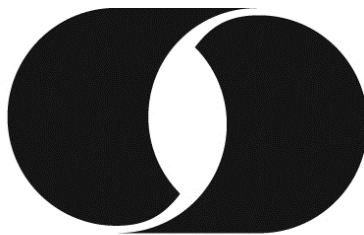


Grower's Manual: A Template for Grower Cooperatives



LEOPOLD CENTER
FOR SUSTAINABLE AGRICULTURE

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Adapted from

Grower's Manual of GROWN Locally, Producer Cooperative, Decorah, Iowa

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**About the Leopold Center**

Iowa State University's Leopold Center for Sustainable Agriculture is a research and education center with statewide programs to develop sustainable agricultural practices that are both profitable and conserve natural resources. The center was established under Iowa's Groundwater Protection Act of 1987 with a three-fold mission: to conduct research to identify and reduce negative environmental and socioeconomic impacts of agricultural practices; to research and assist in developing alternative practices consistent with a sustainable agriculture; and to work with ISU Extension to inform the agricultural community and the public of its findings.

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**About GROWN Locally**

GROWN Locally is a cooperative of over 30 farms and food producers in Northeast Iowa (Allamakee, Winneshiek, Howard, Clayton, and Fayette Counties). Founded in 2000, they provide fruits and vegetables, meat, eggs, and dairy products to local schools, restaurants, and other institutions in their region.

Acknowledgments

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I. Introduction

This Grower's Manual was originally developed by GROWN Locally, a producer cooperative in northeast Iowa, to establish standards for pre- and post-harvest practices and the product specifications used with local foodservice establishments. Adhering to these methods and standards allowed GROWN Locally's growers to pass their internal audit, and their facility to be GHP certified.

In July 2011, the Manual was purchased by the Leopold Center for Sustainable Agriculture and revised and reformatted to serve as a model for other cooperatives and regional food systems groups. The revision process included a review of Extension, state, and federal food safety publications and consultation with ISU Extension specialists to ensure that the manual calls for science-based best practices that comply with current regulations.

II. GAP & GHP: Good Agricultural Practices and Good Handling Practices

Good Agricultural Practices and Good Handling Practices, or GAP and GHP, are voluntary sets of standards established by the USDA. GAP focuses on on-farm practices; GHP is used for packing facilities, storage facilities and wholesale distribution centers. Farms and facilities that pass a GAP or GHP audit and become GAP or GHP-certified have proved that their practices for producing, handling, and storing crops minimize the risks of microbial food safety hazards. The audit program corresponds with the recommendations found in the FDA's [*Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*](#).

Although GAP standards are voluntary, many institutional buyers will require GAP and/or GHP certification from their growers and distribution facilities. There are many organizations authorized to perform GAP and GHP audits, including the USDA, AIB International, NFS Davis Fresh Technologies, GlobalGAP, ISO International Standards Organization, Primus Labs, Scientific Certification Systems, and Silliker.

III. Considerations for Adopting this Manual

The GROWN Locally manual was developed by the cooperative to ensure consistency in post-harvest practices and that all growers would be prepared for the internal GROWN Locally audits. (For a facility to pass the 3rd-party audit and be GHP certified for storage and distribution, all of the cooperative's growers need to pass the internal audit.) Though it contains some topics specifically related to the organization of a grower's cooperative, this manual also could be used by individual growers developing their systems and standards for a GAP audit.

Groups or individuals adopting this manual will need to ensure that the practices they choose align with current food safety standards. They also will need to make adjustment based on factors such as the crops that they grow, requirements set by their buyers, and the goals and priorities of their members.

Some considerations for adapting the manual include:

- If water testing costs are prohibitive, the cooperative could require a minimum of annual testing for fecal coliforms (a general indicator of safety) instead of quarterly testing to prove water is potable.
- The labeling and tracking processes could be combined into one recording process; this prevents the errors that may occur when repeating inputs.
- Cooperatives should prepare for recall situations by performing a timed mock recall each year. See Section VI (page 24) for details and a sample checklist prepared by North Carolina State Extension.
- The cooperative could require that growers use certain types of sanitizer for certain crops, instead of allowing them to choose among the set of approved sanitizer solutions listed in this publication.
- The cooperative should have a policy in place for addressing issues with producers who do not meet quality standards and/or fail to deliver the quantities they have listed in their availability. GROWN Locally is in the process of developing a set of consequences for such behavior.
- The cooperative should consider taking out an insurance policy as an organization, in addition to requiring liability insurance of its growers. For example, GROWN Locally has a \$5 million dollar liability policy.
- There are other types of insurance, in addition to product liability, that cooperatives could consider requiring or recommending for their growers, such as general farm liability and product recall insurance. North Carolina State Extension's [Fresh Produce Safety Portal](#) provides several documents and resources about insurance available to growers.
- Each cooperative should set a clear system for grading produce that corresponds to USDA standards when possible, and/or is consistent with the systems of other food purveyors that supply their sales region. GROWN Locally also uses the "Wholesale Success" book from FamilyFarmed.org as a reference.

In addition to the recommendations above, cooperatives should document the process for making and approving revisions to the manual, and implement an annual process for reviewing and updating the manual.

IV. GROWN Locally Cooperative Structure

GROWN Locally's producers include full members, new producers in their first (probationary) year, and broker producers who provide product if members do not have it. Twice a week, they make deliveries to local schools, restaurants, and other institutions.

