

**Exploring Green/Environmental Conservation
in the School Nutrition Setting:
Results of a National Survey**



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National Food Service Management Institute The University of Mississippi

Building the Future Through Child Nutrition

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PURPOSE

The purpose of the National Food Service Management Institute is to improve the operation of child nutrition programs through research, education and training, and information dissemination.

MISSION

The mission of the National Food Service Management Institute is to provide information and services that promote the continuous improvement of child nutrition programs.

VISION

The vision of the National Food Service Management Institute is to be the leader in providing education, research, and resources to promote excellence in child nutrition programs.

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**EXPLORING GREEN/ENVIRONMENTAL CONSERVATION IN THE SCHOOL
NUTRITION SETTING: RESULTS OF A NATIONAL SURVEY**

EXECUTIVE SUMMARY

School nutrition (SN) professionals contribute to the health and well-being of students by providing them nutritious meals in a healthy school environment. School nutrition operations expend large amounts of resources (food, energy, water, metal, paper, and plastic products) to meet students' nutritional needs. School nutrition professionals take these, and many other factors, under consideration when adopting and sustaining green and environmental conservation (GEC) practices within the SN departments and for their school community. However, guidance and documentation of sustained GEC practices within the SN arena, and peer-reviewed research evaluating GEC practices in SN programs, are limited. Building on previous case study research, the National Food Service Management Institute, Applied Research Division conducted a two-phased study to examine common GEC practices and the attitudes and behaviors of SN directors who adopt GEC practices.

In the first phase of the study, six SN professionals involved in GEC approaches in SN programs participated in an expert panel to provide insight into GEC practices, benefits, and barriers of sustainability. In the second phase of the study, qualitative data from the expert panel was used to draft a survey. The survey was evaluated and piloted by a review panel of 19 SN professionals, and were revised according to the review panel's recommendations. The final survey was distributed to a random sample of 700 SN directors in all seven USDA regions across the country. A total of 223 surveys (31.8%) were returned.

From the surveys received, 42.9% of respondents reported that their SN department/school district is involved in GEC efforts, and 25.0% indicated that they were in the process of planning GEC initiatives. The six GEC practices that were being planned or sustained at the time of data collection were the following: recycling; energy conservation; air and water conservation; resource conservation; GEC building renovations and construction practices; and other GEC practices, such as purchasing locally grown foods and school gardening projects.

School nutrition professionals perceived “environmental conservation” as supporting and promoting the protection of the environment (3.38 ± 0.5), and believed that the sustainability of GEC practices depends upon administrative support (3.32 ± 0.6). School nutrition directors indicated that their primary roles in GEC efforts were as nutrition educator (56.0%) and role model (49.1%). The top perceived benefits of implementing and sustaining GEC practices included: providing a safe and healthier environment for students (3.17 ± 0.8), and encouraging students to adopt lifelong conservation behaviors (3.15 ± 0.7). The top perceived barriers that have prevented the implementation and sustainability of GEC practices in SN programs/schools included: the lack of equipment and/or resources to support GEC practices (2.76 ± 0.8) and cost (2.70 ± 0.9). Findings from this study will be used to develop a Web-based GEC resource for SN professionals who wish to implement or sustain GEC practices.

INTRODUCTION

School nutrition (SN) professionals contribute to the health and well-being of students by providing them nutritious meals in a healthy school environment. In 2012, more than 31.6 million children received lunch through the National School Lunch Program (United States Department of Agriculture, Economic Research Service, 2012). To provide these healthy meals, SN operations use large amounts of energy, water, metal, paper, and plastic resources. School nutrition operations, as well as other restaurant and food service industries, consume as much energy per square foot as any other department in their organization (Wie, Shanklin, & Lee, 2003; Mills, 2008). According to the Washington State Department of Ecology (1987), schools generate as much as 240 pounds of solid waste per student per year or one to one-and-a-half pounds per student per day. With the growing concerns to protect the environment, SN directors and their staff are actively leading and participating in their departments', schools', and communities' efforts to improve the environment and conserve energy and natural resources.

Many factors drive the decisions made by SN professionals to adopt and sustain green/environmental conservation (GEC) practices. These GEC practices include recycling, purchasing eco-friendly equipment and cleaning products, incorporating waste management practices, and establishing farm-to-school programs, as well as other GEC practices. While decisions to implement and sustain these practices may differ, many SN directors face challenges of “going green,” or adopting environmental conservation practices, such as: spacing, labor, or equipment issues; budget constraints; lack of school and community support; and the lack of financial, education and training resources to sustain these practices (Lewis & Nettles, 2012). Peer-reviewed research evaluating GEC practices in SN programs is limited and needed to

provide additional guidance for planning, implementing and GEC practices in SN programs and schools.

