2011 Sweet Potato Production

Food Safety Needs Survey

Acknowledgements

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EXECUTIVE SUMMARY

Researchers from North Carolina State University in collaboration with Louisiana State University, Mississippi State University and the University of California surveyed sweet potato growers in their respective regions to assess the industry's food safety preparedness. Forty-one (41) sweet potato growers in 6 states (NC, LA, MS, AL, AR, CA) completed the survey. Three-fourths (78%) of the respondents had over 100 acres in production and over half (59%) had 2010 gross sales exceeding $1 million. The representation of large scale operations makes the outcome of the survey more indicative of the practices occurring on the majority of acres but not by the majority of sweet potato growers. The presence of a kill step in the preparation of sweet potatoes minimizes the overall risk of microbial food-borne illness resulting from human consumption. However, the trend toward increased consumption of raw sweet potatoes does present a potential area of concern. The majority of respondents utilize good agricultural practices (GAPs) to help mitigate potential food safety concerns resulting from microbial contamination and adulteration by foreign objects, such as metal, glass or rocks.

INTRODUCTION

Food safety incidents in ready-to-eat (RTE) produce like spinach and bean sprouts, as well as, in some processed foods, like peanut butter and meat, have increased the general public's interest in the safety of food production practices. The recent passage of the Food Safety Modernization Act by the United States Congress has elevated public interest, as well.

Good Agricultural Practices or GAPs provide general food safety guidance on critical production steps where food safety might be compromised during the growing, harvesting, transportation and storage of crops. GAPs guidance includes water quality testing, worker hygiene protocols, crop inputs utilization, and post harvest handling and transportation. Much of agriculture has adopted or is adopting GAPs as part of normal production operations.

Liability associated with the production, processing, selling or serving of food products can disrupt a company, brand or entire industry. Most medium to large food handlers selling or serving food products require that their suppliers undergo third-party audits on a regular basis to monitor compliance to their food safety and/or GAPs programs. These audit results are often shared with customers as verification of the producer's commitment to food safety and GAPs. In fact, a majority of the sweet potato processors have begun requiring GAP audits of their suppliers.

RTE crops present the greatest concern for microbial contamination and food-borne illness since the crop is consumed raw. For crops that are cooked or destined for intense processing

involving heat or any other microbial kill step, contamination is limited to post-production handling practices by the processor or consumer. However, the trend toward increased consumption of raw sweet potatoes does present potential food safety concerns. GAPs minimize the potential for microbial contamination and adulteration by foreign objects, such as metal, glass or rocks.

The 2011 Sweet Potato Production Food Safety Needs Survey was conducted to supplement information collected during the 2010 National Sweet Potato Council Convention. The objective of this survey was to determine the current status of food safety issues recognized within the sweet potato industry by growers, including, any buyer requirements for food safety documentation.

Survey information is reported in aggregate form only in order to preserve the identity of all participants. Farm-specific information is not included and will not be released to individuals without an operation's prior written permission.

METHODS

Researchers from North Carolina State University (NCSU) in collaboration with Louisiana State University (LSU), Mississippi State University and the University of California (UC) - Davis were awarded a USDA Specialty Crop Research Initiative grant to assess food safety needs of the sweet potato production industry.

The 2011 Sweet Potato Production Food Safety Needs Survey (Attachment 1) was developed by Dr. Diane Ducharme, NCSU, in collaboration with Drs. Jonathan Schultheis, NCSU, Tara Smith, LSU, Scott Stoddard, UC-Davis and William Burdine, Mississippi State University. The researchers surveyed growers during 2011 and 2012 state sweet potato meetings, as well as, during the 2012 Sweet Potato Convention. Also, the survey was mailed to approximately 100 members of the United States Sweet Potato Council located in multiple states.

RESULTS

A total of 41 sweet potato growers in 6 states (NC, LA, MS, AL, AR, CA) participated in the survey. Of those respondents, 28 were identified as farm owners, with the remainder describing themselves as farm managers, food safety coordinators, or farm organizations in general.