GROWN Locally uses the former Ridgeway School's kitchen (Ridgeway, Iowa) as its facility. They recently passed a GHP audit, conducted by Primus Labs, on the facility for storage and distribution. The facility is not used to pack out: all product comes in pre-packaged to Grown Locally specifications and is not repackaged. GROWN Locally adheres to the following general standards for its products and practices:

- All GROWN Locally produce is double washed and sanitized when appropriate, using sanitizers approved for usage on foods and food contact surfaces. It is packaged in new plastic bags and clean boxes and kept at the appropriate temperature until delivery.
- GROWN Locally meat and poultry products are locally processed and USDA inspected. They are stored and kept frozen until delivery.
- GROWN Locally eggs are from free range hens and all egg producers are licensed egg handlers.
- In general, GROWN Locally producers follow the Good Agricultural Practices outlined in the [ISU publication PM 2045](#), and have participated in food safety and post-harvest handling training courses.

Detailed descriptions of GROWN Locally's pre- and post-harvest practices are in the Grower's Manual that follows.

V. GROWN Locally Grower's Manual

A. Overview

As a farmers' cooperative striving to produce the highest quality food to our customers, our number one goal is handling our product in the safest manner possible. This manual sets forth the steps all our members must follow to help ensure we meet this goal. An **annual audit** of all member operations will be conducted by a team from the Cooperative to ensure compliance with this manual and help correct any deficiencies. GROWN Locally cannot buy product from a producer that does not pass the audit.

For purposes of compliance and uniformity, any changes to requirements and policies will be communicated to members by the Board of Directors at the monthly meetings, by email, or by written notice. The Operations Committee, chaired by the President of the Board of Directors, makes recommendations for changes and brings them to the general membership for a vote on an as-needed basis. The Audit and Compliance Committee, chaired by the Vice President of the Board of Directors, oversees our third party audit and the farm inspections/audits each year.

B. Minimum Requirements

- A minimum of \$1,000,000 product liability insurance is required for all members and brokers. In lieu of liability insurance, a USDA GAP certification is acceptable.
- A copy of proof of potable water, by *quarterly* water testing whenever that producer is in operation, should be made available to the co-op.
- If a member uses a foliar spray (not drip) irrigation from a source other than a tested well, the irrigation spray should be halted two weeks before harvesting that produce.

C. Harvest

Harvest knives and other tools must be washed and sanitized with a solution of **50-100 ppm bleach** for at least 7 seconds before use. (See page 7 for more information on sanitizer solutions.) Harvest tubs must be washed before harvest and sanitized once per day. Staff must have access to restrooms (within ¼ mile) and hand-washing stations while harvesting. Hand-washing stations should have clean water, soap, and single-use paper towels.

D. Post-Harvest Personnel Procedures

Hand-Washing Policy:

All employees must follow proper hand-washing practices. Post these instructions prominently by wash stations:

Wash hands and forearms vigorously and thoroughly with soap and water for a minimum of 20 seconds. (Lathering should last 10-15 seconds.)

1. Wash hands with liquid soap.
2. Wash between the fingers and under nails thoroughly.
3. Use only hand washing stations designated for that purpose.
4. Dry hands thoroughly using paper towels.
5. Turn off faucet using a paper towel.

All employees must wash hands

- when entering the facility before work begins;
- before touching food and/or equipment;
- when contamination of hands occurs;
- after toilet use before returning to work;
- after touching face, nose, or hair;
- after sneezing or coughing;
- after cleaning duties;
- after smoking; and
- after eating.

Before post-harvest handling, workers must:

1. Rinse overshoes or change out of footwear.
2. Change out of clothes that are too soiled.
3. Wash hands.
4. Put on a clean apron.

Other Personnel Procedures:

- Workers must not handle food while experiencing flu-like symptoms (sore throat, fever, vomiting, diarrhea, or jaundice) and/or a diagnosis of a food-borne illness. See “Safe Food Is YOUR Job—Health and Hygiene Tips for Food Handlers ([Extension PM1419](#)) for more information on health and food safety.
- Drinking liquids out of a closed container is permitted. There is no eating allowed in harvest/post-harvest areas. Employees must eat in designated places outside of food harvest and packing areas.
- All soiled aprons/clothes should be laundered after use.

E. Cleaning and Sanitizing of Work Areas

Wash all food contact surfaces prior to washing produce. Tables, counters, sinks, and equipment must be:

1. Cleaned with soap and water (using scrub pads) or pressure-washed.
2. Wiped with a squeegee to remove excess water, or allowed to air dry.
3. Sprayed with a surface sanitizer of **50-100 ppm bleach**.
4. Left to air dry before use.

Cloths and scrub pads need to be soaked in bleach solution in-between uses. Squeegees must be replaced when cracks become visible.

Floors must be swept at least once per day, when food is not out, and washed/sanitized as needed.

Equipment must be scrubbed or pressure-washed and sanitized before and after each harvest. This may include wash tanks, sinks, brushes, brush washers, roller tracks, and produce tubs.

Coolers must be cleaned regularly and sanitized with a surface sanitizer. Temperature readings must be monitored and documented daily.

Packaging: All boxes must be in good, clean condition. See specific crop instructions for use of a plastic liner.

