USDA Agricultural Marketing Service
U.S. DEPARTMENT OF AGRICULTURE

Data Guidelines for Produce Markets in Regional Food Systems

Project Report

USDA AMS Cooperative Agreement

22-TMMSD-ME-0002

March 2024

Project Goal

Develop a voluntary data framework and guidelines linking naming conventions, pack size, traceability, and key attributes for local and regional fruits and vegetables.

Overview

The goal of the Data Guidelines for Produce Markets in Regional Food Systems project is to provide tools and resources to increase the consistency of naming and data conventions for produce across the local foods sector and promote use of more standardized pack sizes. We achieved this goal through a collaborative effort to identify a "voluntary consensus data standard" for fresh fruits and vegetables, that leverages existing naming conventions, pack sizes, and product attributes definitions. While robust global traceability standards exist and many institutions have created wholesale packing guides, information at the local and regional level remains inconsistent and initiatives are not well integrated across scales. Thus, a systemic approach was needed to evaluate and generate streamlined standards and informational guidelines.

These guidelines will be made available for public use and may be voluntarily integrated into current technology systems for producers, suppliers, and buyers; to reduce barriers to entry to wholesale markets for local and regional producers and food hubs; to allow for more synthesizable data and easier strategic planning across products, producers, and systems; and to provide a framework standard that producers, aggregators, distributors, and buyers can trust.

This work was conducted as part of a cooperative agreement between Wolfe's Neck Creek Center and USDA AMS. The project was guided by IC-FOODS as a key partner, and a diverse group of local and regional food supply chain stakeholders. These stakeholders identified, evaluated, and aggregated existing standards and practices to generate voluntary produce data guidance for practitioners. Specifically, the project steering committee included representatives from food hubs, farms, technical service farm organizations, technology providers, academic institutions, government, national grocery chains, and broadline distributors. Stakeholder collaboration was critical for ensuring that project outputs and guidelines are relevant and useful for regional produce supply chains.

Project Outputs

Stakeholder Process and Refining Objectives

The critical element for this entire process was close collaboration with the steering committee, representing a deliberate and diverse set of perspectives with expertise in regional produce.

Each stakeholder participated in a structured interview process to capture their perspective on current challenges for local and regional produce markets that could potentially be addressed through improvements in information and more standardized data approaches. Each stakeholder also shared the local market resources they had access to regarding information tools, buy/sell sheets, and transactional tools currently in use.

Stated Objectives

- Review current guidance to understand how producers currently determine the naming convention and pack size for their products.
- Understand the advantages and disadvantages of current standards for local and regional producers.
- Develop a voluntary consensus standard using the information collected and evaluated.
- Disseminate the standard and encourage adoption.
- Document the project process, activities, and outputs.

The steering committee participated in monthly group video-meetings to help refine and guide the focus of the research and to ultimately prioritize what specific challenges would be addressed and included in the guidelines and toolkits developed by the project. A one day in-person workshop was then held in the latter half of the project to review and refine a final strategy and set of desired outputs. The workshop was designed to systematically review the data elements to be included in the guidelines and the best way to present the information. This was done via structured discussion reviewing the outlined guidelines and template, and forming consensus on goals, content, and appropriate messaging. Workshop outputs were discussed at the subsequent virtual meeting, seeking input from steering committee members unable to participate in the in-person workshop, and providing space for additional discussion. All virtual and in-person meetings were designed with a combination of structured discussion on specific topics, combined with space for open discussion.

One clarification that emerged as part of the in-person workshop was review and agreement on who the target audience was for the work being done, and--tangentially, how to best reach this community with project outputs. It was agreed that the project would focus first on providing resources to aid smaller producers in becoming "wholesale ready" and able to participate in a broader marketplace. Refining the project focus in this way supports the interconnected goals of expanding the volume of local produce and the ease of accessibility to regional products for institutional buyers, and increasing transparency around where food sold through institutions comes from by improving end-user access to product information. The primary markets considered in this refinement were schools and universities, hospitals, independent grocers, and other institutional buyers. As such, the guidelines were targeted for use by not only small producers, but also food hubs, food hub networks, marketing coops, online marketplaces, and other local/regional partners. Adoption of the data guidelines by these types of entities can improve local-scale market information exchange and simplify key partners' internal operations and interactions with small growers, potentially improving accessibility to product offerings for institutional purchasers and the broader marketplace.