Of the respondents, 49% were from NC and 37% from LA, 2 states which together, according to 2012 USDA Sweet Potato Statistics, account for 70% of the total number of sweet potato farms, 62% of the total acreage and 51% of total production. Survey results are reported according to general categories.

General Farming Operations

Seventy-eight (78%) of the farm operations surveyed harvested greater than 100 acres of sweet potatoes (Table 1) with 60% having 2010 gross revenues exceeding $1 million (Table 2). Based on this information it can be concluded that the majority of respondents represent larger sweet potato operations.

Table 1 (question 7). Sweet Potato Acres harvested in 2010

Acreage	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
1-50				1 (6.7)		5 (25)	6 (15)
50-100	1 (100)			1 (6.7)		1 (5)	3 (7)
>100		1 (100)	3 (100)	13 (86.7)	1 (100)	14 (70)	32 (78)
Total	1 (100)	1 (100)	3 (100)	15 (100)	1 (100)	20 (100)	41 (100)

Table 2 (question 8). Gross sales of Sweet Potatoes in 2010

Gross Sales	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
<$100,000				2 (13.3)		4 (21)	6 (15)
$101,00 to 500,000				2 (13.3)		1 (5.3)	3 (8)
$501,000 to 1 million	1 (100)			4 26.7)		2 (10.5)	7 (18)
>$1 million		1 (100)	3 (100)	7 (46.7)	1 (100)	12 (63.2)	24 (60)
Total	1 (100)	1 (100)	3 (100)	15 (100)	1 (100)	19 (100)	40 (100)

While the hiring information collected in this report seems somewhat skewed with 33% of operations hiring over 20 full-time employees in 2010 (Table 3) the 83% of farms hiring over 20 seasonal employees (Table 4) seems more likely. As with most specialty crop farming operations, a spike in labor required during peak season is common.

Table 3 (question 9a).Full-time employees hired during 2010

Full-time	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)

0	1 (100)	0	0	3 (23)		2 (10)	6 (15)
1-5	0	0	0	7 (54)		4 (20)	11 (28)
6-10	0	0	0	2 (15)		5 (25)	7 (18)
11-20	0	0	0	0 (0)		2 (10)	2 (5)
21-40	0	1 (100)	1 (33)	1 (8)		4 (20)	7 (18)
>41	0	0	2 (67)	0 (0)	1 (100)	3 (15)	6 (15)

Table 4 (question 9b). Seasonal employees hired during 2010

Seasonal	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
0	0	0	0	0	0	0	0
1-5	1 (100)	0	0	1 (7)	0	3 (15)	5 (13)
6-10	0	0	0	1 (7)	0	1 (5)	2 (5)
11-20	0	0	0	0 (0)	0	0	0 (0)
21-40	0	0	0	2 (14)	0	5 (25)	7 (18)
>41	0	1 (100)	3 (100)	10 (71)	1 (100)	11 (55)	26 (65)

This survey reflects that 73% of respondents devoted their business to fresh sweet potato production, while 24% to the processing industry (Table 5). Not surprisingly, fresh market sales capture 70% (consumers, retailers and wholesalers) of the market (Table 6). In all 6 states, production of sweet potatoes for the fresh market exceeds that for processing.

Table 5 (questions 10-11). Market segment

Production	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Fresh	60	90	82	60	90	53	73
Processed	40	10	10	40	10	31	24

Table 6 (question 12). Allocation of crop by market segment

Market	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Consumers	40	10	11	3	20	10	**16**
Foodservice	30	3	4	1	0	20	**10**
Processors	1	1	23	37	10	22	**16**
Retailers	25	60	30	20	60	20	**36**
Wholesale	0	26	29	30	10	15	**18**
Remainder	4	0	0	0	0	8	**1**
Total	**100**	**100**	**97**	**91**	**100**	**95**	**97**

A self-reported 85% of the operations surveyed conduct language appropriate training with 57% of training occurring annually (Table 7). Eighty-five percent (85%) of the operations have language appropriate hygiene placard reminders (Table 8).

