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## Appendix A.

# Statistical Methodology

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### THE SURVEY POPULATION

The target population for the 2014 Organic Survey was all farms and ranches meeting the standards of the National Organic program (NOP) administered by the USDA's Agricultural Marketing Service (AMS). The 2014 Organic Survey defined three organic operation groups – certified, exempt, and transitioning. A certified farm meets NOP standards to market under the “USDA Organic” seal. An exempt farm also meets the criteria for marketing as organic but, because of annual sales less than \$5,000, is exempt from fees associated with certification. A transitioning farm produces organic products by the NOP standards but has not met the three-year organic practices requirement. (NOP standards are available on the internet at [www.ams.usda.gov/nop](http://www.ams.usda.gov/nop).)

The 2014 Organic Survey mail list was built from several sources: all operations in the United States that indicated they were certified, exempt, or transitioning to organic production, or showed potential, in the 2012 Census of Agriculture; all operations included in the 2011 Certified Organic Survey; and producers on the 2013 Agricultural Marketing Service Certified List. AMS locates and lists certified organic producers, processors, and handlers meeting the standards of the NOP. Extensive review was conducted to identify and remove any duplication.

The final mail list included 16,992 farms that met the above criteria. Table A provides the sample counts and response rates for the United States and for each state. The response rate is an indicator of quality of data collection. The response rate for the 2014 Organic Survey was 63 percent.

### DATA COLLECTION

#### Method of Enumeration

The 2014 Organic Survey was conducted primarily by mail. It was supplemented with Computer-Assisted Web Interviewing (CAWI), Computer-Assisted Telephone Interviewing (CATI), and Computer-Assisted Personal Interviewing (CAPI).

#### Report Form

A 16-page 2014 Organic Survey report form was designed to collect data from certified, exempt and transitioning farms as defined by the National Organic Program (NOP). The report form content was developed using questions from the 2008 Organic Production Survey and the 2011 Certified Organic Production Survey, and from input from the USDA's Office of the Secretary and Risk Management Agency, as well as the organic industry. Cognitive testing of the form was conducted in five states with operations in the target population. The report form collected information about organic production of field crops, vegetables, fruits, trees nuts, berries, floriculture crops, nursery crops, mushrooms, Christmas trees, maple syrup, livestock and livestock products, production practices, production expenses, marketing practices, value-added production, and other information about an operation's characteristics. See Appendix B for a copy of the final report form and instruction sheet.

#### Report Form Mailings and Respondent Follow-up

The initial mailout occurred in January 2015. The mail packet included a cover letter with instructions on how to complete the survey online and response

due dates, a labeled report form, an instruction sheet, and a return envelope. One follow-up mailout to nonrespondents occurred in February 2015. Printing and mail packet preparations and the initial and follow-up mailouts were managed by the U.S. Census Bureau's National Processing Center (NPC) in Jeffersonville, IN. Additional nonresponse interviews occurred via telephone by three NASS Data Collection Centers and in person by National Association of State Departments of Agriculture (NASDA) staff in March and April of 2015.

Data were collected for a select group of operations by the NASS Regional Field Offices (RFO). To minimize the number of agency contacts, operations were included in this group if they were scheduled for contact of other NASS agricultural surveys. Report forms were labeled at the NPC and sent to the RFOs in February 2015. RFO staff and contracted NASDA employees collected data by personal enumeration or by phone from February 2015 through April 2015.

## **REPORT FORM PROCESSING**

### **Data Capture**

All report forms returned to the National Processing Center were immediately checked in using bar codes printed on the mailing label and removed from the follow-up mailout. All forms with any data were scanned and an image was created for each page of a report form. After the images were created, the data were keyed as reported from the paper form received. Any inconsistencies and respondent remarks were reviewed by statisticians in the Regional Field Offices and corrected, if necessary, during data editing and analysis.

### **Data Editing and Analysis**

Data from each report form were processed through a computer edit which flagged inconsistent entries. Each report with a flagged entry was reviewed by Regional Field Office (RFO) and/or Headquarters (HQ) statisticians. Action was required for any record with reported data that were clearly incorrect, for example, in some cases, respondents may have failed to provide all of the information requested, only indicating the presence of an item but not the

amount. These items were tagged for machine imputation.

