rules as required by the pesticide label and other applicable rules. Also, make sure potential human allergens such as milk, eggs, fish, shellfish, soy oil, and peanuts are not applied to the edible portion of produce.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Use proactive pest/animal management strategies for rodents, birds, cows, deer, poultry, pigs, slugs, and snails, and <i>actively</i> keep animals, including pets, and their fresh manures, away from operational fields, orchards and school gardens, and produce packing and storage areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Make sure lands and water around the production area are not a potential source of contamination from rain/flood run-off or airborne contaminants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Make sure that produce with feces contamination (from birds, rats, deer, pigs, slugs, snails, or other pests) or signs of being eaten by an animal, is not harvested to eat. Also, do not harvest produce from any flooded plots, as flood waters can contain human pathogens and pesticides.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Use appropriate water quality for irrigation and crop rinsing as required by federal and State regulations and industry best practices. Farm/garden water(s) should be tested for microbial content at an approved laboratory. <i>Note: Per Department of Health's Hawaii Administrative Rules §11-11-8, produce rinse/wash water must be potable and supplied by County sources.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Install a "back-flow prevention" system on the farm/garden irrigation system to protect municipal/neighborhood water sources from possible contamination by agricultural/garden chemicals. <i>Note: This is required by the EPA Clean Water Act and perhaps other local ordinances.</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Clean and maintain the packing shed and storage area, harvest baskets, tools, non-porous food contact surfaces, and refrigerators so they are not a potential source of physical, chemical, or microbial contaminants (e.g., falling rodent/amphibian feces, mold, dust, paint chips, nuts/screws, glass, plastics, farm and home chemicals, pet hair, rust, mud, fibers, leaking overhead pipes, unprotected glass lights, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Take precautions to reduce/prevent damage/vandalism or contamination of produce.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Label each box of produce with farm/garden contact information , "Grown in Hawaii, USA," and the appropriate field and harvest information to allow for timely identification to a specific field (i.e., trace-back) in the event of a food-borne illness outbreak.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Acknowledgments

Drawing by Nancie McCormish, Drawn by Design. Thanks to Dr. Ginger Nickerson, University of Vermont, and Dr. Fred Brooks and Frederika Bain, CTAHR, for their review and feedback. Development of this publication was funded by the Hawaii Department of Agriculture's Agribusiness Development Corporation.