Utilizing data from a previous GEC qualitative study, The National Food Service Management Institute, Applied Research Division conducted a two-phase study to examine sustained GEC practices across the country and the barriers associated with implementing and sustaining these practices in SN settings. The study also explored the attitudes and behaviors of SN directors who adopt GEC practices, and how their contributions to school conservation efforts may impact adoption and sustainability of these practices.

Research Objectives

The specific objectives of this project included the following:

- Describe the extent to which SN professionals are involved in the planning, implementation, and sustainability of GEC practices in schools;
- Examine SN professionals' attitudes/beliefs about their perceived roles in, and responsibility for, supporting and contributing to GEC efforts in the SN setting and the school district;
- Document the types of practices, activities/strategies that are being utilized in efforts to adopt GEC into the school environment, and identify the venues in which these efforts are occurring (i.e., kitchens, cafeterias/dining areas, classrooms, etc.);
- Identify any policy development, education, and training activities related to GEC that have been implemented for students, SN staff, and other school personnel;
- Investigate allocation of resources (funding, rebates, and other resources) for GEC activities; and
- Identify the barriers to providing GEC practices.

METHODOLOGY

Research Plan

The purpose of this study was to identify the green and environmental conservation (GEC) practices in school nutrition (SN) programs throughout the United States. To accomplish research objectives, the two-phase study also explored the roles of school and community stakeholders, and examined the benefits and barriers associated with implementing and sustaining these practices. In the first phase, qualitative data from a previous GEC study by Lewis and Nettles (2012) at the National Food Service Management Institute, Applied Research Division (NFSMI, ARD) and research literature were used to develop the protocol for an expert panel. The expert panel discussion guided the development of a survey instrument that was used to assess SN professionals' roles in planning, implementing, and sustaining environmental practices as a part of the SN operation or as a part of their school.

Informed Consent

The Human Subjects Protection Review Committee of the University of Southern Mississippi approved the protocol for this research study. All data were stored in the NFSMI, ARD office. Recorded information collected from the previous study, data collected from the expert panel, draft survey, review panel, and survey data from the current study were transcribed in a manner to ensure the anonymity of all participants. Informed consent was obtained from respondents participating in all facets of the study. Agreement to participate on the review panel and returned surveys from respondents served as consent.

Phase I

Expert Panel

State agency child nutrition directors representing the seven USDA regions were asked to provide names and contact information for two to three SN directors in their states who had initiated GEC approaches and initiatives in their SN programs. These SN directors were e-mailed invitations requesting their participation on an expert panel. Expert panel members were invited to participate in directed discussions. The purpose of these discussions was to collect data relative to the objectives of the study, and to collect information that would be used to develop the survey instrument for Phase II. The invitation described the purpose of the project, the role of the expert panel, and included the researcher's contact information should questions and concerns related to the study arise. The invitation also included an informed consent statement outlining the details of expert panel members' participation in the study. A return e-mail from the invitees agreeing to participate on the expert panel served as consent. Six expert panel members agreed to participate; confirmation e-mails were sent with additional information regarding the upcoming panel discussions and travel arrangements.

The expert panel discussion was facilitated by a researcher with an assistant moderator documenting participants' comments on a computer. The agenda and questions for the expert panel meeting were planned to address the goals related to the research objectives. The information collected from the discussions guided the development of a survey instrument to assess SN professionals' roles in planning, implementing, and sustaining environmental practices in their SN operation or as a part of their school's efforts. The data collected from the expert panel session were summarized and used to develop the draft survey instrument.

Phase II

Survey Development, Review, and Survey Revision

The results from the expert panel discussion conducted during Phase I and previous NFSMI, ARD GEC case study research data were used to develop and format an electronic survey (e-survey) instrument to assess the research objectives. The survey was electronically formatted and administered using Survey Monkey online survey software (www.surveymonkey.com). Researchers e-mailed 30 SN professionals (recommended by state agency child nutrition directors) who had demonstrated implementing and sustaining GEC practices in SN settings. The e-mail invited SN professionals to serve on the review panel to evaluate the survey and cover letter. The e-mail included instructions and an informed consent/confidentiality statement for participating and completing the directed review. The e-mail also included an attached cover letter with a link to the draft survey instrument, and an evaluation form. The cover letter described the purpose of the research study; and provided instructions for accessing, reviewing, completing, and providing comments on the e-survey. The researcher's contact information and return instructions for e-mailing the evaluation form were also included. Evaluation instructions asked reviewers to provide comments/suggestions on the evaluation form related to the readability, clarity, and flow of the survey instrument to meet the goals and objectives of the research study. Completion of the e-survey and return of the evaluation form served as consent to participate in the review process. Responses from 19 review panelist were tabulated; comments and suggestions were summarized and incorporated into the development of the final survey instrument.