After the initial edit, an automated imputation program supplied missing data based on similar organic agricultural data from a respondent in close geographic proximity. A post-imputation computer edit was performed to ensure imputation actions provided acceptable results. Instances where imputed data failed edit checks were referred to statisticians for corrective action.

The computer edit ensured the data on a report form were internally consistent. An analysis tool was provided to examine the data across records to check for distributional irregularities and data outliers. Statisticians corrected suspect data when necessary and re-edited the record.

## **ESTIMATION**

NASS's goal was to produce organic agricultural totals for the publication that were fully adjusted for list undercoverage, nonresponse, and misclassification. Although much effort was expended making the 2014 Organic Survey mail list as complete as possible, the mail list did not include all U.S. organic farms, resulting in list undercoverage. Some organic farm operators who were on the 2014 Organic Survey mail list did not respond to the survey, despite numerous attempts to contact them. In addition, although each operation was classified as an organic farm or non-organic farm based on the responses to the report form, some misclassification occurred; that is, some organic farms were classified as non-organic. Table B provides the farm counts from the 2012 Census of Agriculture (COA) and the farm counts and acres from the 2014 Organic Survey (organic acres were not collected in the 2012 COA).

### **Nonresponse Weights**

Not every organic farm that was contacted provided the requested data. Nonrespondents were accounted for in the final data by increasing the survey weights of the respondents inversely to the proportion of nonrespondents. Record-level list frame control data and 2012 COA state-level number of organic farms were used to define weighting cells (strata)

comprised of farms of similar size or production. The counts of survey respondents and nonrespondents were used to compute the adjustment factor for the weighting cell. The methodology assumed nonresponse was random. For example, a weighting cell has 100 farms of which 80 responded and 20 did not. Every respondent would have its original weight of 1 increased to 1.25 (100/80) to represent the farms not responding.

An error was identified in the telephone data collection instrument that caused 1,283 respondents to not be asked the transitional acreage questions in Section 16 of the report form. The error was remedied and every effort was made to recontact the respondents. An additional weight was applied to the successfully recontacted respondents for values in Section 16 only to account for those respondents that we were not able to recontact. The calculation methodology was the same as the overall nonresponse weight methodology.

### **Undercoverage Weights**

The 2012 COA was used to adjust for undercoverage. The records of respondents to the 2014 Organic Survey were matched to the records responding on the 2012 COA organic production section. For the records that responded as having organic production on both the 2014 Organic Survey and on the 2012 COA, the undercoverage weights from the 2012 COA were applied to the 2014 Organic Survey response. These records were used to build a regression model of undercoverage weights using 2014 Organic Survey responses. For

each 2014 Organic Survey response that did not match to a 2012 COA record, the estimated weight from the regression model was that record's undercoverage weight. Because the 2014 Organic Survey list of exempt organic operations was not as complete as the 2012 COA list, the undercoverage weight did not fully adjust for undercoverage of exempt organic operations. Thus, the number of exempt organic operations are not fully represented.

### **Misclassification Weights**

At the conclusion of data collection, NASS attempted to contact the farms that reported no organic production to verify that the farm was accurately classified as a non-organic farm. As a result of this effort, NASS was able to calculate the rate of non-organic misclassification and found that the rate was consistent across the states. The reciprocal of the rate of non-organic misclassification was applied to all of the responses reporting no organic production to define the misclassification weight in the 2014 Organic Survey.

### **MEASURES OF SURVEY QUALITY**

Results of the 2014 Organic Survey are subject to nonsampling errors. Sources of nonsampling errors include respondent reporting errors, recording errors, errors in data capture, or errors in action taken during editing and imputation. Extensive efforts were made to minimize these types of errors. Table C provides statistical precision estimates for the number of farms and acres and the total value of sales for the United States and for each state.

**Table A. Organic Survey Sample Size and Response Rates: 2014**

[For meaning of abbreviations and symbols, see introductory text.]