Assessment and Analysis

The assessment of existing resources took a multi-pronged approach, including:

1. Formal academic literature review
2. Review of published industry standards
3. Review of USDA market and other public data resources
4. Review of various sources for local & regional market information
5. Extensive stakeholder interviews.

A bibliography of the published resources that were reviewed is included as an appendix.

Key Findings

The role of academia and available literature on this topic was surprisingly light. For example, there was recent literature on the role of blockchain and impact of GS1 standards on the industry, but we were unable to find a very large body of discussion within academia about data standards in relation to local and regional produce markets or any real reference to developing or expanding standards.

The efforts to develop produce data infrastructure has been almost entirely industry-led. In particular: a large consortium led by the Produce Marketing Association developed an extensive set of data standards and guidelines that was released in 2013, the "Implementation Guide for Fresh Produce Data Standards and Synchronization". This work was a key building block for data management and electronic data exchange that underpins current transactional systems and also subsequent initiatives managed as part of GS1 data standards provisioning and also the multi-partner Produce Traceability Initiative. All are providing standardized approaches for improving data standards plus tools, formal registries, and other resources to better digitize the marketplace and enable traceability and transparency. At the macro-scale, the produce industry's product information has been largely standardized and there is a bevy of technical tools in use and constantly being improved.

Conversely, the challenge this project was designed to address was that data management practices, tools, and resources in use at larger scales are largely disconnected from market activities at the local and regional scales. After reviewing existing standards, above, there was consensus that this work did not need to develop new data "standards", so much, as to put together a set of guidelines and informational frameworks to aid function at the small scale – while also providing a bridge to enable digitization and connectivity with larger scales over time.

For example: An initial goal/frustration leading to this project effort looked at the variability of pack sizes and variability of naming conventions for similar products at the local scale – and the current difficulty, if not impossibility, of comparing pricing information or estimating market volumes. The solution that evolved was not to try and standardize each element, but to provide tools to improve how information is collected and shared to enable better analyses and comparisons.

Why the disconnect, and why this solution? Through the assessment process, three key dimensions emerged that help explain the scale-related gaps in the adoption of data standards across the supply chain: cost, complexity, and the products, themselves. One, cost: small scale producers and regional partners often operate on thin margins, and may not see value in investing money, or time, in new or sophisticated technologies. Two, complexity: most industry-

led standards were developed around long/multi-partner commercial supply chains, and much of the technology developed to manage these supply chains is both expensive and more complicated than is needed by partners in shorter/simpler local and regional supply chains. Three, products: Small scale products and producers do not have product uniformity or volumes that are readily comparable or easily integrated into current larger industry product and data models.

Solution: From extensive review of the materials noted above, iterative consultation with stakeholders, and regular working meetings with the steering committee, the project team prioritized a set of market challenges and information to be included in the data guidelines. Specifically, the team determined that standardizing a format for product names, traceability guidelines, and data associated with pack sizes is both useful and feasible, but standardizing parameters for product-specific pack sizes (an initial desire) would not be feasible due to myriad specialized requirements from buyers.

Our goal is to **acknowledge different scale-related needs**, and not seek to change the local-scale products themselves – but to **enable more complete information about these differences to be easily represented and compared in transactional systems.** The resulting data guidelines, and their importance to improving the consistency of regional food systems market data, are described in the following section.

Data Guidelines

To work towards consistency of market data in regional food systems these guidelines provide a system for organizing individual product data. The guidelines include standardized formats for information most relevant for local scale market transactions including: 1) product naming and attributes, 2) unit of measure, and 3) transaction and traceability information. They are designed to provide a system for small producers, food hubs, food hub networks, marketing coops, online marketplaces, and other local/regional partners to organize individual product data with a goal to simplify and reduce transaction costs and to work towards more consistent regional market data.

The guidelines were developed through a collaborative effort of growers, aggregators, and buyers that leverages existing traceability standards, naming conventions, pack sizes, and product attributes definitions in a manner appropriate for local and regional production systems.

Using the Data Guidelines

The guidelines described below are designed to be used in a spreadsheet format. A template spreadsheet and detailed instructions for use are provided on the project website. These materials can be used to maintain business records and generate invoices.

They will also allow aggregators and other entities working with multiple producers to easily combine information across businesses and provide bigger picture analytics to relevant stakeholders.

