Chapter 13
Marketing Sweetpotatoes in the United States: A Serious Challenge for Small-to-Moderate Volume Growers

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Introduction

Historically, U.S. sweetpotato marketing efforts have focused primarily on the holiday seasons of Thanksgiving and Christmas and the intervening weeks. Typically, November and December sweetpotato sales are nearly 1/3 of total annual sales, a figure that far exceeds the period's normal expected sales rate of 17% (Lucier, 2008). While sweetpotatoes remain a popular holiday food for Americans, most consumers have grown accustomed to year-round availability of fruits and vegetables so recent marketing efforts have stressed the year-round availability of nutritious, healthy, high beta-carotene sweetpotatoes. Year-round availability of sweetpotatoes became common about 20 years ago when growers and shippers built environmentally controlled storage facilities, adopted improved curing and storage technologies, and minimized major pest and disease problems in stored sweetpotatoes. Industry leaders believe that advertising and promotional efforts, which stress nutrition, health, and processed uses, have helped to stabilize the decline in per capita sweetpotato consumption. Sweetpotatoes have become a more regularly consumed year-round vegetable in Southern U.S. households (Johnson-Langdon, 2008). For generations, Southern households have served sweetpotatoes in a variety of ways including baked, candied, and marshmallow-topped. With the notable exception of California, most sweetpotatoes are grown and consumed in the U.S. South. The top producers of sweetpotatoes are growers located in North Carolina (38% of U.S. annual production), in California (23%), in Mississippi (19%), and in Louisiana (16%) (Lucier, 2008). Thus, growers located in the remaining states collectively supply less than 4% of the average domestic crop (Table 13.1). Government survey data from 2002 indicated that 35% of the U.S. population lives in the South but Southern households consumed 42% of all fresh-market sweetpotatoes shipped and ate 54% of all processed sweetpotatoes sold nationally. According to US Census of Agriculture data, approximately 2,375 farms, located in nine states,

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Table 13.1 Top 5 states in US in Sweetpotato production, 2007

State	Area harvested (hectares)	Yield (kg)	Price (kg)	Production (million kg)
North Carolina	17,402	7,484	$45.98	3,218.2
California	5,382	14,515	$41.80	1,930.4
Mississippi	8,094	7,938	$42.46	1,587.6
Louisiana	6,070	8,845	$44.66	1,326.8
Alabama	971	5,443	$70.18	130.6
Other states	1,538	5,126	$43.45	175.9
Total U.S.	39,457	8,573	$44.66	8,369.5

grew and sold a commercial crop of sweetpotatoes in 2002 (Census of Agriculture 2007). Since 2002, the sweetpotato industry has expanded total output despite a decline in the number of U.S. farms earning income from sweetpotato production. In the U.S., 2007 United States Department of Agriculture (USDA) data suggested that the number of sweetpotato farm operations had declined slightly, U.S. planted acreage was up 18%, yield per hectare was up 21%, and total national output had increased 44% when compared with 2002 data (Lucier, 2008).

Cursory analysis of marketing and price trends over the past two decades suggests that U.S. demand for sweetpotatoes has increased modestly, despite little gains in per capita consumption levels. This is in contrast to most fruit and vegetable commodities that, on average, have increased about 15% since 1987 (Lucier and Jerardo, 2007). Recent USDA data indicated that U.S. sweetpotato output increased about 42% (2% annually) over the past two decades while per capita usage (consumption) has remained flat around 2 kilograms (kg) per person (Lucier, 2008; Lucier and Plummer, 2002). While stabilization of sweetpotato per capita consumption might signify industry underachievement and be a source of concern for grower-shippers, consumption stabilization has reversed a longer-term decline in consumption that began in the early 1920s when U.S. sweetpotato consumption peaked around 13.6 kg per person. In 1965, U.S. sweetpotato per capita consumption had declined to 2.7 kg per person, or roughly 20% of its 1920s level. For 2008, USDA anticipates that annual sweetpotato consumption will be about 2.36 kg per person, a figure that is still below the 1965 level but greater than the 2006 value of 2.09 kg per person (Lucier, 2008). Long-term U.S. marketing prospects for sweetpotatoes depend primarily on new and expanded uses for value added sweetpotatoes as well as modest improvements in per capita consumption of fresh market sweetpotatoes (Bliss, 2008).