Table 7 (questions 13-14). Operations conducting language appropriate training and frequency

Training	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Provided	1 (100)	1 (100)	3 (100)	12 (80)	1 (100)	17 (85)	35 (85)
Frequency							
Annually	1 (100)		1 (33)	5 (42)		13 (76)	20 (57)
As needed					1 (100)		1 (3)
Monthly			1 (33)	2 (17)		4 (24)	7 (20)
Quarterly				2 (17)			2 (6)
Seasonal		1 (100)	1 (33)	1 (8)			3 (9)
Weekly				1 (8)			1 (3)
Weekly in Season				1 (8)			1 (3)

Table 8 (question 15). Language appropriate hygiene placards

Placards	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
	1 (100)	1 (100)	3 (100)	12 (80)	1 (100)	17 (85)	35 (85)

Water Sourcing by Use

Water used for field operations is obtained from multiple sources with 56% coming from wells, 10 % each from pond & municipal sources and 23% from a combination of water sources (Table 9). No operations reported single sourcing from streams.

Table 9 (question 16). Primary field operation water source

Water	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Pond				1 (7)		3 (16)	4 (10)
Well	1 (100)	1 (100)	3 (100)	10 (67)		7 (37)	22 (56)
Stream							
Municipal				2 (13)		2 (11)	4 (10)
Other (combination)				2 (13)		7 (37)	9 (23)

Irrigation methods in the field ranged from overhead (32%), no irrigation at all (24%) or some combination (24%) of overhead, drip, and flood (Table 10).

Table 10 (question 17). Type of Irrigation Used

Water	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Overhead				2 (13)		11 (55)	13 (32)
Drip, under Plastic			1 (33)				1 (2)
Drip, not under plastic			2 (67)				2 (5)
Flood		1 (100)		4(27)			5 (12)
No Irrigation	1 (100)			3 (20)	1 (100)	5 (25)	10 (24)
Other (combination)				6 (40)		4 (20)	10 (24)

For those businesses with packing operations, 65% of water is obtained from wells, 23% municipal, only 3% from ponds and 10% using some combination of sources (Table 11). As with field use, no operations reported single sourcing from streams. Packing houses guidelines require the use potable water standards. From the survey results, 88% of surveyed participants are using well or municipal water sources.

Table 11 (question 18). Primary water source for packing operations

Water Source	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Pond						1 (9)	1 (3)
Well	1 (100)		3 (100)	6 (43)		10 (91)	20 (65)
Stream							
Municipal		1 (100)		5 (36)	1 (100)		7 (23)
Other (combination)				3 (21)			3 (10)

Microbial Contamination

Microbial testing is being done in the sweet potato industry (Table 12) with 74% testing processed water and 62% testing field water for generic *E.coli*. Microbial testing of environmental surfaces and crop or product is conducted in 41% and 47% of the operations, respectively.

Table 12 (question 19). Microbial tests are performed on the following materials to verify food safety:

Test	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Crop/Product	1 (100)	1 (100)	0 (0)	3 (25)	1 (100)	9 (60)	15 (47)
Process Water (generic *E.coli*)	1 (100)	1 (100)	3 (100)	9 (64)	1 (100)	10 (71)	25 (74)
Field Water (generic *E.coli*)	0 (0)	1 (100)	2 (67)	9 (60)	-	9 (64)	21 (62)
Environmental Surfaces	0(0)	0 (0)	0 (0)	4 (33)	1 (100)	8 (53)	13 (41)

Mitigation measures employed by the sweet potato industry reflect a high knowledge of understanding with over 80% positive responses on most risk mitigations measures employed (Table 13). Several areas that exhibit concerns are construction of controls to limit potential

contaminants to water sources (76%), limiting irrigation water contact (57%) and identifying upstream potential contaminants (52%). While not immensely alarming for this industry, these represent areas for potential future work.

