# THE BENEFITS OF FARM TO SCHOOL

## Stay Informed

Join our network:
**FarmtoSchool.org**

Twitter
**@FarmtoSchool**

Facebook
**National Farm to School Network**

Instagram
**@FarmtoSchool**

NATIONAL FARM to SCHOOL NETWORK

**GROWING STRONGER TOGETHER**
The National Farm to School Network is as an information, advocacy and networking hub for communities working to bring local food sourcing, school gardens and food and agriculture education into school and early care and education settings.

Updated April 2017

## What is Farm to School?

Farm to school enriches the connection communities have with fresh, healthy food and local food producers by changing food purchasing and education practices at schools and early care and education sites. Farm to school empowers children and their families to make informed food choices while strengthening the local economy and contributing to vibrant communities. Farm to school implementation differs by location but always includes one or more of the following three core elements:

**Procurement**: Local foods are purchased, promoted and served in the cafeteria, as a snack or in classroom taste-tests.

**Education**: Students participate in education activities related to agriculture, food, health and nutrition.

**School gardens**: Students engage in hands-on, experiential learning through gardening.

## Why Farm to School?

### KIDS WIN
Farm to school provides all kids access to nutritious, high-quality, local food so they are ready to learn and grow. Farm to school activities enhance classroom education through hands-on learning related to food, health, agriculture and nutrition.

### FARMERS WIN
Farm to school can serve as a significant financial opportunity for farmers, fishers, ranchers, food processors and food manufacturers by opening doors to an institutional market worth billions of dollars.

### COMMUNITIES WIN
Farm to school benefits everyone from students, teachers and administrators to parents and farmers, providing opportunities to build family and community engagement. Buying from local producers and processors creates new jobs and strengthens the local economy.

## Benefits of Farm to School

Economic Development

Public Health

Education

Environment

Community Engagement

# Economic Development

## Job Creation and Economic Activity

- Creation and maintenance of jobs in the community and in the state; for every job created by school districts purchasing local foods, additional economic activity creates another 1.67 jobs.[40,55]
- Increase in economic activity in the community and in the state.[40,49,50,55]
- Each dollar invested in farm to school stimulates an additional $0.60-$2.16 of local economic activity, in one case resulting in $1.4 million overall contribution to the state.[40]
- Strengthen connections within the state's food economy.[40]
- Increase in student meal participation from 3 percent to 16 percent (average +9 percent), generating increased revenue for schools through meal programs.[8-9,20-21,23-25,36,41,49,58]
- Decrease in school meal program costs.[41,48]

## Farmer and Producer Income

- Increase in local procurement as farm to school programming matures, with documented local sourcing reaching up to 50 percent of all produce purchases in season.[7-9,20,22-23,25,36-37,39]
- Average 5 percent increase in income from farm to school sales and establishment of a long-term revenue stream for individual farmers.[7,9,20,22-23,36,39,55]
- Increase in market diversification and economic growth opportunities for farmers; positive relationships for farmers with school districts, parents and community members; farmers contracted to plant crops for schools; opportunities to explore processing and preservation methods for institutional markets; establishment of grower collaboratives or cooperatives to supply institutional markets.[36-37, 68]

# Public Health

Farm to school is a community-based strategy that includes a focus on creating a healthy school food environment.[1] Farm to school activities support development of healthy eating habits for children while improving family food security by boosting the quality of school meal programs.[2–5]

## Student Nutrition Behaviors

- Improvement in early childhood and K-12 student health behaviors, including choosing healthier options at school meals, consuming more fruits and vegetables through farm to school meals and at home (+0.99 to +1.3 servings/day), consuming less unhealthy foods and sodas, reducing screen time and increasing physical activity.[6-31,43-46,49,51,53,57,61-64,67,68]
- Increase in fruit and vegetable consumption among those with the lowest previous intake.[51]
- When schools offer school gardens, 44.2 percent of students eat more fruits and vegetables; when schools serve local food, 33.1 percent of students eat more fruits and vegetables.[46]
- Demonstrated willingness to try new foods and healthier options (in early childhood and K-12 settings).[7,20-22,30-33,45,47]
- Tripled amount of fruit and vegetable consumption when students participate in hands-on, food-based activities.[47]
- Minimized diet-related diseases in childhood such as obesity and diabetes through the promotion of eating fresh fruits and vegetables, specifically for high-risk, low-income students.[50,59,61]