While long-run consumption patterns suggest that fewer Americans eat sweetpotatoes, recent production and marketing uses offer a more positive view of the U.S. industry. National sweetpotato output has increased 38% over the past decade (1997–2007) and U.S. season average shipping-point prices also have increased, on average, about $1.10 per 100 kg over the past decade. For the July 1, 2006-June 30, 2007 marketing year, USDA estimated that the U.S. average free-on-board (FOB) shipping-point price was about $44.50 per 100 kg, or nearly 33% higher than the July 1996-June 1997 shipping-point price (Lucier, 2008). In general, for seven of the most recent ten marketing years, year-to-year comparisons

of season average shipping-point prices revealed that price increased relative to the previous year's price (Lucier, 2008). Thus, significant increases in U.S. output and shipping point prices suggested that sweetpotato growers realized demand-expansion over the past decade despite very little growth in per capita consumption levels. It is likely that a number of factors have impacted demand such as industry-wide promotional efforts to stress the nutritional and health benefits of eating sweetpotatoes along with innovative firms stressing value-added concepts such as fries and chips with buyers. It is anticipated that plantings will continue to increase modestly in 2009 and the near-term future as value-added demand appears strong. Increased availability of sweetpotatoes in restaurants and in processed forms would result in small-to-moderate gains in per capita consumption and result in strengthened sweetpotato demand across all regions of the U.S, especially the South.

Declining demand and flat per capita consumption was an industry-wide concern in the 1950s. Consumption continued its downward trend during the 1960s and 1970s and industry reaction was the creation of state-wide Sweetpotato Commissions in the major producing states (North Carolina Sweetpotato Commission, California Sweetpotato Commission, Louisiana Sweetpotato Commission, and the Mississippi Sweetpotato Commission) as well as establishment of the U.S. Sweetpotato Commission currently located in Columbia, South Carolina (Johnson-Langdon, 2008; Estes, 2006). The main goals of the national and state commissions were to promote and advertise the benefits of sweetpotato consumption. In this way, Commission members (often current sweetpotato growers and shippers) hoped to increase sweetpotato sales, expand market outlets, increase in-store shelf space, educate consumers about the nutritional benefits of eating sweetpotatoes, and expand foreign marketing opportunities. Secondary goals of state Commissions also included collecting assessment fees that enabled them to fund sweetpotato research at land grant universities. Commissions often represented growers, shippers, handlers, and processors in dealing with a variety of state and federal regulators, legislative policy makers, and the media. Since 2000, state commission promotional efforts have focused on the overall health benefits and nutritive value obtained from including sweetpotatoes with at-home dinners beyond the holiday season.

Americans often have a choice of purchasing one or two basic types of sweetpotatoes: (1) moist, orange-flesh varieties that are often marketed incorrectly as "yams" (*Dioscorea spp*.) but are in fact sweetpotatoes (*Ipomoea batatas*); and (2) dry white-flesh or yellow-flesh varieties that have a firmer flesh and are often grown in more Northern U.S. climates (AgMRC, 2008). Dry-flesh types were grown first in the U.S. and then moist, orange flesh varieties became widely available in the 1960s. Many growers, shippers, and distributors switched to moist-flesh types and wanted to differentiate them from the drier, traditional varieties so new growers decided to market the new, moist-flesh types as "yams". Today, many Americans still believe that yams and sweetpotatoes are exactly the same. Of course, yams are a tropical crop not grown in the mainland U.S. and are unrelated botanically to sweetpotatoes. To eliminate consumer confusion, current USDA regulations require that any sweetpotatoes marketed as "yams" can be sold in the U.S. only if the seller

also identifies and labels the shipping container with the "sweetpotato" name also displayed (Estes, 2006).