Based on comments and suggestions from the review panel, revisions were made to the survey instrument. Suggestions were provided by the review panel and NFSMI, ARD staff to

change the survey distribution format from electronic to a scannable, paper survey for mail distribution. The final scannable survey was developed using the Magenta 5.0 Forms Designer software and consisted of two sections:

- Section I:
 - GEC Practices
 - Recycling Practices (n = 14)
 - Energy Conservation Practices (n = 16)
 - Air and Water Conservation Practices (n = 15)
 - Resource Conservation Practices (n = 13)
 - GEC Building Renovations and Construction Practices (n = 12)
 - Other GEC practices (n = 10)
 - GEC Roles
 - SN Director/Manager (n = 9)
 - SN Staff (n = 8)
 - School District and Community (n = 13)
 - GEC Resources (n = 8)
 - Benefits for Sustaining GEC Practices (n = 9)
 - GEC Policies and Procedures (n = 6)
 - Evaluating GEC Practices (n = 10)
 - GEC Training (n = 5)
- Section II:
 - GEC Perceptions (n = 17)
 - GEC Perceived Barriers (n = 14)
 - Demographics (n = 5)

Sample and Survey Distribution

The study sample was selected from the data base of school districts maintained by Market Data Retrieval, a company that specializes in the school market (100 SN directors in each of the seven USDA regions). Pre-notice letters were mailed to each SN director in the sample.

These letters explained the purpose of the study and requested each director's participation by completing and returning the forthcoming survey, which would be mailed within one week. One week later, survey packets consisting of the survey cover letter, the survey instrument, and a self-addressed, postage-paid envelope for returning the completed survey were mailed to 700 SN directors. The cover letter informed participants of the purpose of the study, requested their participation, informed them of their rights and confidentiality of their responses, and provided the researcher's contact information for questions or concerns. No identifying codes were placed on the survey, thus preserving the anonymity of all respondents. Participants were asked to return the completed surveys within a three-week time period. A reminder postcard was sent to the participants two weeks after the initial letters were mailed to encourage directors to complete and return the survey if they had not already.

Data Analysis

Surveys were analyzed using the statistical package SPSS Version 17.0 for Windows. Descriptive statistics included means, standard deviations, frequencies, and percentages of total responses.

RESULTS AND DISCUSSION

A total of 223 of 700 surveys (31.8%) were completed and returned. The majority of respondents were school nutrition (SN) directors (89.0%) with SN managers and area supervisors also represented. All United States Department of Agriculture (USDA) regions were represented, with the largest percentage of respondents (19.2%) from the Southeast region and the smallest percentage of respondents (10.3%) from the Northeast region. Respondents with the largest percentage of respondents had less than five years of work-related experience in their current position (28.6%), had at least a Bachelor's degree (22.7%), and had no active role in implementing and/or sustaining green and environmental conservation (GEC) practices in their SN program and/or school district. Personal and program characteristics of the survey participants are presented Table 1.

Table 1

Personal and Program Characteristics of Survey Participants

Characteristics	Frequency^a	%
USDA Region (n = 214)		
Southeast	41	19.2
Mountain Plains	37	17.3
Mid-Atlantic	33	15.4
Western	32	15.0
Midwest	25	11.7
Southwest	24	11.2
Northeast	22	10.3
Job Title (n = 210)		
SN Director	187	89.0
SN Manager	15	7.1
SN Assistant Director/Area Supervisor	8	3.8
Work Experience Under Current Job Title (n = 213)		
Less than 5 years	61	28.6
Six to 10 years	54	25.4
Longer than 20 years	36	16.9
Eleven to 15 years	33	15.5
Sixteen to 20 years	29	13.6
Highest Level of Education		
Bachelor's degree	47	22.7
High school diploma or GED	41	19.8
Some graduate credits	40	19.3
Associate's degree	38	18.4
Master's degree	26	12.6
Graduate credits beyond Master's degree	13	6.3
Doctoral degree	2	1.0
Experience Involved in GEC Practices		
No active role in GEC practices	109	51.2
Less than 5 years	72	33.8
Six to 10 years	7	8.0
Sixteen to 20 years	7	3.3
Eleven to 15 years	6	2.8
Longer than 20 years	2	0.9

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

Green and Environmental Conservation Practices in School Nutrition Programs and Schools

Respondents selected GEC practices in six categories related to their SN department's/school district's involvement and are all presented in Table 2. Simple GEC practices that require changes in behavior were dominate sustainable practices in SN programs and schools. The top three recycling practices reported were recycling paper and cardboard (78.0%), placement of recycling bins in key locations (65.4%), and recycling aluminum and other metals (48.4%). Turning off excess lights (87.0%), purchasing and/or using Energy Star equipment (58.4%), and using energy-efficient bulbs (57.1%) were the top three reported energy conservation practices. Respondents rated turning off water when not in use (84.6%), regular maintenance of ventilation hoods (82.7%), and regular maintenance of faucets, ice machines, and steamers (66.0%) as the top air and water conservation practices. The top three resource conservation practices selected were related to conserving paper products. These included sending e-mails to reduce paper (88.4%), reusing office paper (59.1%), and using both sides of copy paper for printing (56.7%). Respondents selected building renovations and new GEC building construction practices that they and/or their school district were supporting. The highly selected practices were recycling efforts (64.6%), installing energy- and water-efficient equipment (42.2%), and planning or have already installed double-paned windows (25.9%). Other highly rated GEC practices not previously categorized were purchase locally grown foods that were not a part of a farm-to-school program (47.6%), school garden projects (44.1%), and participation in farm-to-school program (40.7%).