Animals: Do not touch animals (including dogs and cats) during harvest and/or post-harvest handling. Pets should not be allowed in the fields, and measures should be taken to exclude wildlife. Animals are not allowed in post-harvest facilities. Care must be taken in keeping rodents and birds out of all facilities, and growers should not harvest produce soiled with bird dropping or in close proximity to animal feces. If animal feces are found in a production field, they should be removed along with the soil around them.

Vehicles: Keep all vehicles clean. Transport items in an enclosed vehicle that is cool.

SANITIZER SOLUTIONS

For surfaces

- **A chlorine solution** for sanitizing food contact surfaces should be **50-100 ppm**, which is achieved by mixing up to 1 Tablespoon of household (unscented) bleach per gallon of room temperature water. Use test strips to achieve an accurate concentration and do not allow the solution to drop below 50ppm.

For products

- **A chlorine solution** for sanitizing food products should be **100-200 ppm**, which is achieved by mixing up to 2 Tablespoons of household (unscented) bleach per gallon of room temperature water. Use test strips to achieve an accurate concentration. The water should be less than 10° F cooler than the product.
- **Hydrogen-peroxide solution**: This solution should be **1-5% hydrogen peroxide**. Test strips should be used to determine whether the solution meets the appropriate levels. Workers should use caution when making and using this solution, as the 5% concentration can cause eye irritation.
- **“New Generation” food-grade vegetable washes** such as Pro-San® LC (Liquid Concentrate), FreshRinse® and Tsunami® are Generally Recognized As Safe (GRAS); growers should use them at manufacturer-recommended rates.

Because sanitizing solutions lose their effectiveness over time, as they are exposed to air and organic materials, workers should make sanitizer solutions daily, check them with test strips, and record the test strip results. See ISU Extension Publication PM 1974C for a sample sanitizer monitoring form, and more information on sanitizing solutions.

F. General Post-Harvest Procedures for Crops

During the post-harvest process, cull all unsatisfactory crops. Water used for cleaning and rinsing product must be clean and potable. All crops must be clean when they arrive at the distribution center. This may mean washing with chlorinated wash water or a hydrogen peroxide-based sanitizer, rinsing, and draining or simply brushing or removing visible soil. The method will depend on the product; see section P for specific crop requirements/recommendations. GROWN Locally products are not sold as “ready-to-eat”; the retail foodservices are required to do additional washing prior to use.

When brushing or wiping product, use tools designated for dedicated product only. Do not use the same tools for cleaning product and cleaning food contact surfaces, as this can lead to cross contamination. Brushes and towels should be cleaned between product types; towels should be changed when soiled.



Washing crops, Rock Spring Farm, Decorah, IA;
Jerry DeWitt, Leopold Center, 2009.



Vegetable Washing Stations,
One Step at a Time Gardens, Kanawha, IA;
Joanna Hamilton, Leopold Center, 2011.

G. Packaging

Growers must be able to provide their product in institutional case size lots, and are expected to clean, sanitize, and package the product in industry standard packaging. Packaging that can be re-used is provided by the cooperative at cost to members. Non-returnable packaging (tomato boxes, box liners, clamshells, etc.) must be purchased by the producer.

In addition to the specific crop packaging instructions below, growers should make sure to

- use food-grade packing materials (an FDA designation);
- use clean packing materials (boxes can be re-used if new, clean liners are added);
- keep packing containers clean during field packing;
- provide adequate drainage for all products, in order to prevent bacterial growth;
- keep raw food separate from produce (if packing meat, dairy, and produce); and
- keep clean produce separate from soiled.



Labels and packaging materials, Rock Spring Farm, Decorah, IA;
Jerry DeWitt, Leopold Center, 2009.

H. Temperature Log

A daily temperature log must be kept for each refrigerator or freezer unit. Keep these logs for a year.

Many templates for temperature logs are available through Iowa State Extension at

<http://www.extension.iastate.edu/HRIM/HACCP/restaurantsflowoffood.htm>.

I. Labeling

All packages must be labeled. Labels need to include the following:

- Your farm name
- Reference/Purchase Order (PO) number
- Product identity and amount
- Packing date
- Customer name

J. Tracking System

Each producer must utilize a tracking record that will allow him/her to pinpoint the source of any product using the information on the product label. Keep these records on hand for one year. The tracking record should include at a minimum:

- Product
- Harvest date
- Pack date
- Reference/Purchase Order (PO) number
- Field number
- Ship date

See page 23 for a sample tracking log used by a GROWN Locally producer.

The following sections (K through O) cover the logistics of GROWN Locally's cooperative operation, from transportation and payment to supplies and delivery. These standards would not be required for an individual grower's audit, but are necessary for developing a successful growers cooperative. Cooperatives also should include specific contact information for after-hours questions and procedures. The manual should be reviewed and updated every season.

K. Transport to Distribution Center

Vehicles used for transporting product to the distribution facility should be clean and well maintained. Chilled product must be kept cool during transport to prevent product from reaching warm temperatures by arrival time at the distribution facility. Any frozen product (meats) must be kept frozen. Eggs need to be kept at 33° to 45° F, and kept separate from other products. Non-food items should be kept isolated from food products.