Table 13 (question 20). Mitigation measures to Reduce Risk of Pathogens

Mitigation Measures	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Inspection of water sources	1 (100)	1 (100)	2 (67)	11 (73)	1 (100)	15 (94)	**31 (84)**
Construction of Controls to limit potential risks	1 (100)	1 (100)	2 (67)	8 (53)	1 (100)	15 (94)	**28 (76)**
Prevent regulated and non-regulated Substance Entry into water sources	1 (100)	1 (100)	3 (100)	12 (86)	1 (100)	13 (87)	**31 (89)**
Restroom Location away from water sources	1 (100)	1 (100)	3 (100)	15 (100)	1 (100)	16 (94)	**37 (97)**
Limited Irrigation Contact with consumable fruit	1 (100)	0 (0)	3 (100)	4 (31)	-	9 (75)	**17 (57)**
Identify Upstream Contamination	1 (100)	1 (100)	2 (67)	4 (29)	1 (100)	8 (62)	**17 (52)**
Water Testing seasonally	1 (100)	1 (100)	3 (100)	10 (71)	1 (100)	12 (80)	**28 (80)**
Corrective Actions after unacceptable samples	1 (100)	1 (100)	2 (100)	9 (64)	1 (100)	11 (100)	**25 (83)**
Other	-	-	-	-	-	-	**-**

As indicated in Table 14, growers currently implement practices in their operations that can impact microbial contamination, including human presence (labor) and the possibility of animal intrusion in vegetative buffer strips.

Table 14 (question 21). Microbial contamination sources or mitigations on farm

	AL	AR	CA	LA	MS	NC
Fencing	+	+		+		+
Trapping				+		+
Raw Manure			+	+		+
Composted manure			+			+
Vegetative Buffer strips		+	+	+	+	+
Irrigation Reservoirs			+			+
Human Presence		+	+	+	+	+

Harvesting and Traceability

Of the 90% of growers who use wooden bins for harvest only 64% sanitize them (Table 15).

Table 15 (questions 22-23). Wooden bin use and decontamination

Wooden Bins	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Use	1 (100)	1 (100)	3 (100)	14 (93)	1 (100)	17 (85)	**37 (90)**
Sanitize	1 (100)	1 (100)	2 (66)	9 (64)	1 (100)	9 (56)	**23 (64)**

Only 37% of growers surveyed dispose of sweet potato culls as animal feed (Table 16).

Table 16 (question 24). Use of sweet potato culls for animal feed

Animal Feed	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Use culls for feed	1 (100)	1 (100)	2 (67)	4 (27)	1 (100)	5 (29)	**14 (37)**

Eighty-nine percent (89%) of growers surveyed have documented traceability programs (Table 18). Of those growers, all can track the harvested sweet potatoes to the bin level while only 62% can trace back to the harvest crew (Table 17).

Table 17 (questions 25-26). Traceability of harvest to bin and crew

Harvest	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Bin	1 (100)	1 (100)	3 (100)	14 (100)	1 (100)	17 (100)	**37 (100)**
Crew	0 (0)	0 (0)	1 (33)	5 (36)	1 (100)	16 (94)	**23 (62)**

Table 18 (questions 27-28). Incidence of documented traceability programs and format (PTI guidelines)

Traceability Program	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Documented	1 (100)	1 (100)	3 (100)	13 (87)	1 (100)	14 (82)	33 (89)
PTI Guidelines	0 (0)	1 (100)	1 (33)	4 (36)	1 (100)	11 (69)	18 (55)

Half of respondents still storage traceability information in the paper format (Table 19). Only 24% use electronic alone and 26% use a combination.

Table 19 (question 29). Traceability Information Storage

Records Storage	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Electronic	-	-	2 (67)	1 (8)		5 (31)	8 (24)
Paper	1 (100)	1 (100)	1 (33)	8 (67)		6 (38)	17 (50)
Both	-	-	-	3(25)	1 (100)	5 (31)	1 (26)

Only 27% of on-site packing operations monitor free chlorine, test pH and manage temperature of dump tank water (Table 20).