Basic Global Trends

Although the primary focus of this chapter is on U.S. sweetpotato marketing, it is useful to review how the U.S. sweetpotato industry fits into the global sweetpotato production and marketing system. Sweetpotatoes likely were first grown about 5,000 years ago near Central America, perhaps in the West Indies islands off the coast of Mexico (AgMRC, 2008). Today, sweetpotatoes are grown broadly throughout the world and often are raised as a cheap substitute for corn and rice in diets. In contrast, for American consumers, sweetpotatoes are a holiday starch consumed regularly only in the Southern region of the U.S. For developing economies, sweetpotatoes rank as the fifth most important food crop on a fresh-weight basis ranking only behind rice, wheat, corn (maize), and cassava (Scott, 2001). In 2006, the U.S. ranked 12th in world sweetpotato production at about 800,000 metric tons for all uses (Lucier, 2008). For Americans, sweetpotatoes rank 12th in vegetable consumption and are not among the broad spectrum of foods that consumers eat regularly. Asian and African nations often are among the largest sweetpotato producers, with China ranked first, Nigeria ranked second, and Uganda ranked third in world production (Scott, et al., 2000; Lucier, 2008). However, it should be noted that these statistics likely understate output since in many parts of Asia and Africa food is often in short supply so many small-volume farmers raise sweetpotatoes for family home consumption. Therefore, it is likely that in many poorer parts of Africa and Asia local production has expanded since 2000 despite overall reductions in world output. In contrast, since 2000, it is evident that fewer sweetpotatoes are grown and consumed as food in China and Indonesia. Sweetpotato plantings in China have declined, in part, as human consumption declined but animal feed use expanded. Worldwide, yield per hectare has leveled off after increasing steadily during the 1990s as improved varieties became available and pest pressures moderated. China is the world's dominant sweetpotato producer accounting for 81% of global production annually (Anonymous, 1997; Lucier, 2008). In China, nearly 20.6 billion kg of dried sweetpotatoes are used each year to feed swine and other livestock (AgMRC, 2008). U.S. growers supply approximately 3.8% of the world's output (800 million kg of sweetpotatoes). In the U.S. expanded uses for sweetpotato are being investigated as part of University research projects because the high-starch content of sweetpotatoes can be increased through breeding and high-starch sweetpotatoes would be useful as an industrial product (for example, flour and pectin) or they could be used as a biofuel (ethanol). At North Carolina State University, a major research effort is underway led by Dr. Craig Yencho to determine the feasibility and sustainability of producing a sweetpotato-based biofuel (Estes, 2006).

In the U.S., sweetpotatoes are primarily consumed as food although in cattle and pork regions of the Midwest some farmers crush sweetpotatoes and then feed

them to their livestock. The bulk of the U.S. crop (80%) is sold for fresh market consumption (retail, foodservice, and exports) while processed sweetpotatoes account for the remaining 20% (canned, baby food, chips, and frozen) of sales (Gonzalez, 2008). U.S. distributors imported about 6,350,300 kg (about 2.9% of supplies) in 2007 but at the same time U.S. firms exported nearly 6% of available supplies. Most exports (90% of 2007 export volume) were sold to firms located in Canada or England (Lucier, 2008; Gonzalez, 2008).

U.S. sweetpotato yield per hectare can vary greatly. Among the four major producing states (North Carolina, Mississippi, California, and Louisiana), yield per hectare averages about 22,408 kg/ha except in California where growers expect to average 33,612 kg, or about 50% more/ha than the rest of the U.S. (Johnson-Langdon 2008; May and Scheuerman, 1998). It is unclear why California growers average much higher yields but nearly ideal growing conditions and superior crop management skills likely contribute to above average yields (Lucier, 2008). Sweetpotato yield is more variable among growers located in the non-major producing states. During the past decade, sweetpotato yield per hectare in other states that report sweetpotato yield estimates ranged from a low of 5,041 kg/ha in Texas (in 1998 and 2000) to 21,286 kg/ha in Alabama (2003) and Virginia (1999).

In North Carolina, the largest volume state in the U.S., the 2006–2007 sweetpotato output exceeded 204 million kg Approximately 81% of North Carolina's 2006–2007 crop was sold to fresh market outlets including food service operators, retail grocers, and or export markets, a proportion very similar to the national market breakdown (Fig. 13.1). In addition, nearly 39 million kg of North Carolina sweetpotatoes were processed, mostly by canneries. Combined frozen and chip utilized