Table 2

Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a

Recycling Practices (<i>n</i> = 683)	Percent of Cases	Number
Recycle paper and cardboard	78.0	124
Placement of recycling bins in key locations	65.4	152
Aluminum, steel, tin, and/or other metals	48.4	77
Use recycled paper products	43.4	69
Recycle oil	40.3	64
Recycle plastic milk bottles or other plastic containers	38.4	61
Recycle wood pallets	28.3	45
Use recyclable lunch trays and serviceware	23.9	38
Recycle glass	23.3	37
Reuse/recycle biodegradable products	12.6	20
Implement/follow single stream recycling procedures	8.8	14
Purchase/use carts and racks made of recycled aluminum	8.2	13
Recycle polystyrene/other Styrofoam	7.5	12
No plans/no involvement to recycle	3.1	5

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

(Table 2 continues)

*(Table 2 continued)**Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a*

Energy Conservation Practices (<i>n</i> = 758)	Percent of Cases	Number
Turn off excess lights	87.0	140
Purchase and/or use Energy Star equipment	58.4	94
Use energy-efficient bulbs	57.1	92
Install programmable thermostats	46.0	74
Use energy-efficient equipment	42.2	68
Plans to install or use motion-sensored lighting	35.4	57
Remove refrigerators and microwaves from the classrooms	29.8	48
Remove excess fluorescent bulbs	27.3	44
Use an Energy Monitoring and Management System (EMS)	27.3	44
Implement/practice fuel conservation procedures	24.8	40
Practice other energy conservation procedures	24.2	39
Use biofuels in transportation vehicles	5.0	8
Use solar panels	3.1	5
Purchase/use hybrid vehicles	1.2	2
No plans to implement/no involvement energy conservation practices	1.2	2
Use wind energy	0.6	1

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.*(Table 2 continues)*

(Table 2 continued)

Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a

Air and Water Conservation Practices (<i>n</i> = 721)	Percent of Cases	Number
Turn off water when not in use	84.6	137
Conduct regular maintenance of ventilation hoods	82.7	134
Conduct regular maintenance of faucets, ice machines, and steamers to prevent leaks	66.0	107
Implement/follow Integrated Pest Management System (IPMS)	56.2	91
Install and conduct regular maintenance of water filtration systems	34.6	56
Plans to or has installed motion-sensored water faucets	22.2	36
Plans to or has installed low-flow spray nozzles	21.0	34
Plans to or has installed low-flow faucets	20.4	33
Use microfiber mops and cleaning cloths	16.0	26
Use GEC-certified products that are non-toxic and/or biodegradable to reduce pollutants in the air and water	14.2	23
Practice other air and water conservation procedures	13.0	21
Plans to or has installed sensor-controlled grease hoods	5.6	9
No plans to implement/no involvement air and water conservation	4.9	8
Plans to or has installed waterless urinals in bathrooms	2.5	4
Plans to or has installed water collection system	1.2	2

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

(Table 2 continues)

*(Table 2 continued)**Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a*

Resource Conservation Practices (<i>n</i> = 688)	Percent of Cases	Number
Send e-mails instead of paper memos to reduce paper use	88.4	145
Reuse Paper	59.1	97
Use both sides of copy paper for printing	56.7	93
Prepare menu items that require less labor and energy to produce	48.2	79
Plans to or follows other paper reduction practices	45.7	75
Plans to reduce or has already reduced bleach practices	38.4	63
Plans to become or is currently bleach-free	20.7	34
Donate leftovers to local food banks	17.7	29
Purchase products with minimal packaging to reduce garbage waste	17.1	28
Use can crushers to reduce waste	11.0	18
Use other resource conservation practices	10.4	17
Use pulper to reduce amount of waste	3.7	6
No plans to implement/no involvement in resource conservation practices	2.4	4

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

(Table 2 continues)

(Table 2 continued)

Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a

Building Renovations/New Green and Environmental Conservation Building Construction Practices (<i>n</i> = 372)	Percent of Cases	Number
Supports recycling efforts	64.6	95
Install energy- and water-efficient equipment	42.2	62
Plans to or has installed double-paned windows	25.9	38
Plans to or has installed windows for natural light and ventilation	24.5	36
No plans/no involvement for GEC building renovations and/or construction	17.0	25
New GEC building construction	15.6	23
Green and environmental conservation building renovations	15.0	22
Use eco-friendly paint	14.3	21
Plans to obtain or has LEED (Leadership in Energy & Environmental Design) for School certification	10.9	16
Use recycled materials such as rubber tires for flooring	8.2	12
Install low-VOC (Volatile Organic Compounds) flooring	8.2	12
Plans to earn or is applying for other GEC certification programs	6.8	10