Geographic area	Sample count (number)	Response rate (percent)
United States .....	13,530	63
Alabama .....	29	62
Alaska .....	16	69
Arizona .....	50	62
Arkansas .....	28	61
California .....	2,573	64
Colorado .....	198	57
Connecticut .....	88	61
Delaware .....	8	88
Florida .....	180	48
Georgia .....	110	58
Hawaii .....	168	56
Idaho .....	162	67
Illinois .....	221	74
Indiana .....	289	64
Iowa .....	634	60
Kansas .....	96	55
Kentucky .....	101	66
Louisiana .....	18	67
Maine .....	407	67
Maryland .....	101	72
Massachusetts .....	143	62
Michigan .....	401	50
Minnesota .....	554	55
Mississippi .....	8	63
Missouri .....	198	70
Montana .....	137	74
Nebraska .....	164	68
Nevada .....	34	71
New Hampshire .....	116	57
New Jersey .....	92	63
New Mexico .....	111	54
New York .....	854	64
North Carolina .....	224	74
North Dakota .....	117	51
Ohio .....	549	57
Oklahoma .....	46	54
Oregon .....	520	69
Pennsylvania .....	668	63
Rhode Island .....	19	47
South Carolina .....	42	64
South Dakota .....	92	61
Tennessee .....	64	55
Texas .....	235	67
Utah .....	51	76
Vermont .....	477	60
Virginia .....	146	75
Washington .....	680	63
West Virginia .....	27	67
Wisconsin .....	1,238	61
Wyoming .....	46	63

**Table B. Land Used for Organic Production: 2012 Census of Agriculture and 2014 Organic Survey**

[For meaning of abbreviations and symbols, see introductory text.]

Geographic area	2012 Census of Agriculture certified organic farms (farms)	2014 Organic Survey					
		Certified organic farms		Exempt organic farms		Transitional organic land	
		Farms	Acres	Farms	Acres	Farms	Acres
United States .....	12,771	12,634	3,642,933	1,459	27,627	688	50,688
Alabama .....	10	15	1,300	13	245	6	(D)
Alaska .....	6	7	282	10	94	1	(D)
Arizona .....	42	61	17,810	-	-	-	-
Arkansas .....	23	26	300	8	511	2	(D)
California .....	2,831	2,632	685,848	173	1,320	57	2,596
Colorado .....	162	134	114,750	23	366	13	680
Connecticut .....	55	78	2,243	44	338	8	26
Delaware .....	13	6	207	4	49	1	(D)
Florida .....	171	146	19,245	20	119	21	135
Georgia .....	51	86	8,232	31	752	19	374
Hawaii .....	129	121	3,373	45	132	7	17
Idaho .....	179	151	125,011	10	130	3	120
Illinois .....	179	215	40,481	34	573	12	304
Indiana .....	271	251	25,369	31	929	30	3,062
Iowa .....	536	593	97,186	19	262	29	1,413
Kansas .....	83	77	42,057	6	62	11	543
Kentucky .....	70	86	6,997	21	190	4	140
Louisiana .....	15	14	4,004	9	299	2	(D)
Maine .....	457	444	55,988	73	2,455	23	427
Maryland .....	81	110	13,978	10	33	6	157
Massachusetts .....	131	131	6,922	48	1,120	3	18
Michigan .....	365	288	57,495	44	590	14	464
Minnesota .....	523	475	131,239	37	1,794	26	2,523
Mississippi .....	7	8	2,802	-	-	-	-
Missouri .....	160	184	48,630	32	791	19	649
Montana .....	146	138	317,878	9	47	10	1,398
Nebraska .....	159	166	110,145	4	400	9	4,303
Nevada .....	63	45	7,057	4	7	7	1,687
New Hampshire .....	120	112	7,303	38	737	7	60
New Jersey .....	43	60	2,339	27	322	5	309
New Mexico .....	122	105	34,412	11	19	14	(D)
New York .....	824	855	210,871	62	1,830	15	664
North Carolina .....	148	200	21,595	64	597	25	803
North Dakota .....	130	94	134,632	-	-	11	1,234
Ohio .....	506	499	73,384	42	1,007	26	782
Oklahoma .....	36	35	10,393	10	595	5	51
Oregon .....	434	455	203,555	70	611	35	1,185
Pennsylvania .....	581	653	96,958	26	659	19	471
Rhode Island .....	28	23	64	1	(D)	-	-
South Carolina .....	32	35	2,460	12	229	17	424
South Dakota .....	94	78	78,318	2	(D)	3	36
Tennessee .....	36	30	3,182	24	485	10	186
Texas .....	188	178	125,373	56	1,266	52	4,005
Utah .....	46	60	120,437	-	-	4	4
Vermont .....	513	506	112,819	36	2,132	-	-
Virginia .....	104	139	28,094	28	318	14	709
Washington .....	674	643	73,441	73	400	18	268
West Virginia .....	5	9	1,916	15	204	14	732
Wisconsin .....	1,137	1,128	226,056	100	2,549	49	2,391
Wyoming .....	52	49	128,502	-	-	2	(D)

**Table C. Coefficient of Variation: 2014**

[For meaning of abbreviations and symbols, see introductory text.]