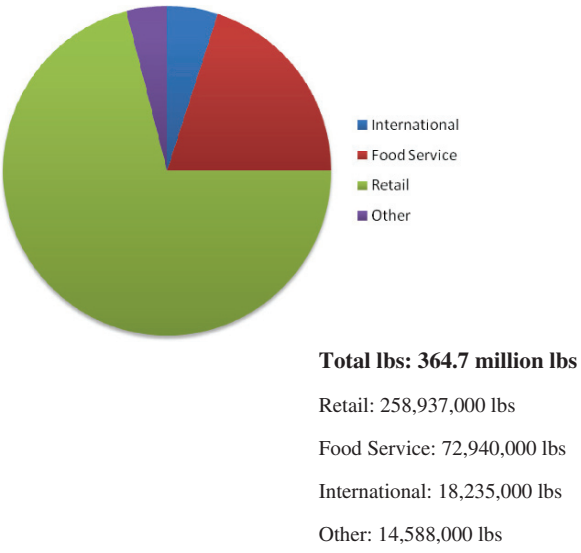

Fig. 13.1 2006 Fresh market breakdown for North Carolina SweetPotato Sales

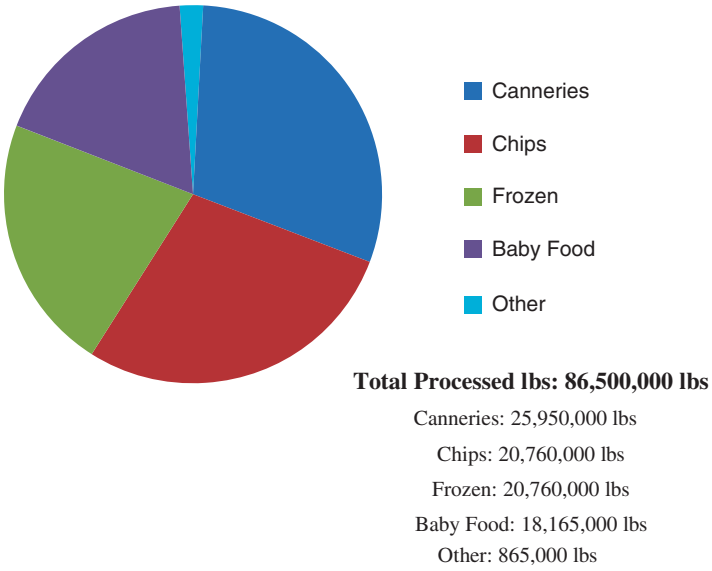

Fig. 13.2 2006 breakdown of total Ibs processed for North Carolina Sweetpotatoes

approximately 48% (18.7 million kg) of the processing crop (Fig. 13.2). Finally, baby food processors used 8 million kg, or about 21% of the processed sweetpotatoes (Gonzalez, 2008).

U.S. Utilization Patterns

Since 2005, American growers have produced, on average, 805 million kg of sweetpotatoes per year (Lucier], 2008). Growers obtained this output from 36,826 ha harvested. Farm receipts between 2005 and 2007 were, on average, in excess of $350 million each year. In the major U.S. production areas, sweetpotato plants are set in fields during April and May. The crop reaches maturity in 105–130 days, depending on the variety planted, the soil temperatures, and the environmental conditions (see Plates 13.1 and 13.2). Typically, harvesting occurs in major production areas between late August and mid-November. Some sweetpotatoes are marketed as "green" (that is, uncured) sweetpotatoes and are sold immediately after harvest. However, the vast majority (perhaps 90%) of the U.S. crop is 'cured', that is, heated to nearly 30 °C in an enclosed, high humidity (90%) room for 4–8 days, and then the temperature is lowered to 12.8 °C (May and Scheuerman, 1998). Curing sweetpotatoes allows the skin to harden thus preventing the entrance of decay organisms. After curing, sweetpotatoes are placed in an environmentally-controlled facility held at 15.6 °C and stored in bulk bins until they are sold. Bulk bins contain between 227 kg and 431 kg of sweetpotatoes, depending on the grower-shipper preference, the buyer preference, and the amount of storage space available. At packing time, sweetpota-

Plate 13.1 Sweetpotato grading and packing line located at grower-shipper packing shed in Columbus County, North Carolina (See also Plate 10 on page xxii)

Plate 13.2 Commercial grower-shipper bulk bin storage room equipped with environmental management controls, Nash County, North Carolina (See also Plate 11 on page xxii)

toes are dumped into a water tank to be washed, cleaned, disinfected, and then dried via a heater. Three market grades are recognized by packer-shippers: 1) U.S. #1's; 2) U.S. #2's; and 3) jumbos and canners grade. Grades are differentiated by differences in weight, maximum and minimum diameter, and shape. The highest prices paid by buyers for fresh market are for US #1's, the next highest price paid is for jumbos, and finally the lowest fresh market price paid is for US # 2's. For processing uses, buyers often pay the lowest price for canner grade sweetpotatoes. Contract and spot market prices range between $6.60 and $8.80 per 100 kg Fresh market sweetpotatoes are graded and placed in 18 kg shipping cartons for market distribution. In contrast, canners and processing uses are sold in bulk bins weighing between 227 kg and 450 kg When transporting sweetpotatoes, distributors must recognize that sweetpotatoes are sensitive to both ethylene and chilling injury. Therefore, sweetpotatoes should never be shipped together with ethylene-producing produce or ripening fruit such as apples or melons. In addition, transport temperature should remain between 12 °C and 13 °C rather than the common produce transport temperature of 2.2 °C.