Each grower is responsible for maintaining their delivery vehicle in good repair and clean condition. The cargo area must be kept clean, and protected from dust, dirt, water, and pests during transport. The cargo area should be insulated to preserve the quality of produce. Incoming vehicles may be inspected by the distribution facility manager and product may be rejected if it is not up to standards. All products must be delivered in the quantities and packaging as detailed in the specific crop instructions below.

L. Delivery

Access to the distribution facility is controlled; it is locked when the facility manager is not present. Deliveries to the facility must be made on Mondays and Thursdays between 4:00 and 9:00 pm. All visitors are required to sign in and out and show ID. The producers are known to the facility manager: if using a substitute driver to drop off product or pick up supplies, notify the manager in advance. Delivery by the Cooperative to customers will be made on Tuesdays and Fridays.

M. Availability

GROWN Locally eventually will use LocalDirt.com for online inventory postings and Purchase Order management, once the Quickbooks software is integrated. Currently growers can use the following methods to communicate their availability to the cooperative:

- Contact the coordinator by phone to submit your inventory.
- Fill out the future inventory log (with carbon paper) at the sign-in desk—you can write down projected product you will have available for the next delivery day on this sheet (retain a copy for your use). You also need to let the coordinator know 3 weeks in advance if you think you are going to have a large quantity of something or if you will be having something new available.

The coordinator will get the final Purchase Orders to the producers by Sunday evenings and Wednesday evenings.

N. Payment

Growers will be paid every two weeks; payments generally will be 2-3 weeks out from the Purchase Order receiving date.

O. Supplies

Supplies can be picked up at the distribution facility. Be sure to record on the sign-in sheet at the facility any supplies picked up. Growers should notify the distribution manager or the coordinator of impending supply needs, shortages of supplies, or outages. Supplies will be kept in locked storage, separate from any potential contaminants and insect or rodent pests.

As a cross reference, each grower should keep track of supply items they receive such as boxes, bag liners, clam shells, tomato boxes, mesh bags, and sanitizer. Each grower will be billed for any supplies received through the co-op.

P. Crop Specifics: Packaging, Harvesting & Grading, Cooling, and Cleaning

These specifications were developed by the GROWN Locally Cooperative growers in order to meet the demands of their buyers, and in accordance with the guidelines of [Wholesale Success](#), a book by FamilyFarmed.org. ISU Extension staff recommend using the [Produce Fact Sheets](#) prepared by University of California-Davis for temperature and storage guidelines.

Asparagus	
Packaging	10# case – 1 $\frac{1}{9}$ bushel box, with bag liner and damp paper towels on bottom.
Harvesting & Grading	Stalks should have closed bracts and be 6-10" long. They should be fairly straight and fresh as well as free from decay and damage. There should be no broken tips, dirt, disease, or insect damage. They should be free of excess woody fiber in the stems. Harvest with a field knife in the morning or when cool. Do not harvest when stem is thinner than a pencil. Bunch in 1 pound bunches, with a rubber band, and trim for uniform height. Asparagus should be packed upright. Do not let asparagus overheat.
Cooling	Hydro-cool or store at 32° F.
Cleaning	Wash, sanitize and rinse.

Bok Choy	
Packaging	12 Bunches – 1 $\frac{1}{9}$ bushel box, with bag liner
Harvesting & Grading	Cut roots off below crop. There should be no spotting, discoloration or wilting on stems. Damaged or yellow leaves should be removed. Cut open several heads to ensure there is no tip burn on internal leaves.
Cooling	Hydro-cool promptly, store at 32° F.
Cleaning	Wash with sanitizer in water tank, rinse, and drain upside down.

Broccoli (Broccolini)	
Packaging	18# case – 1 $\frac{1}{9}$ bushel box, with bag liner
Harvesting & Grading	Harvest firm head with buds not open. Head should be 4-6" in diameter, with 6-8" of stem. For Broccolini, stems should be 8" long and head should be small. There should be no discoloration of bud clusters and the head should be free from decay, dirt and insects. Bud clusters should be generally compact. Pack so that stem ends do not damage crowns.
Cooling	Hydro-cool promptly, store at 32° F.
Cleaning	Sanitize with approved solution. Rinse thoroughly.

Brussels Sprouts	
Packaging	8# case – ¾ bushel box
Harvesting & Grading	When sprouts are 1-2" in diameter harvest the entire stem with sprouts intact. The sprouts should be well colored, firm and free from soft decay. There should be no dirt, disease, or insects.
Cooling	Store at 32° F.
Cleaning	Washing is not recommended.

Cabbage	
Packaging	25# case – 1⅞ bushel box
Harvesting & Grading	Heads should be uniform in size in each case. Crisp, firm, compact heads should be easy to harvest and should not have loose leaves or be cracked open. At harvest, leave 1 to 2 wrapper leaves, which can have minimal insect damage. Do not ship cabbages that are full of worm excrement. Cut open some cabbage to check for internal problems. Stems should not be longer than ½". Cabbage stands up to heat, so harvest can be done at any time of day.
Cooling	Store at 32° F.
Cleaning	Washing is not recommended.

Cantaloupes and Honeydew Melons	
Packaging	Per # – 1⅞ bushel box
Harvesting & Grading	Melons are harvested based on "slip," or the ease with which they can be detached from the vine. Harvest cantaloupe at half slip, which means part of the stem will detach from the fruit, but part remains. Honeydew melons do not slip and must be cut off. The blossom end must be firm. Handle melons with care and sample the melons for ripeness. Avoid high temperatures and sun when harvesting. Send fruit that are uniform in size.
Cooling	Cool to and store at 40° F, when harvested at half slip. Cool to and store at 36° F when harvested at full slip.
Cleaning	Wipe off fruit in the field with a clean product towel; they can be water washed if necessary.