Product Naming & Attributes Guidelines

The data guidelines begin with product naming and attributes. The most essential element of product naming guidelines is the **order** in which elements of the product name are organized. As such, product name information should begin with the main commodity category (tomatoes, apples, leafy greens), followed by the product variety (Roma, Aurora, Mustard greens) and then the grade. Standardizing the order of product names is essential to making data easily transferable across businesses, and substantially reduces the amount of data cleaning required to aggregate and analyze data from multiple sources. If consistent ordering is adopted across regional food system businesses it will simplify data management for food hubs and other local and regional food aggregators while also making it for easier for individual producers to interface with existing grocery, food service, and other wholesale purchasing systems.

Next, any relevant agricultural practices or certifications may be noted. Agricultural practices and certifications may include items such as vine-ripened, hot house grown, USDA Organic, Minority-owned business, state or regional certifications, or environmental certifications. In recent years certifications acknowledging various business and production practices have proliferated, yet they are recorded inconsistently and are not always visible on invoices or purchase orders (eg: buried in notes fields). The guidelines aim to resolve inconsistencies in tracking agricultural practices and certifications via the inclusion of a dedicated field for recording agricultural practices and certifications. Consistent inclusion of agricultural practices and certification data will give purchasers better tools for finding production attributes they are seeking and enable producers to get rewarded for these practices within a broader market space.

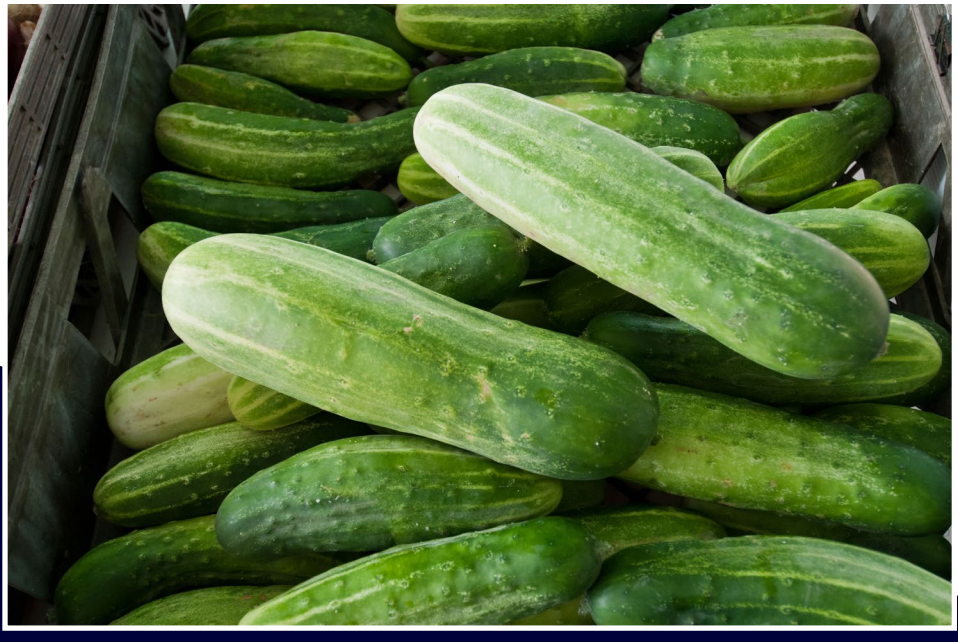
Notably, the practices and certifications field is not intended to capture whether or not a product is considered "local". Given significant variation in definitions and requirements for local product across businesses and purchasing programs, these data guidelines include robust production location information with the aim of allowing buyers to determine on a case-by-case basis if a product meets their definition of local. Location information is included in the product traceability profile section of the data guidelines and includes information on the physical location products were grown.

Finally, to further identify specific products the user may decide to include product codes such as PLUs, GS1 brick codes, or an internal code created by the seller.

Unit of Measure (UoM) Guidelines

The Unit of Measure, or UoM, is a familiar concept for produce markets. However, in local markets, there is tremendous variability in count, weight, and packing containers that makes product comparisons and aggregation difficult. This variability also makes it challenging for local and regional producers to integrate with mainstream purchasing systems because purchasers lack sufficient information to guarantee that the product meets client needs. For example, kale and other leafy greens may be sold in bunches, or loose in a bag or case. If a food hub or school food buyer are trying to source 100 pounds of kale, this variation in unit of measure can make it difficult for these buyers to know how many units to order. Further, variability in UoM information makes market analysis challenging, as sector level prices per unit are almost impossible to pin down. This stands in contrast to mainstream produce markets where sector level pricing information is available for most commodities.