## Knowledge, Attitudes and Access

- Improvement in nutrition habits, environmental awareness and health-related knowledge.[57,61]
- Increase in willingness to try and consumption of fruits and vegetables at an older age due to gardening at a young age.[60]
- Increase in access to fruits and vegetables; increase in planning and preparing meals at home.[57,61-64]
- Increase in ability and interest in incorporating healthier foods into family diets and guiding children in early childhood and K-12 to make healthier choices; positive changes in shopping patterns reflecting healthy and local foods.[7,20,22,27,33,68]
- Increase among young children in asking their families to make healthier purchases.[33]
- Improvement in household food security.[40]
- Improvement in food service operations to support healthy outcomes, such as increased cafeteria offerings of fruits and vegetables; development of new seasonal recipes; changes in cafeteria waste management policies.[8-9,21,23-25,36,37]

# Education

## Student Engagement and Academic Achievement

- Increase in knowledge and awareness about gardening, agriculture, healthy eating, local foods, nutrition, growing cycles, seasonality and other STEM concepts (in early childhood and K-12 settings).[7,20-22,26,31-33,42,44,48,49,61,68]
- Enhanced overall academic achievement in K-12 settings, including grades and test scores; increase in opportunities for physical activity and social and emotional growth; increase in school engagement.[53,61,63,57]
- Provides children with an understanding of agriculture and the environment; provides children with opportunities for social and emotional growth; improves life skills, self-esteem, social skills and behavior.[34-35,48,50,53,57,63]
- Increased opportunity for innovative teaching platforms for core subjects, such as science, math and language arts in early childhood and K-12 settings.[68]
- Greater opportunity for necessary experiential and hands-on learning.[50,69]
- Encourages low-income students and students of color to engage in food and environmental issues in their communities.[53]

## Educator and Parent Engagement

- Positive changes in teachers' diets and lifestyles; positive attitudes about integrating farm to school related information in curriculum; intention to implement farm to school activities in the classroom.[7,20-22, 30,52,66]
- Increase in knowledge among parents of young children about farmers' markets.[33]
- Increase in parent acceptance of farm to school programs as their children demonstrate healthier behaviors such as increased fruit and vegetable consumption.[54]
- Increased parent engagement in early childhood educational opportunities.[68]
- Improvements in food service staff motivation and morale; increase in knowledge and interest in local food preparation and seasonal recipes; increase in interactions with teachers to strengthen classroom and cafeteria connections.[7,22,38]



# Environment

## Food Waste

- Reduced food waste of local food, both on the production side as well as plate waste; decrease in overall food waste due to farm to school activities.[41,56,58]

## Sustainability

- Reduced transportation-related environmental impacts, such as emissions of air pollutants.[50,71]
- Support of environmentally sound, sustainable and socially just approaches to food production, processing, packaging, transportation and marketing.[68]
-

# Community Engagement

- Increase in community awareness about and interest in purchasing local foods and foods served in school cafeterias.[7,22]
- Improved acceptance of healthier school meals among the community.[58]
- Increase in opportunities to combat racial and economic inequities in the school food system.[70]
- Increase in support from parents and community for healthier school meals.[41,58]