Table 20 (question 30). Dump tank water monitoring for free chlorine, pH, and temperature

Monitoring	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Yes	1 (100)	-	-	-	-	9 (56)	10 (27)
No	-	1 (100)	2 (67)	11 (73)	1 (100)	-	15 (41)
Not Using	-	-	1(33)	4 (27)	-	7 (44)	12 (32)

All survey participants with packing operations have pest management programs in place while only 91% have sanitation programs in place (Table 21). Of the respondents, 84% felt that pesticides are not a significant food safety risk (Table 22).

Table 21 (questions 31-32). Pack house cleaning, sanitizing and pest management programs

Program	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Cleaning/sanitizing	1 (100)	1 (100)	3 (100)	13 (87)	1 (100)	13 (93)	32 (91)
Pest management	1 (100)	1 (100)	3 (100)	15 (100)	1 (100)	15 (100)	36 (100)

Table 22 (question 33). Do you feel that pesticides are a significant food safety risk on your farm?

Safety Risk	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Yes				1 (7)		4 (23)	5 (13)
No	1 (100)		3 (100)	14 (93)	1 (100)	13 (77)	32 (84)
N/A		1 (100)					1 (3)

GAP certification typically requires the use of shatterproof lights and food-grade lubricants in packing operations to minimize the introduction of foreign materials into the packed sweet potatoes. Of those respondents with packing operations only 85% use shatterproof lights and 76% use food grade lubricants (Table 23).

Table 23 (questions 34-35). Practices in place to minimize foreign material introduction in the pack house

Food Safety	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Shatterproof lights	1 (100)	1 (100)	3 (100)	10 (77)	1 (100)	13 (87)	29 (85)
Food-grade lubricants	1 (100)	1 (100)	3 (100)	9 (64)	1 (100)	11 (79)	26 (76)

GAP Certification

Given the data that 70% of the surveyed dedicate their sales to fresh markets (consumers, retailers, wholesalers). Seventy-nine percent (79%) of industry is either GAP or GlobalGAP certified with 50% being certified for less than 5 years (Table 24). While additional data are needed to confirm, the current data suggest that fresh produce buyers are requiring the GAPs/GlobalGAP certification. The majority of the sweet potato industry believes that GAP certification provides industry credibility and competitive advantages (Table 25).

Table 24 (questions 36-37). Occurrence and duration of GAPs or GlobalGAP certification

GAP Certified	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
GAP Certified	1 (100)	1 (100)	2 (67)	12 (80)	1 (100)	13 (76)	30 (79)
< 1 year				1 (7)		1 (6)	2 (6)
1-5 years	1 (100)	1 (100)	1 (33)	8 (57)		5 (31)	16 (44)
> 5 years				3 (21)	1 (100)	6 (38)	10 (28)
Not GAP certified			2 (67)	2 (14)		4 (25)	8 (22)

Table 25 (question 38).

Description	AL	AR	CA	LA	MS	NC
Fresh Produce Buyer(s) require(s) GAP/GlobalGAP certification/audits		+	+	+	+	+
Processed Buyers require(s) GAP/ GlobalGAP		+	+	+	+	+
Believe GAP certification provides industry credibility		+	+	+	+	+
GAP/GlobalGAP certification provides competitive advantage	+	+	+	+	+	+
Other						

Over 83% of farming operations have made changes to become GAP certified (Table 26).

Table 26 (question 39). Operations that have made changes to become GAP certified

GAP Certification	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Changes Made	1 (100)	1 (100)	3 (100)	10 (83)	1 (100)	15 (88)	30 (88)

Only 56% of sweet potato operations have prepared communication statements for use in the event of a food safety crisis or recall situation (Table 27).

Table 27 (question 40).Communication plans have been developed for your farm in the event of a crisis

	AL (%)	AR (%)	CA (%)	LA (%)	MS (%)	NC (%)	Total (%)
Statements Prepared	0 (0)	1 (100)	0 (0)	6 (43)	0 (0)	13 (76)	20 (56)

Economics of Food Safety

Implementation of most food safety practices is perceived by grower operations to be a minimal additional cost to their business (Table 28). However, 84% view the additional cost of labor to implement food safety practices to be significant. Equipment (61%), containers (50%), GAP audits (45%) and traceability components (42%) are also perceived to add significant costs to the operation of the farm.