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

(Table 2 continues)

*(Table 2 continued)**Green and Environmental Conservation Practices in School Nutrition Programs and Schools^a*

Other Green and Environmental Conservation Practices (n = 294)	Percent of Cases	Number
Purchase locally grown foods (not a part of farm-to-school program)	47.6	69
School garden projects	44.1	64
Participate in Farm-to-School Programs	40.7	59
No plans/no involvement in any other GEC practices	17.9	26
Composting	16.6	24
Participate in community conservation projects	13.8	20
Provide GEC and food conservation education	7.6	11
Green and environmental policy development	4.8	7
Shorter school days to conserve resources	4.8	7
School-based GEC team	4.8	7

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

**Green and Environmental Conservation Roles – School Nutrition Directors, Managers,
and Staff in School Nutrition Programs and Schools**

Respondents were asked to select role descriptions for SN directors, managers, and staff that correspond with their involvement for implementing and sustaining GEC practices in their SN program and school district. The top three roles identified for SN directors and managers were nutrition educator (56.0%), role model to students and other school professionals (49.1%), and GEC trainer for SN staff (35.8%). School nutrition staff also served as role models (50.7%) to students and other staff, as nutrition educators (30.3%), and assisted in the development, implementation, and sustainability of GEC practices (26.3%) in the SN and school environment. All GEC roles for SN directors, managers, and staff are presented in Table 3.

Table 3

Green and Environmental Conservation Roles – School Nutrition Directors, Managers, and Staff in School Nutrition Programs and Schools

Green and Environmental Conservation Roles – School Nutrition Directors and Managers (<i>n</i> = 369)	Percent of Cases	Number
Serve as a nutrition educator	56.0	89
Serve as a role model	49.1	78
Train staff in GEC practices	35.8	57
Assist in the development of GEC practices	32.7	52
Apply for grants or request/receive resources to support GEC practices	22.6	36
No role in SN department's and/or school district's GEC practices	15.1	24
Lead GEC efforts	11.3	18
Green and environmental conservation team member	5.0	8
Sponsor or mentor student GEC group/organization	4.4	7
Green and Environmental Conservation Roles – School Nutrition Staff (<i>n</i> = 244)	Percent of Cases	Number
Serve as a role model	50.7	77
Serve as nutrition educators	30.3	46
Assist in the development of GEC practices	26.3	40
No role in SN department's and/or school district's GEC practices	22.4	34
School nutrition staff are involved in GEC training	13.8	21
Green and environmental conservation team member	7.2	11
Lead GEC efforts	6.6	10
Sponsor or mentor student GEC group/organization	3.3	5

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

School District and Community Stakeholders' Involvement, and Resources to Support and Sustain Green and Environmental Conservation Practices

School district and community stakeholders had a shared role in the sustainability of GEC practices in SN programs and other GEC practices in the school environment. Respondents indicated that school staff, administrators, and community stakeholders play key roles in the implementation and sustainability of GEC practices. School staff (75.6%), teachers (71.8%), and the school district's building supervisors and custodians (71.8%) were recognized as the top three stakeholders involved in assisting SN professionals with the sustainability of GEC practices. Results for all stakeholders' roles and involvement are presented in Table 4.

Table 4

School District and Community Stakeholders' Involvement (n = 916)

School District and Community Stakeholders	Percent of Cases	Number
School staff	75.6	118
Teachers	71.8	112
School District's Building Supervisors/Custodians	71.8	112
School District Administrators	71.2	111
Students	70.5	110
Principals	62.2	97
Student Groups/Organizations	42.9	67
Parents	34.0	53
Community Partners	30.8	48
Environmental Specialist/Health Inspector	18.6	29
Vendors/Manufacturers	17.3	27
Farmers	12.2	19
School District's GEC Coordinator	8.3	13

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

Resources needed to support and sustain GEC practices were as important as the roles stakeholders performed. The top three resource initiatives needed to support and sustain GEC practices in SN programs and school districts were parental/community participation (56.3%), partnership with city and county agencies (47.7%), and collaboration with food vendors (47.0%).

Table 5

Green and Environmental Conservation Resources to Support and Sustain Green and Environmental Conservation Practices (n = 223)

Resources to Support and Sustain Green and Environmental Conservation Practices	Frequency^a	%
Parental/community participation in SN department/school district GEC practices	81	56.3
School nutrition department/school district partnership with city/county	71	47.7
School nutrition department/school district collaboration with food vendors	71	47.0
School nutrition department/school district collaboration with area businesses	66	44.3
School-based organization contribute to GEC practices	62	43.7
School nutrition department/school district participate in GEC rebate/reimbursement programs	41	29.7
Grant funding	24	16.8
Green and environment conservation funds generated are used to sustain GEC practices	23	16.9

^a Percentages for each item total greater than 100%, because respondents could select multiple responses.

