An Overview of Units for Small to Large-Scale Agricultural Operations

HAND-WASHING UNITS
3) Summary
4) N.C. State Hand-washing Stations
   5) N.C. State Commercial Unit
   6) N.C. State Farmers Market Unit
7) “Use-Yer-Foot” Unit
8) Quick & Easy Unit #1
9) Quick & Easy Unit #2
HAND-WASHING UNITS SUMMARY

**NCSU Commercial Unit**
- Cost: $2,000
- Application: Commercial-scale fields
- Capacity: 125 gallons
- System: Gravity-fed with knee valves
- *Minus the trailer

**NCSU Farmers Market Unit**
- Cost: $2,000
- Application: Farmers markets, Events, etc.
- Capacity: 125 gallons
- System: Pump
- *Minus the wagon

**“Use-Yer-Foot” Unit**
- Cost: $139 (rentals available, $15/day)
- Application: Farmers markets, Events, etc.
- Capacity: 10 gallons
- System: Gravity-fed with foot pedals
- *N.C. residents add state sales tax, shipping not included

**Quick & Easy Unit #1**
- Cost: <$100
- Application: Farmers markets, Smaller fields, Events, etc.
- Capacity: 5-10 gallons
- System: Gravity-fed with valve faucet (no push buttons)

**Quick & Easy Unit #2**
- Cost: <$100
- Application: Farmers markets, Smaller fields, Events, etc.
- Capacity: 5 gallons
- System: Gravity-fed with valve faucet (no push buttons)
Rod Gurganus, director of N.C. MarketReady, the N.C. Cooperative Extension outreach of N.C. State’s Plants for Human Health Institute, and Dr. Gary Roberson, extension specialist in biological and agricultural engineering, developed two hand-washing station prototypes for producers.

Took into account producer feedback, construction costs, functionality and used widely available materials like water tanks and plumbing parts to give producers room for customization.

Construction costs are estimated around $2,000 for both units, minus the support trailer or wagon, but will vary depending on brands, accessories, etc.

Custom additions can include waste receptacles, steps/ramps, towel racks and soap dispensers.

*The N.C. Rural Economic Development Center’s Agricultural Advancement Consortium funded this project with a $24,000 grant.*
N.C. STATE COMMERCIAL UNIT

Background

- This facility has a 125gal capacity and is intended for commercial use in fields.
- Gravity-fed system: top tank holds clean water (125gal), bottom tank collects waste water and should have double the capacity of the top tank (250gal).
- Designed for six people to wash their hands (can be customized). Operated by knee valves that control water flow when pressed with the leg (reduces contamination risks from faucets).
- Frame must be able to support the water supply tank when full (1,000lbs). Trailer weight capacity should be 3,000lbs. min.
- Construction costs will vary, but this unit cost about $2,000, minus the trailer.
  - Water tanks: $600/pair
  - Plumbing: $600
  - Support frame: $500
  - Sinks: $300/pair

Visit http://ncsu.edu/enterprises/ncfreshproducesafety/hand-washing-unit/large-station/ for construction guidelines. Funding from the N.C. Rural Economic Development Center’s Agricultural Advancement Consortium made this project possible.
Background

- Producer feedback highlighted a need for a smaller hand-washing facility for use at farmers markets, one that would be easier to deploy and involve fewer costs.
- This unit holds two 125gal tanks and is operated by a water pump system.
- The sinks fold up and latch for easy transport and storage.
- Construction costs will vary, but this unit cost around $2,000, minus the wagon.
  - Water tanks: $600/pair
  - Pump system (pump, accumulator tank, electrical): $500
  - Plumbing: $400
  - Sinks: $300/pair
  - Accessories (soap dispenser, etc.): $100
- A solar panel could be added to the electrical box for more efficient charging.

Visit [http://ncsu.edu/enterprises/ncfreshproducesafety/hand-washing-unit/small-station/] for construction guidelines. Funding from the N.C. Rural Economic Development Center’s Agricultural Advancement Consortium made this project possible.
Background

- The “Use-Yer-Foot" portable sink is offered by Turtle Run Farm in Graham, N.C.
- This lightweight, folding, user-friendly hand-washing unit includes a removable drain tub, durable foot-pedals and a 10gal capacity.
- The folded size of this unit is about 36" high x 26" wide x 5" deep.
- One unit is $139 plus shipping. Rentals are available at $15/day.
- Accessories are also available:
  - Drain kit and hose to hook up to sanitary drain: $20
  - Mounted soap dispenser: $20

Visit [www.useyerfoot.com](http://www.useyerfoot.com) for additional details.
HANDWASHING STATION
*Use it OFTEN!*

Use CLEAN water jugs:

1. SANITIZE with 2 tbsp unscented bleach in 1 gallon of water – SLOSH to cover all surfaces.
2. Let STAND 5 minutes and DRAIN. DO NOT RINSE!
3. FILL with approved drinking water