# Summary of Farm to School Benefits

| Population | Reach | Benefits |
|---|---|---|
| **Students** | | |
| Fruit and vegetable consumption | Increased +0.99 to +1.3 servings per day | Public Health |
| Physical activity | Reduced screen time and increased physical activity | Public Health |
| Health | Minimized diet-related diseases such as childhood obesity and diabetes | Public Health |
| Food system awareness | Increased knowledge about gardening, agriculture, healthy food, local food, seasonality | Public Health<br>Education |
| Food choices | Willingness to try new and healthy food; choosing healthier options in the cafeteria and at home | Public Health<br>Education<br>Community Engagement |
| Academic achievement | Overall improvement in both grades and test scores (K-12) | Education |
| Behavior | Improved life skills, self-esteem, social skills and other types personal growth | Education |
| **Schools** | | |
| Meal participation | Average increase of 9% (range 3% to 16%) | Economic Development<br>Public Health |
| Meal cost | Lowers school meal program costs | Economic Development |
| Local food sourcing | Reaching up to 50% of all produce purchases in season | Economic Development<br>Environment |
| Cafeteria options | Increased offerings of fruits and vegetables; new seasonal recipes; new waste management policies | Public Health<br>Environment |
| Food service staff | Improved morale; increased knowledge of local food | Education<br>Community Engagement |
| Educators | Positive diet and lifestyle changes; greater intent to integrate farm to school activities in the classroom | Public Health<br>Education<br>Community Engagement |
| Learning opportunities | Greater opportunity for hands-on, active and experiential learning opportunities | Public Health<br>Education |
| **Farmers and Producers** | | |
| Income | Average increase of 5% | Economic Development |
| Markets | Increased diversification and new opportunities | Economic Development<br>Community Engagement |
| **Families and Community Members** | | |
| Local economy | $0.60-$2.16 economic activity generated for every $1 spent | Economic Development |
| Job creation | Each new farm to school job contributes to the creation of additional 1.67 jobs | Economic Development<br>Community Engagement |
| Low-income students and students of color | Decreases health risks; encourages community engagement in environmental issues | Public Health<br>Community Engagement |
| Parents and families | Increased food security and positive diet changes; increased student participation in meals at home | Public Health<br>Community Engagement |
| Food waste and transportation | Decreased food waste; decreased air pollution | Environment |