Benefits of Sustaining Green and Environmental Conservation Practices

School nutrition professionals indicated their level of agreement with nine statements regarding the perceived benefits of GEC practices in SN programs and/or school district. Respondents were asked to make their selection using a scale of 4 (*strongly agree*), 3 (*agree*), 2 (*disagree*), and 1 (*strongly disagree*), with an additional option of 0 (*not applicable*). Table 6 presents the means and standard deviations for each of the statements in descending order of importance. There were six statements selected with a mean importance rating of 3.00 or higher, that indicated implementing and sustaining GEC practices in the school environment cultivated behavior changes to conserve and protect the environment for the future of the students.

Table 6

Benefits of Sustaining Green and Environmental Conservation Practices

Benefit Statement	n	Mean^a	SD
The SN department's/school district's participation in GEC practices provides a safe and healthier environment for students.	152	3.17	56
The SN department/school district participates in GEC practices to help protect the environment.	152	3.16	52
Implementing GEC practices in schools will encourage students to adopt lifelong conservation practices.	156	3.15	55
The GEC practices reduce school-generated waste in landfills.	153	3.13	56
The SN department participates in GEC practices to help protect the environment.	148	3.07	64
The GEC practices save money and resources over time.	155	3.04	64
Farm-to-school programs provide more fruit and vegetable options for students.	134	2.88	86
The SN department/school district is viewed as a role model for its environmental protection actions.	139	2.64	69
The SN department/school district receives recognition for its sustainable GEC efforts.	121	2.32	74

Note: SD = standard deviation

^aThe response scale was a 4-point Likert-type scale ranging from 4, *strongly agree*, to 1, *strongly disagree*; and 0, *not applicable*.

Green and Environmental Conservation Policies and Procedures

School nutrition professionals answered “yes” or “no” to six statements to indicate if their SN program and/or school district had developed and/or implemented GEC policies and procedures to guide and sustain GEC practices. The majority of respondents indicated that their SN program (89.9%), school district (83.1%), or state agency did not have a GEC policy to guide GEC efforts. Only 20.0% of SN programs and 25.0% of school districts had developed/adopted resources and materials to inform students, school staff, and the community about GEC practices.

Table 7

Green and Environmental Conservation Policies and Procedures

Green and Environmental Conservation Policy and Procedure Statements	n	Yes Percentage (n)	No Percentage (n)
Our SN department has developed a GEC policy or resolution to guide GEC efforts.	157	10.2% (16)	89.9% (141)
Our school district has developed a GEC policy or resolution to guide GEC efforts.	154	16.9% (26)	83.1% (128)
Our state agency has guidelines for GEC initiatives.	149	21.5% (32)	78.5% (117)
Our school district has a GEC team/task force that assesses GEC efforts.	154	18.8% (29)	81.2% (125)
Our SN department has developed/adopted GEC resources for SN staff to use.	150	20.0% (30)	80.0% (120)
Our school district has developed/adopted resources and materials to inform students, school staff, and the community about GEC practices.	156	25.0% (39)	75.0% (117)

Evaluation and Training of Green and Environmental Conservation Practices

Respondents were asked to reply “yes” or “no” to statements on the evaluation of GEC practices and are listed in Table 8. More than half of all SN professionals indicated their SN program’s GEC efforts were in compliance with the school district’s standards (68.7%) and that they were responsible for supervising and assessing GEC practices (50.3%) in their department. However, only 16.9% followed their school districts’ guidelines to ensure that employees complied with GEC policies.

Table 8

Evaluation of Green and Environmental Conservation Practices

Evaluation Statements	n	Yes Percentage (n)	No Percentage (n)
I am responsible for supervising and assessing GEC practices in the SN department.	159	50.3% (80)	49.7% (79)
Our school district has an employee designated to supervise and assess GEC practices.	159	25.8% (41)	74.2% (118)
Our school district has guidelines to ensure that employees comply with GEC policies.	154	16.9% (26)	83.1% (123)
The SN department’s GEC efforts are in compliance with school district standards.	150	68.7% (103)	31.3% (47)
Our SN department has established GEC goals and objectives.	155	18.7% (29)	81.3% (126)
Our school district has established GEC goals and objectives.	150	26.0% (39)	74.0% (111)
Our SN department has a plan for achieving the GEC goals and objectives.	153	20.9% (32)	79.1% (121)

(Table 8 continues)

*(Table 8 continued)**Evaluation of Green and Environmental Conservation Practices*

Evaluation Statements	n	Yes <i>Percentage</i> <i>(n)</i>	No <i>Percentage</i> <i>(n)</i>
Our school district has a plan for achieving the GEC goals and objectives.	150	26.0% (39)	74.0% (111)
Our school district has guidelines to ensure that all employees comply with local, state, and federal GEC standards.	151	27.2% (41)	72.8% (110)
Our school district has a GEC team responsible for evaluating and providing recommendations to improve GEC efforts.	151	18.5% (28)	81.5% (123)