Cauliflower	
Packaging	18# case – 1 $\frac{1}{9}$ bushel box, with bag liner
Harvesting & Grading	Cauliflower should be white to cream in color and firm and compact, unless otherwise specified. Handle with care as heads bruise easily. Cauliflower should be free of mechanical damage, decay, insects, browning or yellowing which is caused by sun exposure. Heads should be at least 4" in diameter and surrounded by a whirl of trimmed green leaves.
Cooling	Hydro-cool or store at 32° F.
Cleaning	Wash and sanitize with approved solution, and rinse thoroughly if necessary.

Celery	
Packaging	12 Bunches – 1 $\frac{1}{9}$ bushel box, with bag liner
Harvesting & Grading	Cut roots off below the crop. There should be no spotting, discoloration or wilting on stems. Trim leaves and leave no more than 2". Any leaves remaining should not be yellow wilted or decayed. Celery stems should not be less than 7" on average.
Cooling	Hydro-cool promptly; store at 32° F.
Cleaning	Trim before washing. Wash and rinse thoroughly to remove all of the dirt from inside of the crop.

Cucumbers	
Packaging	20# case – $\frac{3}{4}$ bushel box
Harvesting & Grading	Harvest when dry, regardless of temperature. Fruit should be firm, glossy, crisp, and free from injury from sunscald, scarring, mosaic, and other diseases. Fruit is overripe when skin starts to yellow or seeds start to harden. Slicing cucumbers should be at least 6" long. Cucumbers within a case should be uniform in size.
Cooling	Store at 50-54° F.
Cleaning	Can be brush washed; if washing, sanitize and rinse.

Eggplant	
Packaging	20# case – 1 $\frac{1}{9}$ bushel box
Harvesting & Grading	Pick when dry; wear cotton gloves to wipe off field dirt. The flesh must be firm, the calyx must be a fresh green, and the color must be bright. Harvest with clippers and keep the stem short. Be careful not to scratch the fruit.
Cooling	Rapid cooling to 50° F is necessary. Store at 50-54° F.
Cleaning	Wash only if necessary.

Garlic	
Packaging	# – bagged – $\frac{1}{2}$ bushel box
Harvesting & Grading	Should be clean and consistent in color and size. Minimum diameter is 1 $\frac{1}{2}$ ". Garlic is ready to dig when there are 3-5 dry leaves.
Cooling	Cooling is not necessary; long-term storage is at 32° F. To cure, bunch in 10 -12 stems and hang, or lay on a screen, in a warm ventilated environment for 8-10 days.
Cleaning	After curing, remove outer 1 – 2 layers of skin; the stem end should be at least 1" and roots removed.

Green Beans (Yellow & Fillet)	
Packaging	25# – $1\frac{1}{9}$ bushel box, with bag liner
Harvesting & Grading	Do not harvest when wet. Do not pick too young—pods should be well formed and straight. Bulging seeds and fibrous pods are too old and unacceptable. Beans should be free from soft rot and damage and not broken.
Cooling	Put directly into the cooler or hydro-cool. Store at 41 to 46° F.
Cleaning	Washing is not needed if beans are clean. If beans are hydro-cooled they should be drained and as dry as possible.

Head Lettuce	
Packaging	12 Heads – $1\frac{1}{9}$ bushel box with a bag liner
Harvesting & Grading	Lettuce should be fresh, green, and not soft or split, with no leaf decay, spotting, or discoloration. Harvest with a field knife and remove damaged or yellow leaves. Cut above ground and be sure to keep your knife clean. Cut open a couple of heads to ensure there is no tip burn on internal leaves.
Cooling	Hydro-cool and set heads upside down to drip dry or cool as soon as possible after harvest in a cooler at 32° F.
Cleaning	When necessary wash in sanitized water, rinse in clean water.

Kale / Chard	
Packaging	12 Bunches – $\frac{3}{4}$ bushel box, with bag liner
Harvesting & Grading	A bunch is 6-8 stems, rubber banded, with the stems uniform and at least 4" long. Leaves should not be limp, discolored or browning. Do not pick too young or too old.
Cooling	Hydro-cool; store at 32° F.
Cleaning	Wash via hydro-cooling.

Kohlrabi	
Packaging	30# case – 1 $\frac{1}{9}$ bushel box
Harvesting & Grading	Heads should be uniform in size in each case. Only young kohlrabi should be harvested. Succulent and tender leaf stems are a good indicator of youth. Remove leaves and root stem.
Cooling	Store at 32° F.
Cleaning	Wash if necessary; sanitize and rinse if washing.

Leeks	
Packaging	12 Heads – 1 $\frac{1}{9}$ Bushel Box with a bag liner
Harvesting & Grading	Pick leeks that are at least an inch thick, the larger the better. Use a fork to dig, do not pull. Cut the leaves in an inverted V with a scissors or a field knife. They should be firm and smooth and free of blemishes with characteristic white stems and dark green leaves.
Cooling	Store at 32° F.
Cleaning	Peel off the loose dirty skin and spray with hose to remove dirt. Sanitize and rinse.