In the absence of uniformity for local and specialty products, the strategy of the data guidelines is to provide complete data on **all four fields** for UoM rather than just one or two: count, unit, weight, and case size. While a departure from typical UoM record keeping, providing four data points allows distributors and buyers a complete picture of the variation they might expect in a product, and instills greater confidence that the product will meet their need and expectation. Further adapting those entries to account for variability by providing a range or estimate (e.g. 10-12 oz, 50-60 count) gives even greater insight into the product characteristics and allows for better comparison of products across market channels.



Transaction and Traceability Guidelines

Product traceability can be challenging in the global marketplace, but it is essential for meeting modern food safety standards. Efforts such as the Produce Traceability Initiative have made huge strides in the development of standards and processes at a large commercial scale, whereas processes and norms are traceability in local and regional food systems are still nascent. Establishing robust traceability systems is essential to risk mitigation for all businesses that handle food products and, by extension, an important area of development in local and regional food systems. To support development of standard traceability practices the project collaborative distilled the most fundamental aspects of traceability practices utilized in mainstream supply chains and adapted them for relevance to local food system stakeholders. The fundamentals of traceability fall into two categories 1) information about the market transaction and 2) specific product traceability.

Information about the market transaction is created and included on an invoice at the time of sale by the product seller, which may be either a farmer/producer or hub/consolidator. Information about the market transaction includes: an invoice ID, quantity of product being sold, price per unit, and the total price for the quantity of each product being sold.

In addition to basic market transaction information, traceability information must be captured for each product. For traceability purposes the user must include the name of the producer/farm, the physical address where the product was produced, the county of production, and product lot codes. Lot codes are particularly important to traceability. Specifically, in the event of a product recall, lot codes allow

producers and food hubs to home in on the exact product units that need to be recalled. For example, if a farmer who utilizes lot codes produces lettuce in 3 different fields and lettuce from one field must be recalled the producer or distributing hub will only have to recall product from the effected field, rather than all lettuce from that farm. In contrast a producer who does not use lot codes would have to recall all lettuce, thus incurring losses beyond what is necessary to ensure food safety.

In addition, the inclusion of county information alongside the production address is intended to make it easier for local food purchasing programs to determine if product meets their definition of local without having to manually search addresses to determine production location.

Users may also choose to include a Supplier ID, or Digital ID, to identify the producer or business selling the product. Supplier IDs are unique identifiers that maintain visibility of the supplier's identity at every step of the supply chain. They are often utilized by aggregators or re-sellers to ensure traceability back to the point of production. Thus, a food hub may want to issue Digital IDs to contributing farms, as this information is then included in any Lot codes for products they repack.

A specific example of a Supplier Digital ID is GS1's global registry for individual businesses, and directory of location identifiers (Global Location Number or GLN) for each step of the supply chain to simplify traceability of product movement. GLN's can be issued for a business/entity, or location such as an address, a building, or even a specific bin or cooling room in a warehouse.