Table 28 (question 41). Perceived additional cost to implement the following:

Practice	Not Using	No Additional	Minimal Additional	Significant Additional
Labor	0 (0)	5 (14)	1 (3)	31 (84)
Management time and effort	0 (0)	3 (8)	19 (51)	15 (41)
Computers/software	1 (3)	6 (16)	25 (66)	6 (16)
Printers	2 (5)	7 (18)	25 (66)	4 (11)
Labels	4 (11)	5 (13)	25 (66)	4 (11)
Equipment	0 (0)	1 (3)	14 (37)	23 (61)
Containers	0 (0)	1 (3)	18 (47)	19 (50)

Sanitizers and Cleaning Solutions	0 (0)	7 (18)	29 (76)	2 (5)
Hand washing facilities	0 (0)	11 (29)	26 (68)	1 (3)
Bathroom facilities	0 (0)	11 (29)	26 (68)	1 (3)
Worker/Management Training	0 (0)	10 (26)	24 (63)	4 (11)
Documentation efforts	0 (0)	8 (21)	16 (42)	14 (37)
Conservation efforts to reduce pathogens	3 (8)	2 (6)	23 (64)	8 (22)
Wildlife/Domestic animal management	3 (8)	7 (19)	19 (51)	8 (22)
Water/microbial or performance testing	4 (11)	4 (11)	24 (63)	6 (16)
Traceability Components (GS1, GTINs)	4 (11)	1 (3)	17 (45)	16 (42)
GAPs Audit	4 (11)	3 (8)	14 (37)	17 (45)

CONCLUSION

According to USDA National Agricultural Statistics Service (NASS) information, the four largest sweet potato producing states in 2010 based on thousand hundred weights (1,000 cwt) were NC (9,720), CA (6,390), MS (3,600) and LA (2,470) representing 93% of total US sweet potato production and 87% of total acreage (US Sweet Potato Statistics, USDA-ERS updated June 2011). In this survey, those four states accounted for only 38% of the actual number of farms indicating that much larger farms were represented relative to the remaining 28 sweet potato producing states.

Based on the completed surveys alone, the sweet potato industry appears to be relatively proactive in the adoption of Good Agricultural Practices certification and associated practices to minimize adulteration. The results suggest that the larger operations are prepared to address many potential food safety issues. Because the more numerous small farm operations are under-represented in the survey an accurate assessment of their food safety preparedness cannot be determined.

As companies look at including fresh produce safety training to their company, the make-up of personnel (full-time or seasonal) needs to be considered to best effect training efficiency. Training should be inclusive of both the general, as well as, job specific risks. Training on the implementation of a company's food safety policies and procedures documentation should be included. Frequency of training should be consistent with the employee's hire date – either on the hire date or before entering production areas.

The increasing importance of sustainable production to food companies can appear at conflict with fundamental food safety requirements. For instance, maintaining diverse habitat in crop production areas can lead to animal intrusion creating a potential food safety hazard. Removal of vegetative buffer zones could minimize animal intrusion but negatively impact habitat and,

thereby, wildlife development. Co-management strategies are being developed by federal and state agencies and universities, including the University of California – Davis (www.ucfoodsafety.ucdavis.edu) to optimize practices that support habitat development while minimizing contamination from animal intrusion. Co-management is a potential area of development in sweet potato production.

As recent updates on the Food Safety Modernization Act include food supplies used for animal feed will need to follow food safety rules that require it to be of the same food safety quality as food for human consumption, the industry will need to watch for details on these rules when released and determine how it effects their operations.

While sweet potatoes are not categorized as a high risk crop according to the Food Safety Modernization Act, traceability programs will require traceability within a commodity to occur within hours if needed. Electronic management of records similar to the Produce Traceability Initiative will be necessary.