# Resources


1. Green LW, Sim L, Breiner H. Evaluating Obesity Prevention Efforts: A Plan for Measuring Progress. The National Academies Press, Washington D.C.: Committee on Evaluating Progress of Obesity Prevention Efforts; Food and Nutrition Board; Institute of Medicine. 2013.
2. White House Task Force on Childhood Obesity Report to the President. Solving the Problem of Childhood Obesity within a Generation. 2010.
3. United States Department of Agriculture. Know Your Farmer, Know Your Food Initiative. 2010. Available at http://www.usda.gov/ wps/portal/ usda/knowyourfarmer?navid=KNOWYOURFARMER
4. Turner L, Chaloupka FJ. School Policies and Practices to Improve Health and Prevent Obesity: National Elementary School Survey Results Executive Summary. Bridging the Gap, Chicago: University of Illinois. 2010.
5. Keener D, Goodman K, Lowry A, Kettle Khan L. Recommended community strategies and measurements to prevent obesity in the United States: Implementation and measurement guide. 2009.
6. Joshi A, Azuma AM, Feenstra G. Do Farm-to-School Programs Make a Difference? Findings and Future Research Needs. J Hunger Environ Nutr. 2008;3(2/3):229–46.
7. Schmidt MC, Kolodinsky J, Symans C. The Burlington School Food Project, Final Evaluation Report. Center for Rural Studies, Vermont University. 2006.
8. Feenstra G, Ohmart J. Yolo County Farm to School Evaluation Report. Davis, CA: A Report of UC Sustainable Agriculture research and Education Program. 2005.
9. Feenstra G, Ohmart J. Yolo County Farm to School Evaluation Report for the California Farm to School Program. Davis, CA: A Report by UC Sustainable Agriculture Research and Education Program. 2004.
10. Evans A, Ranjit N, Rutledge R, Medina J, Jennings R, Smiley A, et al. Exposure to multiple components of a garden-based intervention for middle school students increases fruit and vegetable consumption. Health Promot Pract. 2012;13(5):608–16.
11. Howerton MW, Sue Bell B, Dodd KW, Berrigan D, Stolzenberg-Solomon R, Nebelling L. School-based Nutrition Programs Produced a Moderate Increase in Fruit and Vegetable Consumption: Meta and Pooling Analyses from 7 Studies. J Nutr Educ Behav. 2007;39(4):186–96.
12. Ratcliffe MM, Merrigan KA, Rogers BL, Goldberg JP. The effects of school garden experiences on middle school-aged students' knowledge, attitudes, and behaviors associated with vegetable consumption. 2011;12(1):36–43.
13. LaRowe TL, Bontrager Yoder AB, Knitter A, Meinen A, Liebhart JL, Schoeller D. Wisconsin Farm to School: One year evaluation Report. Madison, WI: University of Wisconsin-Madison: Wisconsin Prevention of Obesity and Diabetes; Department of Family and Nutritional Sciences; Wisconsin Department of Health Services. 2011.
14. Joshi A, Azuma A. Bearing Fruit: Farm to School Program Evaluation Resources and Recommendation. Center for Food and Justice, UEPI, Occidental College. 2009.
15. Knai C, Pomerleau J, Lock K, McKee M. Getting children to eat more fruit and vegetables: A systematic review. Prev Med. 2006;42(2):85–95.
16. Blair D. The Child in the Garden: An Evaluative review of the Benefits of School Gardens. J Environ Educ. 2009;40(2):15–38.
17. Robinson-O'Brien R, Story M, Heim S. Impact of garden-based youth nutrition intervention programs: a review. J Am Dietetic Assoc. 2009 Feb;109(2):273–80.
18. Hermann JR, Parker SP, Brown BJ, Siewe YJ, Denney BA, Walker SJ. After-School Gardening Improves Children's Reported Vegetable Intake and Physical Activity. J Nutr Educ Behav. 2006;38:201–2.