Shipper-handlers try to minimize the number of times that sweetpotatoes are moved or handled in order to minimize skin damage. Sweetpotatoes lose about 2% of their weight per month in storage so proper storage conditions must be maintained in order to minimize shrinkage and losses. Under ideal conditions, shipper-dealers can hold cured sweetpotatoes for 6 to 9 months without any significant impact on marketability if high-quality sweetpotatoes were placed into storage bins. The risks

associated with storing sweetpotatoes are numerous but common problems include pest infestations, internal rotting, and disease. In addition, there are also significant marketing and price risks associated with storage. For example, analysis of recent Spring (April, May, and June) FOB shipping prices for North Carolina distributors indicated that spring sales prices can be below the previous November's FOB shipping point price. In this circumstance, the shipper has incurred added storage costs (from November till they are sold in the following spring) plus sweetpotatoes lose moisture (i.e., lose weight). Unfortunately for the grower-shipper, however, the average April-May FOB price is occasionally less than the 'uncured', or green price. This is the marketing risk associated with storage. In North Carolina, since 2000 lower April-May prices were observed in 2001, 2003, and 2006. Higher storage (April-May) prices, relative to November, were observed in the remaining years since 2000 (Lucier, 2008; Gonzalez, 2008). This suggests significant price variability and uncertainty for grower-shippers. If they are unwilling to assume this marketing risk, then they simply do not store sweetpotatoes but instead sell their crop immediately to buyers or other shipper-growers who are willing to assume the price and marketing risks. Therefore, both production and price uncertainty contribute to larger shipping volumes and increased sales every November and December despite attempts by state Sweetpotato Commissions to increase and distribute sales more evenly throughout the marketing year. Finally, of course, holiday demand also contributes to increased fall sales remains as growers observe grocers willing to buy sweetpotatoes for customers as soon as the new crop is harvested. It is likely that U.S. shipment volume will remain high during the last quarter of the year simply because of supply, demand, and price uncertainty conditions.

Who Eats Sweetpotatoes in the U.S.?

Relatively little information is available about who eats sweetpotatoes in the U.S. because few marketing surveys are conducted concerning people who eat sweetpotatoes. Instead, surveys tend to focus on heavily consumed vegetables such as tomatoes, sweet corn, and white potatoes. In 2007, U.S. Department of Agriculture (USDA) reported that U.S. consumption exceeded 816.5 million kg, that is, about 2.27 kg per person per year (Lucier and Dettman, 2008) In contrast, Americans eat four times as much fresh market tomatoes, or roughly 9.25 kg per person per year. Relatively few Americans eat sweetpotatoes regularly, with about 1.5% of U.S. residents eating a fresh-market sweetpotato on any given day while fewer people (0.5%) eat processed sweetpotatoes (chips, fries, canned, or patties) daily. For consumption information, data were gleaned from USDA reports; particularly the 1994–1996 -food consumption survey entitled "Continuing Survey of Food Intakes by Individuals" (CSFII 1994–96, 1998). Much of the CSFII information has been summarized in a variety of USDA food publications but sweetpotato consumption was featured in the USDA-ERS publication entitled "Vegetable and Melon Outlook Reports – Sweetpotato Highlights" (Lucier and Jerardo, 2007).

More than any other vegetable purchased, Americans tend to eat sweetpotatoes primarily at home. Sweetpotatoes are consumed at home (89% of total consumption) because relatively few U.S. restaurants offer sweetpotatoes as an option to customers and very few processed forms are available to institutional suppliers. Of course, the popularity of French fries as a starch alternative (1 in 7 U.S. residents eat French fries daily) also hurts away-from-home sweetpotato consumption since people often view potatoes as a substitutable product (Powers, 1994). U.S. sweetpotato consumption also has been hurt by three recent trends in American food consumption: (1) more Americans are eating at away-from-home establishments but many food service suppliers do not offer sweetpotatoes as a vegetable choice; (2) Americans are broadening diets to include spicier foods but this trend does not benefit sweetpotatoes; and (3) U.S. population ethnic diversity has expanded produce choices as many Americans substitute newer or alternative vegetables for more traditional mainstays such as sweetpotatoes (Estes, 2006).