School nutrition professionals also responded “yes” or “no” to statements related to training to implement and sustain GEC practices in the SN department and/or school district. Respondents reported that students (37.5%) were trained and encouraged to adopt GEC practices. However, training was not a focal point for implementing GEC practices. Most SN professionals indicated that they (86.7%), their SN staff (83.8%), and school staff (83.8%) had not received any GEC training. Green and environmental conservation resources, such as posters and handbooks, were not distributed to SN staff and school staff (82.9%) to reinforce any training and encourage the sustainability of GEC practices. The responses for the GEC training section are presented in Table 9.

Table 9

Green and Environmental Conservation Training

Green and Environmental Conservation Training Statements	<i>n</i>	Yes Percentage (<i>n</i>)	No Percentage (<i>n</i>)
I have received training related to the GEC efforts in our SN department/school district.	166	13.3% (22)	86.7% (144)
Members of the SN staff have received training related to the GEC efforts in our SN department/school district.	158	19.6% (31)	83.8% (129)
School staff has received training related to the GEC efforts in our SN department/school district.	154	16.2% (25)	83.8% (129)
Students are trained and encouraged to adopt GEC practices.	152	37.5% (57)	62.5% (95)
Green and environmental conservation resources, such as posters and handbooks, are distributed to SN staff and school staff to reinforce training and to encourage GEC practices.	152	17.1% (26)	82.9% (126)

Perceptions of Green and Environmental Conservation Practices

School nutrition professionals indicated their level of agreement with 17 statements regarding perceptions of GEC practices in SN programs and/or school district. Respondents were asked to make their selection using a scale of 4 (*strongly agree*), 3 (*agree*), 2 (*disagree*), and 1 (*strongly disagree*), with an additional option of 0 (*not applicable*). Table 10 presents the means and standard deviations for each of the statements in descending order of importance. There were four perception statements selected with a mean agreement rating of 3.00 or higher. Green and environmental conservation terminology was common for respondents. School nutrition professionals believed that “environmental conservation” includes supporting or promoting the protection of the environment ($3.38 \pm .56$) and that sustainability of GEC practices

in the SN program and school district ($3.32 \pm .58$) relied upon administrative support. When respondents hear the term “going green” ($3.17 \pm .52$), they often think that the term related to environmental-friendly products. “Green” practices, products, and services ($3.11 \pm .48$) are perceived as environmentally- and economically-friendly.

Table 10

Perceptions of Green and Environmental Conservation Practices

Green and Environmental Conservation Perceptions Statement	n	Mean^a	SD
“Environmental conservation” means supporting or promoting the protection of the environment.	209	3.38	.55
Sustainability of GEC practices depends upon administrative support.	207	3.32	.58
When I hear the term “going green,” I think of environmental-friendly products.	211	3.17	.52
“Green” practices, products, and services are environmentally- and ecologically-friendly.	197	3.11	.48
Implementing and sustaining GEC practices will provide a healthier learning environment.	199	2.95	.62
I take part in GEC practices to protect the environment for the children.	188	2.94	.60
Farm-to-school programs and purchasing locally grown foods provide students with greater access to fresh fruits and vegetables.	206	2.91	.81
Conserving and protecting the environment is a priority for me.	198	2.90	.67
School nutrition programs make efforts to minimize the negative impact on the environment.	203	2.90	.62
Green and environmental conservation practices can save money and resources over time.	205	2.88	.73

^aThe response scale was a 4-point Likert-type scale ranging from 4, *strongly agree*, to 1, *strongly disagree*; and 0, *not applicable*.
(Table 10 continues)

*(Table 10 continued)**Perceptions of Green and Environmental Conservation Practices*

Green and Environmental Conservation Perceptions Statement	n	Mean^a	SD
The terms “going green” and “environment conservation” have the same meaning.	210	2.80	.67
I believe that locally grown foods are healthier.	206	2.70	.82
My school district supports the SN program’s GEC efforts.	161	2.67	.67
“Going green” has become too commercial.	196	2.65	.81
Implementing and sustaining GEC practices costs too much.	190	2.56	.74
Using “green products” means that the products are natural.	206	2.56	.67
I seek vendors who support green and environmental conservation efforts.	165	2.50	.70

^aThe response scale was a 4-point Likert-type scale ranging from 4, *strongly agree*, to 1, *strongly disagree*; and 0, *not applicable*.