Loose Greens (Including Baby Spinach)	
Packaging	3# case – $\frac{3}{4}$ bushel box, with bag liner; # bag – produce bag closed loosely with a twist tie, $\frac{1}{2}$ bushel box
Harvesting & Grading	Pick small leaves, nothing over 3" long. Remove all damaged and imperfect leaves as well as foreign material, including insect damage, wilted or holey leaves, grasses and sticks. For all loose greens it is best to harvest them in the morning when it is cool and the sugar content is highest. A field knife should be used to harvest to prevent crushing the stem.
Cooling	Greens should be cooled to 32° F as soon as possible after harvest.
Cleaning	Handle greens carefully: Do not run water directly on greens at high-pressure, as this will damage the leaves. Do not over-pack by smashing greens. Pack loosely in boxes and bags to prevent leaf breakage. Wash and rinse thoroughly. Sanitize with approved solution. Rinse thoroughly. Spin Dry.

Okra	
Packaging	10# case – $\frac{1}{2}$ bushel box
Harvesting & Grading	Pods should be 3 – 5" long, flexible, and bright green. The ridges should be free of blackening and bruising. Okra should be marketed within 36 hours of harvest.
Cooling	Store at 45 – 50° F.
Cleaning	Okra should not be washed.

Onions	
Packaging	# – bagged – ½ bushel box (Fresh Onions); 25# Bag - Cured; 50# Bag - Cured
Harvesting & Grading	Harvest mature bulbs with good firmness and compactness of fleshy scales. They should be free of mechanical damage, insect damage, decay, sunscald or sprouting. Onions should be generally uniform in size in each bag. Medium onions are 2 – 3¼” in diameter and Large onions are 3¼” or greater. Onions for curing should not be picked before the tops begin to dry naturally.
Cooling	Long-term storage is at 32° F. To cure: Field cure onions for 3-5 days without rain, then put in a warm ventilated area at 68 – 86° F.
Cleaning	For fresh onions, wash, sanitize and rinse, and trim off the roots and stem. After curing, trim roots and stems, and brush off before or after storing.

Peas	
Packaging	10# – ½ bushel, with bag liner
Harvesting & Grading	Stems should be green and pod should be uniformly bright green and free from defects. There should not be any broken peas. Snow peas should be 2” or longer and flat. Snap peas should be 2 ½ - 3” long and well-formed but not bulging. Shell peas should be 2 ½ - 3” long, uniform and well-shaped with a fully developed pea. Do not let peas heat up when picking.
Cooling	Put directly into the cooler or hydro-cool; store at 32° F.
Cleaning	Washing is not needed if peas are clean. If peas are hydro-cooled they should be drained and as dry as possible.

Peppers	
Packaging	20# case – 1⅞ bushel box; 10# case – ¾ bushel box; 5# case – ½ bushel box
Harvesting & Grading	Peppers should be free from injury caused by sunscald, decay, or insects; colored peppers should be at least 95% colored. They should be of similar size and variety when packed. Size A will be 2-3 peppers per pound and Size B will be 3-4 peppers per pound. Seconds are peppers that are somewhat misshapen and may have some scarring. Seconds will not have decay or injury from insects. Pick when dry.
Cooling	Hydro-cool, or cool immediately to no lower than 45° F, as they are subject to chilling injuries.
Cleaning	Spray wash, sanitize, and rinse.

Potatoes	
Packaging	25# bags or 50# bags; 20# Case – ¾ bushel box, with bag liner (New Potatoes and Fingerlings)
Harvesting & Grading	Potatoes should be fairly well shaped, free from damage, firm, and fairly clean. Potatoes in a bag or case should be of similar characteristics and the size should be noted on the label. B size potatoes have a diameter of 1½–2¼", Medium potatoes have a diameter of 2¼–3¼", and Large potatoes have a diameter of 3–4¼". Some potatoes should be cut in half to ensure there are no internal defects; these sample potatoes should not be packed. New potatoes are considered to be new when the skins are not well formed and the potato is not mature; this is any time from blossom formation until the vines begin to die back naturally. Washing and packaging should be done with care to ensure there is no damage to the potato due to the fragile skins.
Cooling	Potatoes that are to be kept in long-term storage should be cured for 1 to 2 weeks at 68° F. After curing, the temperature should be lowered gradually until the reaching 45–50° F. By definition, new potatoes are not cured and should be stored immediately at 45–50° F.
Cleaning	Hand wash or brush wash if potato skins are tough enough.

Radishes (Including Daikon)	
Packaging	12 bunches – ¾ bushel box, with bag liner; 1# bagged – ½ bushel box (Daikon)
Harvesting & Grading	Roots should be well formed, crisp and fresh. Roots should be free from defects, and not split. Bunched radishes are 10 to a bunch and held together with a rubber band. Each bunch needs to be generally uniform in size. Fresh eating radishes should only be topped if required on the purchase order. Daikon radishes are always topped.
Cooling	Hydro-cool; store at 32° F.
Cleaning	Barrel wash or spray to clean, sanitize and rinse.

Raspberries and Blackberries	
Packaging	12 Pints - Flat
Harvesting & Grading	Berries should be free of injury from decay and sunscald. They should be uniform in color, firm and not mushy or broken. When picking, the berry must come free easily from the plant and yet be firm and not mushy. There should be no mold or bugs on the berries.
Cooling	Berries should be force air cooled to 34° F as soon as possible after picking. They need to be stored at 32° F.
Cleaning	Raspberries should not be washed.