It appears that older men and women are more likely to eat sweetpotatoes than any other age population. Men 60 years and older consume about 16% of all sweetpotatoes but they represent only 7% of the U.S. population, that is, they consume double the U.S. average rate (CSFII 1994–1996, 1998). Older women (over 60 years) also eat a lot of sweetpotatoes, roughly 3.17 kgs per woman, or nearly 50% more than the average American. In general, male and females of all ages tend to eat sweetpotatoes in similar amounts, that is, between 1.9 and 2.0 kg annually. As noted earlier, Southern U.S. residents consumed the most sweetpotatoes at 2.59 kg per person while Western U.S. residents ate the least amount of sweetpotatoes at 1.18 kg per person. Midwest (1.95 kgs) and Northeast (1.77 kg) residents eat moderate levels of sweetpotatoes, with people in both regions consuming only slightly below the U.S. average rate of 2.04 kg per person. African-American consumers tend to eat a lot of sweetpotatoes since they eat 21% of all domestic sweetpotato supplies but represent less than 13% of the U.S. population. Slightly more than 50% of all African-American U.S. citizens live in the South while less than 10% live in Western states. In the South, native populations are accustomed to eating sweetpotatoes with at-home meals so sweetpotatoes remain popular with native Southerners (CSFII, 1994–1996, 1998; US Census of Agriculture, 2007). In general, middle and upper income consumers tend to eat more fresh market sweetpotatoes than their population share so this would imply that lower income residents tend to eat less-than-their proportionate share of fresh market sweetpotatoes. CSFII surveys found that lower income consumers tended to eat more processed forms of sweetpotatoes while upper income consumers favored fresh market sweetpotatoes (bakers).

Marketing Options & Sales Channels for U.S. Sweetpotatoes

The marketing of fruits and vegetables is big business in the U.S. although sweetpotatoes remain a small contributor to overall retail produce sales. Produce analysts (Cook, 2004; Kaufman et al., 2000; Estes, 2006) estimate that combined U.S. retail and foodservice sales for fruits and vegetables will be nearly $100 billion

by the end of 2008 (Kaufman, 2008-personal communication; Estes, 2006). Distribution of sweetpotatoes and other vegetables are changing as the U.S. market matures and disposable income increases. Some consumers may view sweetpotatoes as a low-income vegetable similar to cabbage. As household income increases, shoppers purchase higher value or more exotic speciality items. Consumer choices have increased dramatically in recent years as American supermarkets typically offer an array of more than 400 separate stock keeping units (SKUs) in their produce departments (Estes, 2006)This expansion reflects changing consumer demand for more convenience, changing tastes, and greater ethnic diversity in the population.

Primarily, producers, wholesalers, integrated chains, independent distributors, and supermarket retailers have tended to consolidate through mergers, acquisitions, and takeovers as sales per firm have increased. Despite consolidation, competition has increased at all market levels from farm to retail and exerted short-term downward pressure on prices. Industry concentration and competition have intensified, in part, because of the influx of companies that were historically not involved in retail food sales such as Wal-Mart and Super Target stores. For example, Wal-Mart has improved sweetpotato marketing efficiency by requiring all produce suppliers to deliver product at their distribution centers in standard, plastic bulk bins equipped with radio frequency identification (RFID) technology and a digitized electronic bar code (EBC). RFID facilitates food safety traceback problems and offers customers an improved measure of food safety protection in that if a recall notice is issued then Wal-Mart knows which inventory to remove from shelves. Traditional food retailers have been much slower to adopt new RFID and trace back technologies but chain stores were forced to adjust when competitors offered greater safety assurances and lower prices. Also, global markets have evolved and expanded for sweetpotato shippers because of U.S. participation in free trade agreements, which reduce barriers to trade and standardize phytosanitary handling and treatment options. U.S. export expansion efforts remained focused on European Union (EU) countries, especially Great Britain. Since 2000, U.S. export volume has increased 67%, with most exported sweetpotatoes going to Canada and Great Britain (Lucier, 2008).