19. Twiss J, Dickinson J, Duma S, Keinman T, Paulsen H, Rilveria L. Community gardens: Lessons learned from California Healthy Cities and Communities. Am J Public Health. 2003;93(9):1435–8.
20. Joshi A, Kalb M, Beery M. Going Local: Paths to success for farm to school programs. Center for Food and Justice, UEPI, Occidental College. 2006.
21. Abernethy Elementary, Portland Public Schools Nutrition Services, Injury Free Coalition for Kids, Ecotrust. New on the Menu: District wide changes to school food start in the kitchen at Portland's Abernethy Elementary. 2006. Available at http://www.ecotrust.org/farmtoschool/ downloads/Abernethy_report.pdf
22. Croom E, et. al. Growing Farms, Growing Minds: The Burlington School Food Project, Year One Evaluation 2003-04, Center for Rural Studies, Vermont University. 2006.
23. Center for Food and Justice, UEPI, Occidental College. Riverside Farm to School Demonstration Project: Final grant report to the California Endowment. December 2006 and 2004.
24. Flock P, Petra C, Ruddy V, Peterangelo J. A Salad Bar Featuring Organic Choices: Revitalizing the School Lunch Program. 2003.
25. Christensen H. Juanamaria Healthy Schools Project Final Evaluation Report. Ventura County Superintendent's Office. 2003.
26. The Food Trust. Kindergarten Initiative Evaluation Report. 2007 Available at http://www.farmtoschool.org/ les/publications_114.pdf
27. Morris JL, Zidenberg-Cherr S. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. J Am Diet Assoc. 2002;102(1):91-93.
28. McAleese JD, Rankin LL. Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. J Am Diet Assoc. 2007;107(4):662-665.
29. Graham H, Zidenberg-Cherr S. California teachers perceive school gardens as an effective nutritional tool to promote healthful eating habits. J Am Diet Assoc. 2005;105(11):1797-1800.
30. Murphy JM. Education for Sustainability. Findings from the Evaluation Study of the Edible Schoolyard. 2003. Available at http://74-220-222-140.host- monster.com/publications/pdf/ESYFindings-DrMurphy.pdf
31. Hughes LJ. Creating a Farm and Food Learning Box Curriculum for preschool-aged children and their families. J Nutr Educ Behav. 2007;39:171-172.
32. Triant SL, Ryan A. City of Wyoming Parks and Recreation Summer 2005 Programming Evaluation. Wyoming, MI: A Report of Mixed Greens. 2005.
33. Phillips Z, Romero R, Smith K, Reddy R. Farm to Preschool, Strategies for growing healthy children and communities. Presentation. CACFP Roundtable conference. 2011.
34. Dirks AE, Orvis K. An evaluation of the Junior Master Gardener Program in third grade classrooms. HortTechnology. 2005;15(3):443-447.
35. Waliczek TM. The effect of school gardens on children's interpersonal relationships and attitudes toward school. HortTechnology. 2001;11(3):466-468.
36. Gottlieb R. Evaluation of the Santa Monica Farmers' Market Salad Bar Program. Center for Food and Justice, UEPI, Occidental College. 2001.
37. School Food Plus. School Food Plus Evaluation, Interim Evaluation, Phase 2 Report. 2005.
38. Izumi BT, Alaimo K, Hamm MW. Farm-to-School Programs: Perspectives of School Food Service Professionals. J Nutr Educ Behav. 2010;42(2):83-91.
39. Market Ventures, Inc., Karp Resources, Center for Health and Public Service Research, New York University. School Food Plus Evaluation Interim Report Phase 3 School Year 2005-2006. Market Ventures, Inc. 2007.
40. Upstream-Oregon HIA 2011 - Upstream Public Health. Health impact assessment HB 2800: Oregon farm to school and school garden policy. 2011. Available at http://www.upstreampublichealth.org/sites/ default/ les/ F2SHIA_FINALlow-res_0.pdf