Rhubarb	
Packaging	10# – ½ bushel
Harvesting & Grading	Pull or cut rhubarb stems at ground level. Trim leaves back to 3" or less from the stem. The stem should be at least 10 inches long.
Cooling	Hydro-cool or cool to 32° F.
Cleaning	Wash, sanitize and rinse.

Root Crops (Beets, Turnips, Carrots, Rutabagas, Parsnips)	
Packaging	20# case – ¾ bushel box; 10# case – ½ bushel box (baby)
Harvesting & Grading	Tops should be well trimmed; the long root should be trimmed to no shorter than ½". Roots should be fairly smooth and free from defects. Each case should be generally uniform in size: • Beets and turnips, not less than 2" in diameter, (1–1½ "for baby beets) • Carrots should be ½–¾" at the shoulder and at least 5" long. Hairy carrots are bitter. • For parsnips the minimum diameter is 1½". • Rutabagas should not be smaller than 3" in diameter.
Cooling	Store at 33–36° F.
Cleaning	Barrel wash or spray to clean, sanitize and rinse. If they will be stored long term, parsnips and rutabagas should not be washed until after storage.

Scallions	
Packaging	24 bunches – ¾ bushel box with bag liner
Harvesting & Grading	Pick scallions before a bulb forms and the onion end is bigger than a pencil. They should be firm, smooth, and free of blemishes. Trim roots and bunch with a rubber band. A bunch is 10-12 scallions. Cut tops so they are uniform and at least 6" long.
Cooling	Store at 32° F.
Cleaning	Peel off the loose dirty skin and spray with hose to remove dirt. Sanitize and rinse.

Shallots	
Packaging	# – bagged – ½ bushel box
Harvesting & Grading	Shallots should be clean and consistent in color and size.
Cooling	Cooling is not necessary; long term storage is at 32° F.
Cleaning	Wipe off shallots with a clean product towel to remove dirt.

Spinach (Full Size)	
Packaging	3# case – ¾ bushel box, with bag liner
Harvesting & Grading	Remove all damaged and imperfect leaves as well as foreign material. These include insect damage, wilted or holey leaves, grasses and sticks. Stems should be no longer than 1" and there should be no coarse stems. Field heat should be removed as quickly as possible.
Cooling	Hydro-cool
Cleaning	Wash and rinse thoroughly. Sanitize with approved solution. Rinse thoroughly. Spin Dry. Pack loosely in boxes and bags to prevent leaf breakage.

Strawberries	
Packaging	6 Quarts – Flat or box; 10#s - Flat
Harvesting & Grading	Berries should be uniformly red in color, firm, flavorful and free of defects and disease. Harvest at fully ripe for best flavor. Leave cap attached. Do not use overripe or underdeveloped berries. They should be free from mold, decay, foreign matter and insects.
Cooling	Cooling should begin no later than an hour after picking; strawberries need to be stored at 32° F.
Cleaning	Strawberries should not be washed.

Summer Squash	
Packaging	20# case – ¾ bushel box; 12# case – ½ bushel box (baby)
Harvesting & Grading	Zucchini, yellow straightneck squash, and crookneck squash should be 5–9" long and not over-ripe. Patty pan squash should be 3–5" in diameter. Baby squash are any summer squash that are 2–4" long. Cut the stems instead of breaking them off; wear clean cotton gloves and handle with care because of the delicate skins. The surface should be shiny, clean, and free of physical injury. Be sure to avoid stem damage when packing boxes. Squash should be uniform in size with in each case.
Cooling	Store at 41–50° F.
Cleaning	If necessary, wipe off squash with a clean product towel.

Sweet Corn	
Packaging	4 Dozen – 1⅓ bushel box
Harvesting & Grading	Harvest early in the day when it is cool. Sweet corn should be uniform in size and well developed, not over or under ripe. Corn should be free from insect damage and decay.
Cooling	Put directly into the cooler or hydro-cool. It is extremely important to not let your corn heat up: The better the corn is cooled the better it holds its sweetness.
Cleaning	Washing is not necessary.

Tomatoes	
Packaging	18# case – Tomato box; 10# Flat – Cherries/Grapes; 12 Pints – Flat – Cherries/Grapes
Harvesting & Grading	Ripeness required varies by buyer. Wholesalers generally want tomatoes that are less ripe: They should be picked when the pink on the blossom end is the size of a dime and shoulders are still pale or green; these will ripen in 3 days at room temperature. Retail customers will want the tomatoes that are ripe and fully red but still firm. Tomatoes should be picked without the stem, unless they are heirlooms, and put in boxes stem end down. Tomatoes should not have splits. Do not pick over-ripe cherry or grape tomatoes as they will split in shipping. Number 1 tomatoes will be of the same variety type, mature (not overripe or soft), clean, well developed, and fairly smooth and well formed. They should be free from decay, freezing injury, sunscald, or damage from any other cause. Seconds, or Number 2s, are similar to Number 1s but may be misshapen or slightly damaged. They may be slightly damaged by sunscald, but not seriously damaged by causes other than decay and freezing.
Cooling	Store at 66–70° F.
Cleaning	If necessary, wipe off tomatoes with a clean product towel.