Ten years ago U.S. consumers most often bought their fruit and vegetables from a traditional grocery store (Powers, 1994). Today, USDA studies show that U.S. consumers obtain their fruits and vegetables from a variety of sources, including specialty grocers and direct farmer-to-consumer sales. Cook (2004) reports that U.S. consumers obtain a majority of their fruit and vegetable daily servings from food service outlets (restaurants, institutions, etc). Roughly 55% of fruit and vegetable purchases are made from food service suppliers. Unfortunately, sweetpotatoes have a limited presence in food service outlets because very few sweetpotato products are popular and available to food service buyers. The two main marketing channels for sweetpotatoes are retail grocery stores including chain supermarkets and direct sales to consumers via community farmers' markets. As additional forms (chips, patties, and fries) of sweetpotatoes become available to the food service sector, then sales expectations will increase rapidly because of the nutritional and health benefits associated with eating sweetpotatoes.

The U.S. fruit and vegetable marketing system, including sweetpotatoes, operates primarily on free market principles. The marketing system coordinates delivery of sweetpotatoes in the form, place, and time that is preferred by consumers. Unlike the grain and oilseed sectors, U.S. fruit and vegetable producers do not receive government subsidies as part of national legislation. Until recently, few sweetpotato producers were eligible for income insurance or crop insurance. Instead, the government's role (federal and state) was to facilitate commerce, enhance international trade, improve market and price information and transparency, and minimize market distortions concerning sweetpotato transactions. In addition, state and federal agencies established grades and standards to ensure buyer and seller understand how quality is defined. In addition, if grades and conditions are well established then transactions can occur via electronic computer, fax, or telephone without the need to visually inspect each load of sweetpotatoes.

The land grant University system, state departments of agriculture and USDA analysts also assist sweetpotato producers and marketers by conducting market research, enhance demand through advertising and promotional programs, finance and minimize risk exposure for sweetpotato growers, and disseminate timely market information concerning volume and price. As noted earlier, decades earlier the major sweetpotato producing states had established state Sweetpotato Commissions as well as the U.S. Sweetpotato Council. Commissions do not sell product or control sales volume but instead use assessments (voluntarily-contributed funds) to assist the industry by financing research and using funds to promote and advertise sweetpotatoes throughout the U.S. and in individual states. It is important to note that interstate shipment of fresh sweetpotatoes (includes all fresh fruits and vegetables) is regulated by the federal government through the Perishable Agricultural Commodity Act (PACA) of 1930 (modified and updated several times since 1930). PACA is a federal law that is administered by the regulatory branch of the Fruit and Vegetable Division of USDA-Agricultural Marketing Service. Buyers and sellers of fresh produce (including sweetpotatoes) must apply for and receive a PACA license in order to buy or sell product if it is shipped across state borders. Thus, PACA also governs trading practices. Failure to follow fair trade practices as defined by PACA can result in USDA suspending and/or revoking a firm's PACA license. Without a PACA license, buyers or sellers cannot legally buy and sell commodities that travel across states. PACA regulations define "fair" trade as one in which both buyers and sellers are assured that they know what to expect in a business transaction. In essence, fair trade terms focus on when and how buyers must pay sellers and when shippers must deliver volume and quality at the agreed on price to buyers. Well-defined grades, publicly posted prices, PACA licenses, breeding and market research, and promotion programs all contribute to a marketing process that minimizes risk, decreases losses, and increases transaction efficiency for sweetpotato growers and shippers which contributes to reduce prices paid by the consumer.

In the U.S., the most common way to market sweetpotatoes is for the grower-shipper, who has assembled shipping loads of sweetpotatoes, to sell directly to a grocery chain store. Regional or area chain stores operate central buying offices where they buy sufficient quantities of fresh sweetpotatoes (and other perishables)

that they can buy directly from high volume shipper-distributors. Chain store buyers typically send loads of sweetpotatoes to one or more of their wholesale distribution centers where each load is repackaged and stored in its proper environment and temperature. Inventory is rotated to assure that first-in sweetpotatoes are first-out as store produce managers order quantities needed. Specific quantities ordered by produce managers are then loaded onto company-owned distribution trucks for delivery to individual stores.

In addition to direct shipper-to-chain retailer sales, independently owned or small-chain companies (9 stores or less) purchase sweetpotatoes from the spot or open market and this option is the second most-frequently used method of marketing sweetpotatoes in the U.S. In this situation, sales agents, specialized produce selling brokers, specialized produce buying brokers, truck brokers, and specialized produce wholesalers interact with each other in order to move sweetpotatoes from farm to a sales outlet irrespective of buyer location. This marketing option results in grower's sales agent, shippers, selling brokers, or commission merchants contacting buying brokers (located in or near large U.S. city) or merchant wholesalers who are interested in buying and/or reselling sweetpotatoes at the market price (ownership transfers at time of sale). Sweetpotato growers must stay abreast of current market conditions and price, even if they hire an agent or specialized broker to handle sales for them, because the marketing system can take advantage of uninformed growers.