Perceived Barriers of Green and Environmental Conservation Practices

The last section of survey assessed respondents’ level of agreement with 14 statements related to barriers for implementing and sustaining GEC practices. Respondents were asked to make their selection using a scale of 4 (*strongly agree*), 3 (*agree*), 2 (*disagree*), and 1 (*strongly disagree*), with an additional option of 0 (*not applicable*). Table 11 presents the means and standard deviations for each of the statements in descending order of importance. There were no barrier statements selected with a mean agreement rating of 3.00 or higher, indicating that respondents did not agree that the statements were perceived as barriers for implementing and sustaining GEC practices. Mean ratings for the 14 statements ranged from 2.76 to 1.77. Many of the barrier statements that received mean ratings below the disagreement rating of 2.5 were related to stakeholders’ support of GEC efforts. The support statements were written as inverted

agreement (i.e. “I do not support GEC efforts”); therefore, mean low ratings relate to respondents’ disagreement that the stakeholders’ support statements were barriers for implementing and sustaining GEC practices. These mean ratings for these statements were: vendors ($2.35 \pm .73$); SN staff ($2.18 \pm .58$); custodians ($2.16 \pm .72$); teachers ($2.05 \pm .64$); school district administrators’ ($2.03 \pm .60$); school staff [administration/clerical staff] ($2.03 \pm .60$); community stakeholders ($2.02 \pm .52$); students ($1.98 \pm .63$); parents ($1.97 \pm .56$); and school nutrition professionals ($1.77 \pm .61$).

Table 11

Perceived Barriers of Green and Environmental Conservation Practices

Green and Environmental Conservation Barriers Statement	<i>n</i>	Mean^a	SD
The SN department/school district does not have the equipment and/or resources to support GEC practices.	192	2.76	.78
Implementing and sustaining GEC practices cost too much.	195	2.70	.71
Implementing and sustaining GEC practices take too much time.	196	2.42	.66
There are no vendors in our area to support the GEC efforts.	167	2.35	.73
It takes too long to get SN staff to adopt GEC practices.	191	2.26	.61
School nutrition staff would not/does not like the GEC initiatives.	182	2.18	.58
Custodians would not/do not support GEC efforts.	185	2.16	.72
Teachers would not/do not support GEC efforts.	184	2.05	.64
District administrators would not/do not support GEC efforts.	185	2.03	.60
School staff [administration/clerical staff] would not/do not support GEC efforts.	183	2.03	.60

^aThe response scale was a 4-point Likert-type scale ranging from 4, *strongly agree*, to 1, *strongly disagree*; and 0, *not applicable*.
(Table 11 continues)

(Table 11 continued)

Perceived Barriers of Green and Environmental Conservation Practices

Green and Environmental Conservation Barriers Statement	<i>n</i>	Mean^a	SD
The community does not support the SN department's/school district's GEC efforts.	176	2.02	.51
Students would not/do not support GEC efforts.	185	1.98	.63
Parents would not/do not support GEC efforts.	181	1.97	.56
I do not support GEC efforts.	181	1.77	.61

^aThe response scale was a 4-point Likert-type scale ranging from 4, *strongly agree*, to 1, *strongly disagree*; and 0, *not applicable*.

CONCLUSIONS AND RECOMMENDATIONS

This study examined common green/environmental conservation (GEC) practices and the attitudes and behaviors of school nutrition (SN) professionals who adopt GEC practices in SN programs and/or school districts across the United States (U.S.). Overall, SN professionals are involved, and are sustaining six major GEC practices, with recycling as the primary GEC initiative practiced. Among the six categories of GEC practices, initiatives that required minimal change in behavior and little to no implementation resources (i.e., turning off lights, water, and computers when not in use) were more adoptable and sustainable by stakeholders who envisioned the perceived benefits for implementing the practice. Implementation and sustainability of more complex GEC practices that required additional funding and resources rely on stakeholders' perceptions that they are conserving and protecting the environment for the future of the children. Stakeholders' defined roles are also important in sustaining GEC practices in the SN department and school district. School nutrition professionals viewed themselves and SN staff as role models and nutrition educators, and often assisted with the development of GEC practices in the SN department and/or school district. School administrators and SN directors are instrumental with supporting school-based GEC practices, and are key stakeholders for allocating resources, evaluating GEC benefits and barriers, documenting GEC progress, and partnering with stakeholders outside of the school community to expand and sustain GEC practices. The results of this study support that sustainability relies on the type of GEC practice implemented, support from various stakeholders (within and outside of the SN department and school district), and the availability of resources.

One informal finding from this study was the sustained need to use printed, mailed surveys instead of survey distribution using an electronic format as a GEC initiative. Initial

research and expert panel recommendations in Phase I of the study suggested the use of an e-survey and cover letter format as a GEC practice. However, review panel members evaluating the electronic form suggested that researchers would not be able to receive enough feedback due to many SN professionals' e-mail service protection and limitations. Also, it was suggested that many SN professionals still preferred print media, although many recycle paper.

Education and Training Implications

- Education resources and training could be developed to assist SN professionals with the identification of GEC practices in SN programs and SN roles for implementing and sustaining GEC practices.
- A resource could be developed to provide guidance for implementing, evaluating, and sustaining GEC practices in SN programs.

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