ATTACHMENT 1: Survey

2011 Sweet Potato Production Food Safety Needs Survey
USDA – Specialty Crop Research Initiative - North Carolina State University, Louisiana State University, Mississippi State University and University of California at Davis.

This survey is intended to supplement a focus group survey conducted at the 2010 National Sweet Potato Council Convention to determine the current status of food safety issues recognized within the sweet potato industry by growers, including, any buyer requirements for food safety documentation. Survey information will be provided only in aggregate form to interested individuals in order to preserve the identity of all participants. Your farm-specific information will not be released to individuals without your prior written permission. Please complete the survey based on your knowledge of your operation.

1. State (Circle one): NC LA MS CA Other (specify): _____
2. Business Name: _____
3. Grower Name: _____
4. Business Address (city, zip code):_____
5. Telephone: _____ Email: _____
6. Survey Participant Title:
   a) Farm Owner
   b) Farm Manager
   c) Food Safety Coordinator
   d) Other _____

7. Number of sweet potato acres harvested in 2010:
   a) 1-50 acres
   b) 50-100 acres
   c) >100 acres

8. Total gross sales in 2010
   a) $0 to $100,000
   b) $101.000 to $500,000
   c) $501.000 to $1 million
   d) Greater than $1 million

9. How many employees did you hire during 2010?
   A. Full-time _____ a. 1-5 b. 6-10 c.11-20 d. 21-40 e. >41
   B. Seasonal _____ a. 1-5 b. 6-10 c.11-20 d. 21-40 e. >41

10. Percentage of your business devoted to fresh sweet potato production? _____%

11. Percentage of your business devoted to processing sweet potato production? _____%

12. What % of gross sales goes to each of the following markets (must add to 100%):
    a) Consumers (on-farm, roadside stands, etc.) _____%
    b) Food service outlets (schools, hospitals, institutional buyers, restaurants, Co-ops) _____%
    c) Processors _____%
    d) Supermarkets/Grocery Retailers _____%
    e) Wholesale distribution _____%
    f) Remainder _____%
    g) Total 100%

13. Do you conduct language appropriate training with farm workers/handlers on proper hand washing, bathroom use, glove use, illnesses and injuries, break areas and worker hygiene practices?
    a) Yes
    b) No

14. If yes, how often is this training offered?
    a) Annually
    b) Monthly
    c) Other_____

15. Do you have language appropriate placards, signs or other visual reminders for your workers on washing their hands?
    a) Yes
    b) No

16. During field operations what is your primary water source:
    a) Pond
    b) Well
    c) Stream
    d) Municipal
    e) Other:_____

17. Best description of irrigation during field operation:
    a) Overhead
    b) Drip, not under plastic
    c) Drip, under plastic
    d) Flood
    e) Do not irrigate
    f) Other: _____

18. During packing operations what is your primary water source:
    a) Pond
    b) Well
    c) Stream
    d) Municipal
    e) Other_____

19. Do you perform microbial tests on the following materials to verify food safety?

a.) Crop/Product	Yes	No
b.) Water (Generic E.coli) in the packinghouse	Yes	No
c.) Water (Generic E.coli) in the field	Yes	No
d.) Environmental surfaces	Yes	No

20. Please indicate any of the following mitigation measures that you have adopted on your farm to reduce risk of pathogens in your water source? (Circle all that apply)

a.) Inspection of water sources for potential contaminants prior to use	Yes	No
b.) Construction of controls to limit potential runoff, leaching, spillage, drift to water source (diversion berms, runoff control structures, vegetative buffers)	Yes	No
c.) Control measures to prevent regulated (pesticides) and non-regulated (fertilizers) substances into water sources (backflow preventers, check valves, air gaps, etc)	Yes	No
d.) Location of portable restrooms and hand washing facilities away from water sources to limit potential of spills	Yes	No
e.) Irrigation methods that limit contact of water with consumable fruits and vegetables (drip)	Yes	No
f.) Identification of upstream use and potential sources of contamination	Yes	No
g.) Seasonal testing of water quality	Yes	No
h.) Employ corrective measures after unacceptable samples collected	Yes	No
i.) Other – please explain_____	Yes	No