Next, general-line foodservice wholesalers purchase sweetpotatoes from grower-shippers since some restaurants and institutional customers (hospitals, schools, and baby foods) utilize sweetpotatoes. For most food service wholesalers, produce sales are a small percentage of total sales and for sweetpotato growers, foodservice products are limited so foodservice sales are a small but important source of income for some specialty produce suppliers. Finally, direct farmer-to-consumer sales such as those at community farmers' markets represent a small amount of income for geographically dispersed growers who live in rural areas of the South. Southerners prefer to purchase locally grown sweetpotatoes directly from their neighbor-farmers, especially if the direct price is less than the local grocery store price.

Sweetpotato Distribution Patterns

In general, U.S. sweetpotato shipping patterns flow predominantly from south-to-north, that is, North Carolina-grown sweetpotatoes are marketed primarily along the East Coast, including eastern Canada. Similarly, Mississippi and Louisiana grown sweetpotatoes are sold to Mid-Western customers while California growers market their sweetpotatoes primarily to buyers located along the West Coast and western Canada (Gonzalez, 2008). While this selling pattern holds for most grower-shippers, it is certainly true that the largest volume distributors, irrespective of location, sell to any and all customers. Indeed, large-volume grower-shippers have arrangements with other large volume competitors to cooperate with one another to supply sweetpotatoes to customers. Sometimes this is cited as an example of cross-marketing

sweetpotatoes. For example, a North Carolina grower-shipper may have a Dallas, Texas customer so the dealer asks that an allied Louisiana grower-shipper firm supply sweetpotatoes to the Dallas customer using Louisiana-grown sweetpotatoes but packed in the North Carolina firm's shipping cartons. Of course, the North Carolina dealer would reciprocate for the allied Louisiana-based dealer if the customer wanted sweetpotatoes delivered to Maryland. Sweetpotato grower-shippers, dealers, and distributors compete and cooperate with each other, depending on specific circumstances. Finally, some growers hire a broker who negotiates specific details of a sales contract between buyer and seller. Brokers can work for either the buyer or the seller, depending on who pays the brokerage fee (between 8% and 10% of the price). Typically, brokers can arrange transportation for the buyer or the seller. Brokers sell information about buyers and sellers and do not take ownership of sweetpotatoes; they simply arrange deals and collect a fee for their knowledge about market opportunities.

In addition to the south-to-north market flow, shipper-growers recognize that Southerners eat proportionately more sweetpotatoes per capita than the rest of the U.S. so specific marketing emphasis is directed toward Southern markets, especially to consumers located in nearby and adjacent states. In general, consumers eat more sweetpotatoes, as temperatures get cooler. In recent years, innovative marketers have cello-wrapped individual sweetpotatoes so they can be prepared quickly by cooking in a microwave oven (see Plate 13.4). In 2008 new market opportunities

Plate 13.3 Yams and sweetpotatoes for sale side-by-side at Lowe's Grocery Stores, Wake County, North Carolina (See also Plate 12 on page xxii) (photo by E. Estes)

Plate 13.4 Cello-wrapping of sweetpotatoes on grading line at grower-shipper packing shed in Columbus County, North Carolina (See also Plate 13 on page xxiii)

seem to be focused in two areas: (1) value-added uses such as sweetpotato puree; and (2) ethanol biofuel. Shelf-stable puree was developed by Dr. Van-Den Truong, a USDA-Agricultural Research Service Food Scientist stationed at North Carolina State University in Raleigh, N.C. (Bliss, 2008). The puree can be used as a nutritious ingredient for use in soups, baby food, beverages, gluten-free pancakes, and nutraceuticals. Also at North Carolina State University, sweetpotato breeder Dr. Craig Yencho is developing a high dry-matter, industrial sweetpotato variety that can be used in biofuel production. Preliminary results suggest that high-dry matter varieties have potential for fuel use but the economic feasibility of using sweetpotatoes remains uncertain. Feasibility will be investigated in 2010 after several new varieties are field-tested to determine flesh dry matter content.

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