Geographic area	Farms		Acres		Value of sales	
	Farms	Coefficient of variation (percent)	Acres	Coefficient of variation (percent)	Value of sales (\$1,000)	Coefficient of variation (percent)
United States .....	14,093	1.3	3,670,560	6.0	5,456,732	8.6
Alabama .....	28	7.9	1,545	60.0	1,396	28.4
Alaska .....	17	4.2	376	24.1	929	17.8
Arizona .....	61	6.6	17,810	36.3	93,465	64.0
Arkansas .....	34	7.9	811	60.0	(D)	(D)
California .....	2,805	2.0	687,168	24.7	2,231,241	20.3
Colorado .....	157	5.8	115,116	11.8	146,799	45.6
Connecticut .....	122	3.0	2,581	7.2	3,682	23.7
Delaware .....	10	3.0	256	7.2	253	23.7
Florida .....	166	7.9	19,364	60.0	57,182	28.4
Georgia .....	117	7.9	8,984	60.0	12,456	28.4
Hawaii .....	166	6.6	3,505	36.3	13,356	64.0
Idaho .....	161	4.2	125,141	24.1	65,696	17.8
Illinois .....	249	3.3	41,054	9.0	52,723	24.4
Indiana .....	282	3.3	26,298	9.0	59,845	24.4
Iowa .....	612	4.7	97,448	10.4	102,626	20.4
Kansas .....	83	4.6	42,119	11.3	17,215	25.6
Kentucky .....	107	5.7	7,187	28.3	7,757	9.5
Louisiana .....	23	7.9	4,303	60.0	5,521	28.4
Maine .....	517	3.0	58,443	7.2	54,178	23.7
Maryland .....	120	3.0	14,011	7.2	18,973	23.7
Massachusetts .....	179	3.0	8,042	7.2	24,775	23.7
Michigan .....	332	3.3	58,085	9.0	124,612	24.4
Minnesota .....	512	5.7	133,033	5.9	92,242	9.3
Mississippi .....	8	7.9	2,802	60.0	6,000	28.4
Missouri .....	216	3.3	49,421	9.0	43,274	24.4
Montana .....	147	5.8	317,925	11.8	43,657	45.6
Nebraska .....	170	4.6	110,545	11.3	75,917	25.6
Nevada .....	49	5.8	7,064	11.8	20,414	45.6
New Hampshire .....	150	3.0	8,040	7.2	20,849	23.7
New Jersey .....	87	3.0	2,661	7.2	7,786	23.7
New Mexico .....	116	5.8	34,431	11.8	21,860	45.6
New York .....	917	3.3	212,701	8.0	164,203	7.7
North Carolina .....	264	5.7	22,192	28.3	66,941	9.5
North Dakota .....	94	4.6	134,632	11.3	27,279	25.6
Ohio .....	541	6.7	74,391	12.9	88,846	25.9
Oklahoma .....	45	7.0	10,988	22.6	(D)	(D)
Oregon .....	525	4.2	204,166	24.1	237,121	17.8
Pennsylvania .....	679	4.1	97,617	15.9	313,456	25.2
Rhode Island .....	24	3.0	78	7.2	902	23.7
South Carolina .....	47	7.9	2,689	60.0	(D)	(D)
South Dakota .....	80	4.6	78,363	11.3	16,000	25.6
Tennessee .....	54	5.7	3,667	28.3	4,023	9.5
Texas .....	234	7.0	126,639	22.6	199,094	50.2
Utah .....	60	5.8	120,437	11.8	18,458	45.6
Vermont .....	542	5.5	114,951	14.0	93,889	16.2
Virginia .....	167	5.7	28,412	28.3	41,302	9.5
Washington .....	716	5.5	73,841	14.7	514,897	21.9
West Virginia .....	24	5.7	2,120	28.3	(D)	(D)
Wisconsin .....	1,228	4.0	228,605	7.1	200,800	8.0
Wyoming .....	49	5.8	128,502	11.8	16,713	45.6