Watermelon	
Packaging	Per # – 1⅓ bushel box or mesh bags; crates may be used for large orders
Harvesting & Grading	Sample melons for ripeness. Handle melons with care.
Cooling	Cool to and store at 50–59° F.
Cleaning	Wipe off in field with a clean product towel; melons can be water washed if necessary.

Winter Squash	
Packaging	35# case – 1⅓ bushel box; crates may be used for bulk orders
Harvesting & Grading	Cut squash with pruners and leave a short stem. Flesh should be bright yellow or orange, with a fine moist texture. Package to ensure stems do not bruise other squash. Squash can be sold immediately without curing, but should be cured for long storage.
Cooling	Cooling is not necessary. To cure, place in warm ventilated dry area, in temperatures from 85 to 95° F for 8 to 10 days. Store at 50 to 55° F.
Cleaning	Wash, or wipe off with clean product towel, at time of shipment.

Eggs

GROWN Locally producers must follow all federal licensing rules and regulations for eggs and meat. All hens must be free range, and all egg producers must be licensed egg handlers.

Meat and Poultry

Meat and poultry must be processed at a USDA-inspected facility; products must be stored and kept frozen until delivery. Meat and poultry producers must have a Warehouse License.

Q. Sample Tracking Log

This is a template for a tracking log that can trace any product from its purchase order back to the field from which it was harvested.

[illegible]

VI. Mock Recall

The GROWN Locally manual did not address recall situations, but they are a major concern, even for small growers.

Although a majority of the news headlines about food safety recalls involve large companies, millions of products and potentially high numbers of illnesses, small farmers need to be prepared for a recall situation. It's a good idea to complete a mock recall every year to test the plan you have in place.

Recalls are voluntary procedures conducted to identify and recover potentially adulterated, misbranded and/or hazardous foods from trade and/or consumer channels effectively. A mock recall is a simulated recall exercise with a time limit to complete the entire exercise (i.e. 2 hours).

The following checklist for a mock recall is from Audrey Kreske, North Carolina State Extension food safety associate (<http://gapsmallfarmsnc.wordpress.com/2011/08/19/you-want-me-to-call-my-buyer-and-say-what-mock-recall/>)

1. Be sure names and phone numbers of customers who need to be contacted are available and current. *For farmers with only one CSA program, you should know their main contact and a back-up for them.
2. Be sure of names and phone numbers of media representatives, proper authorities (Food and Drug Administration, state department of agriculture, etc.), and legal council.
3. Identify the problem and assess the health risks.
4. Determine the products and lot numbers involved.
5. Determine quantities involved.
6. Determine current inventory on the premises.
7. Determine the amount of product in the marketplace.
8. Identify the customers who have received the product.
9. Collect pertinent documentation regarding the affected product. *Inputs and outputs of affected field, notes on unusual events (flooding, wildlife activity, etc).
10. Determine the percent effectiveness of the mock recall.

The total amount of suspect product must equal the sum of the product shipped and the amount still in inventory.

$$\frac{B + C + D}{A} \times 100 = \% \text{ Effectiveness}$$

A – total amount of product produced

B – Amount still on inventory

C – Amount delivered to customers

D – Incidental usage (product dropped on ground, etc.)

11. Outline the shortcomings in our recall plan and what corrective actions will be taken.
*For example, taking longer than 2 hours and not being able to account for 100% of the product.
*Testing these programs is the best way to ensure their effectiveness and to best ensure preparedness for an actual recall.

VII. Resources

- Produce Fact Sheets, UC Davis: <http://postharvest.ucdavis.edu/producefacts/>
- Temperature Logs, ISU Extension: <http://www.extension.iastate.edu/HRIM/HACCP/restaurantsflowoffood.htm>
- *Wholesale Success*, FamilyFarmed.org: <http://www.familyfarmed.org/wholesale-success/>
- Insurance resources, North Carolina State: <http://ncsu.edu/enterprises/ncfreshproducesafety>
- Mock third-party GAP audit, North Carolina State: <http://plantsforhumanhealth.ncsu.edu/extension/marketready/ncfreshproducesafety/mock-third-party-audit-for-GAPs-certification.php>
- *Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables*, Food and Drug Administration: <http://www.fda.gov/downloads/Food/GuidanceComplianceRegulatoryInformation/GuidanceDocuments/ProduceandPlanProducts/UCM169112.pdf>
- “Safe Food Is YOUR Job—Health and Hygiene Tips for Food Handlers,” ISU Extension PM 1419: <http://www.extension.iastate.edu/Publications/PM1419.pdf>
- “What Producers Should Know About Selling to Local Foodservice Markets,” ISU Extension PM 2045: <http://www.extension.iastate.edu/Publications/PM2045.pdf>
- “On-farm Food Safety: Cleaning and Sanitizing Guide,” ISU Extension PM 1974C: <http://www.extension.iastate.edu/publications/PM1974C.pdf>
- Opening Markets: Blog about North Carolina State Extension Food Safety Project <http://gapsmallfarmsonc.wordpress.com>
- “You want me to call my buyer and say what? Mock Recall,” Opening Markets, North Carolina State Extension, <http://gapsmallfarmsonc.wordpress.com/2011/08/19/you-want-me-to-call-my-buyer-and-say-what-mock-recall/>