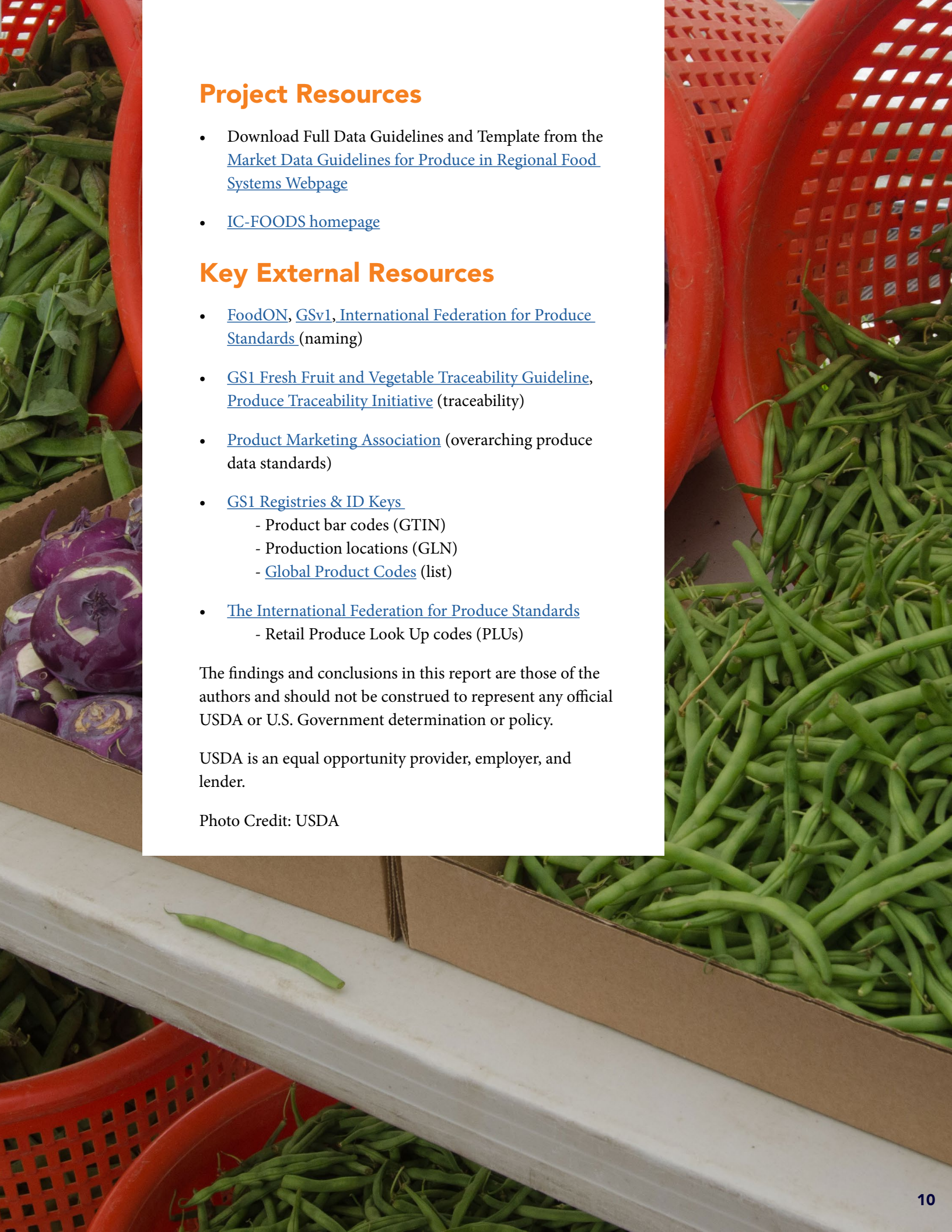
Conclusion

The goal of the Market Data Guidelines for Produce in Regional Food Systems effort is to increase the consistency of produce market data across the local foods sector and promote use of more standardized naming conventions and pack sizes. Food hubs, food hub networks, marketing coops, and other local/regional partners who adopt the data structures and informational approach will simplify and improve both their internal operations and interactions with small growers. At the same time, they will improve their wholesale readiness, and can expand market accessibility to their collective product offerings, especially for institutional purchasers.

Potential benefits of more consistent information for local food systems include:

- Better information for product comparisons and pricing
- Improved ability to access wholesale and institutional markets, such as grocery stores, or USDA-supported commodity purchasing programs through increased visibility of product characteristics and buyer confidence in product specifications.
- Reduction in transaction costs for collaboration between regional entities such as food hubs and coops
- Easier identification as a "local" product

The benefits above support the interconnected goals of expanding the volume of local produce and the ease of accessibility to regional products for institutional buyers. Simultaneously the data guidelines will help increase transparency around where food sold through institutions comes from by improving end-user access to product information. Ultimately these guidelines are a small but important contribution to improving the operational efficacy of entities marketing local and regional foods in mainstream supply chain contexts.



Project Resources

- Download Full Data Guidelines and Template from the Market Data Guidelines for Produce in Regional Food Systems Webpage
- IC-FOODS homepage

Key External Resources

- FoodON, GSv1, International Federation for Produce Standards (naming)
- GS1 Fresh Fruit and Vegetable Traceability Guideline, Produce Traceability Initiative (traceability)
- Product Marketing Association (overarching produce data standards)
- GS1 Registries & ID Keys
  - Product bar codes (GTIN)
  - Production locations (GLN)
  - Global Product Codes (list)
- The International Federation for Produce Standards
  - Retail Produce Look Up codes (PLUs)

The findings and conclusions in this report are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

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A full list of the sources reviewed is available here.