41. United States Department of Agriculture, Food and Nutrition Services. The Farm to School Census. 2016. Available at https://farmtoschoolcensus.fns.usda.gov/schools-serving-kids-eating-healthier-school-meals
42. Mercier S. Food and Agriculture Education in the United States. AGree. 2015.
43. W.K Kellogg Foundation. 2015 School Food Poll. 2015. Available at http://ww2.wkkf.org/2015schoolfoodpoll/
44. Moss A, et al. Farm to School and Nutrition Education: Positively Affecting Elementary School-Aged Children's Nutrition Knowledge and Consumption Behavior. Childhood Obesity. 2013;9(1):51–56.
45. County Health Rankings. Farm to school programs. 2015. Available at http://www.countyhealthrankings.org/policies/farm-school-programs
46. Pew Charitable Trusts and Robert Wood Johnson Foundation. School Meal Programs Innovate to Improve Student Nutrition. 2016.
47. Koch P, Wolf R, Graziose M, Gray HL, Trent R, Uno C. FoodCorps: Creating Healthy School Environments. Laurie M. Tisch Center for Food, Education & Policy, Program in Nutrition, Teachers College, Columbia University. 2017.
48. Wein K. Lettuce Improve School Nutrition: Best Practices and Key Impacts of the USDA Farm to School Grant Program. Duke University Sanford School of Public Policy. 2016.
49. Roche E, et al. Economic Contribution and Potential Impact of Local Food Purchases Made by Vermont Schools. Center for Rural Studies, University of Vermont. 2016.
50. Office of the New York State Comptroller. Locally Grown: Farm-to-School Programs in New York State. 2016.
51. Bontrager Yoder AB, et al. Farm to Elementary School Programming Increases Access to Fruits and Vegetables and Increases Their Consumption Among Those With Low Intake. J Nutr Educ Behav. 2014;46(5):341–49.
52. Stephens L, Shanks CB, Roth A, Bark K. Montana Cook Fresh Workshop Pilot: A K-12 School Nutrition Professional Training to Incorporate Whole Foods in School Meals. J Child Nutr Manag. 2016;40(1).
53. Ray R, Fisher DR, Fisher-Maltese C. School Gardens in the City: Does Environmental Equity Help Close the Achievement Gap? Hutchins Center for African and African American Research. DuBois Review. 2016;3(2):379-95.
54. Holland JH, Green JJ, Alexander L, Phillips M. School Health Policies: Evidenced-based Programs for Policy Implementation. Journal of Policy Practice. 2016;15(4):314-332.
55. Kane D, Kruse S, Ratcliffe MM, Sobell SA, Tessman N. The Impact of Seven Cents. EcoTrust. 2010.
56. Bontrager Yoder AB, Foecke LL, Schoeller DA. Factors affecting fruit and vegetable school lunch waste in Wisconsin elementary schools participating in Farm to School programmes. Public Health Nutrition. 2015;18(15):2855–2863.
57. Boxmeyer C. 2013-2014 Program Impact. Druid City Garden Project. 2014.
58. USDA Office of Communications. New USDA Data Show Growing Farm to School Efforts Help to Reduce Plate Waste, Increase Student Participation in Healthier School Meals Program. 2015. Available at http://content.govdelivery.com/accounts/USDAOC/bulletins/12074ef
59. Capogrossi K, You W. The Influence of School Nutrition Programs on the Weight of Low-Income Children: A Treatment Effect Analysis. Health Economics. 2016;1099-1050.
60. Loso J, et al. Childhood and Current Gardening Is Associated with Increased Fruit and Vegetable Intake among College-Aged Students Participating in the Get Fruved Study. J Am Diet Assoc. 2016;116(9):A13.
61. County Health Rankings. School fruit & vegetable gardens. 2015. Available at http://www.countyhealthrankings.org/policies/school-fruit-vegetable-gardens
62. Savoie-Roskos MR, et al. Increasing Fruit and Vegetable Intake among Children and Youth through Gardening-Based Interventions: A Systematic Review. J Am Diet Assoc. 2017;117(2):240–250.
63. Berezowitz CK, Bontrager Yoder AB, Schoeller DA. School Gardens Enhance Academic Performance and Dietary Outcomes in Children. J Sch Health. 2015;85(8):508-18.
64. Heim S, Stang J, Ireland M. A Garden Pilot Project Enhances Fruit and Vegetable Consumption among Children. J Am Diet Assoc. 2009; 09(7):1220-6.
65. Parmer SM, Salisbury-Glennon J, Hannon D, Struempler B. School Gardens: An Experiential Learning Approach for a Nutrition Education Program to Increase Fruit and Vegetable Knowledge, Preference, and Consumption among Second-grade Students. J Nutr Educ Behav. 2009;41(3):212–217.
66. Cohen NL. Food Safety from Farm and Garden to Preschool. National Institute of Food and Agriculture and University of Massachusetts. Sept 2011-Aug 2015.
67. Izumi BT, et al. Harvest for Healthy Kids Pilot Study: Associations between Exposure to a Farm-to-Preschool Intervention and Willingness to Try and Liking of Target Fruits and Vegetables among Low-Income Children in Head Start. J Acad Nutr Diet. 2015;115(12):2003-2013.
68. Hoffman JA, et al. Farm to Preschool: The State of the Research Literature and a Snapshot of National Practice. J Hunger Environ Nutr. 2016;1-23.
69. Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion. Early Care and Education State Indicator Report. 2016.
70. Giancatarino A, Noor S. Building the Case for Racial Equity in the Food System. Center for Social Inclusion. 2014.
71. National Resource Defense Council. Food miles: How far your food travels has serious consequences for your health and the climate. 2017.


## Photo Credits

Page 1: Emily Hart Roth
Page 2: Urban and Environmental Policy Institute, Occidental College
Page 3: (L) Emily Hart Roth; (R) National Sustainable Agriculture Coalition