21. Which of the following do you use on your farm (select all that apply):
    a) Fencing to deter animals around crop production areas
    b) Trapping/baiting to reduce wildlife
    c) Raw manure
    d) Composted manure
    e) Vegetative buffer strips
    f) Irrigation reservoirs
    g) Migrant labor

22. Do you harvest into wooden bins?
    a) Yes
    b) No

23. If so, do you clean and sanitize these wooden bins?
    a) Yes
    b) No
    c) Not applicable

24. Do you utilize culled sweet potatoes as an animal feed?
    a) Yes
    b) No

25. After the crop has been cured and stored for several months, can you correctly identify the field from which the storage bin harvested?
    a) Yes
    b) No

26. For the same storage bin, can you identify the harvest crew?
    a) Yes
    b) No

27. Do you currently have a documented traceability program?
    a) Yes
    b) No

28. Are you using the Produce Traceability Initiative Guidelines (PTI) for your traceability program?
    a) Yes
    b) No

29. In what form do you store your traceability information?
    a) Electronic
    b) Paper
    c) Other, please explain _____

30. Are you monitoring free chlorine, pH, and temperature of your dump tanks?
    a) Yes
    b) No
    c) Not using

31. Do you have a cleaning and sanitizing program for your pack house?
    a) Yes
    b) No

32. Do you have a pest management program in your pack house?
    a) Yes
    b) No

33. Do you feel that pesticides are a significant food safety risk on your farm?
    a) Yes
    b) No

34. Do you have shatterproof light fixtures in your pack house?
    a) Yes
    b) No

35. Do you use food-grade lubricants in your pack house?
    a) Yes
    b) No

36. Is your operation currently GAP or GlobalGAP certified?
    a) Yes
    b) No

37. If so, how long have you been GAP/GlobalGAP certified?
    a) < 1 year
    b) 1-5 years
    c) >than 5 years
    d) I am not GAP or GlobalGAP certified

38. Which of these statements best describes your operation (Select all that apply)
    a) Fresh Produce Buyer(s) require(s) GAP/GlobalGAP certification/audits
    b) Processed Buyers require(s) GAP/GlobalGAP
    c) Believe GAP certification provides industry credibility
    d) GAP/GlobalGAP certification provides competitive advantage
    e) Other _____

39. Have you made or plan to make any modifications to your operation in order to become GAP/GlobalGAP-certified now or in the future?
    a) Yes
    b) No

40. Have you developed crisis communication statements/plans for your farm in the event of a crisis (for ex. food borne illness outbreak, pesticide contamination, worker injury)?
    a) Yes
    b) No

41. Please indicate how significantly the following might impact cost in your operation? (Circle the most appropriate ranking)

Categories of potential costs	**Not using**	**No Additional Cost**	**Minimal Additional Cost**	**Significant Additional Cost**
a.) Labor	0	1	2	3
b.) Management time and effort	0	1	2	3
c.) Computers/software	0	1	2	3
d.) Printers	0	1	2	3
e.) Labels	0	1	2	3
f.) Equipment	0	1	2	3
g.) Containers	0	1	2	3
h.) Sanitizers and Cleaning Solutions	0	1	2	3
i.) Hand washing facilities	0	1	2	3
j.) Bathroom facilities	0	1	2	3
k.) Worker/Management Training	0	1	2	3
l.) Documentation efforts	0	1	2	3
m.) Conservation efforts to reduce pathogens	0	1	2	3
n.) Wildlife/Domestic animal management	0	1	2	3
o.) Water/microbial or performance testing	0	1	2	3
p.) Traceability Components (GS1, GTINs)	0	1	2	3
q.) GAPs Audit	0	1	2	3

Thank you for taking time to provide this information. Any questions or to receive a copy of the aggregate report of responses, please contact Diane_Ducharme@ncsu.edu