---

**QUICK & EASY UNIT #1**

**HANDWASHING STATION**

**Use it OFTEN!**

**Dispensed Paper Towels**
(turn water off with paper towels!)

**Water from an approved SOURCE**

**Spigot faucet**
(no push buttons)

**Bar or liquid SOAP**

**Catch Basin**

**Trash Can**

**Warm Water**
for Handwashing
100° - 120° F

HOW TO BUILD A FIELD HANDWASHING STATION IN 10 EASY STEPS FOR UNDER $20

Michele Schermann and Annalisa Hultberg
University of Minnesota, Bioproducts and Biosystems Engineering,
Agricultural Health and Safety Program
Jill Randerson
Kidzibits, Inc., Minneapolis, MN

Field handwashing stations can be rented from sanitation companies or you can purchase field handwashing stations from various sources. They are easy to build with a few purchased, found, and salvaged materials. See the materials list at the right and instructions below.

1. Get some wood. Make the sides.

For this stand, we used
4 - 36” 2X6
4 - 18” 2x6” for the sides of the stand. We decided a stand 36” high would be good for handwashing. You can choose any height you wish.

2. Square off the ends and cut them to the right sizes (for the height and size you want).

Materials list.
1. Water container -- the blue container holds 5 gallons of water and has an open/close valve. Available at big-box home hardware store in the camping section. $9.99
2. Soap.
3. Trash can with a lid so paper towels don’t blow around in the wind. We used an old rag container found in the barn.
4. Water catching bucket (5 gallon bucket)
5. Dishpan. Another found item, is the “drawer” under the water container and holds single use paper towels. You can use whatever you want for this. Doesn’t need to be a dishpan.
6. Wood (salvaged), 2x8’s, 2x4’s, and plywood for the top, sized to fit.
7. 60 2.5” screws.
8. Bungee cord

Visit [http://ncgoodfarmersmarketpractices.com/how-to/build-a-handwashing-station/](http://ncgoodfarmersmarketpractices.com/how-to/build-a-handwashing-station/) to download PDF.

Original source: Univ. of Minnesota
This is how the sides will look. They aren’t screwed together yet. At this point we decided to use the dishpan as the drawer because we had one and wouldn’t need to purchase anything else.

The top cross piece was placed slightly below the very top to create a lip for the dishpan “drawer” to slide on.

3. Screw the crosspieces in place. We used 2.5” screws, 4 on each end (16 total per side, 32 for both sides). We drilled holes before we drilled the screws so that the wood wouldn’t crack.

Here you can better see how we placed the top cross piece down from the top to be the dishpan drawer slide.

Now we have our sides built.
4. Figure out how wide to cut the width-wise crosspieces. Placing our dishpan on the “drawer slides” we measured and determined that crosspieces of 14.5” would work. We cut 4-14” pieces of wood. This time we used 2x4s.

5. Screw the bottom widthwise crosspieces onto the other crosspieces. You could also turn them the other direction and screw them into the side pieces. With the crosspieces turned flat, they make a bigger flat area in case you want to put something on those pieces.

6. Screw the top widthwise crosspieces in place. Notice that these are turned up and down (vs flat like the bottom pieces) and screwed through the side supports. They are low enough so that the dishpan drawer fits in the remaining space.

7. Next, cut a scrap of plywood, old countertop, pieces of wood, or other flat material to fit the top of the stand.
8. Screw the top in place.

9. Install your dishpan drawer. That is where you will have the single use hand towels.

10. Get the rest of the parts together.
Use a bungee cord to hold a 5-gallon water container on the top. Supply soap. (See photo on the first page if you forgot what this looks like)

Put a bucket underneath the spigot of the water container to catch the water. You might want to put a rock in the bottom of the bucket if you are in a windy area. Do not empty the bucket of water in the produce field.

Have a lidded trash can handy for the used towels to keep the used towels from blowing away.

Final notes
This is just an idea plan. You can make this any size you want and with any materials. You could change the boards and install a paper towel dispenser under the top, or you could mount a paper towel holder on the side. If you do that, you will need to remember to remove it when it rains so your paper towels don’t get wet. If you really want to be fancy, you could cover the top of the stand with a vinyl fabric covering so that it will stay dry and the plywood won’t warp. Cut vinyl fabric slightly bigger and staple to the bottom side of the top.

Of course this stand won’t last forever, but for a seasonal handwashing station in the field it works very well. Remember to use clean, potable water for handwashing, not rain water or surface water.

See the video, “How to build a handwashing station” at http://safety.cfans.umn.edu/videos.html
More information about on farm food safety can be found at: http://safety.cfans.umn.edu

2011. Developed by the University of Minnesota Agricultural Health and Safety Program team. Funding through a partnership between the MN Fruit and Veg Growers Association and the USDA-Risk Management Agency.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all of its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual’s income is derived from any public assistance program. (Not all prohibited bases apply to all programs). USDA is an equal opportunity provider and employer.