

INTERVENTION TABLE 7

School & Community Gardens

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
United States						
McAleese, Rankin (2007) Idaho	<p>Establishment and maintenance of a garden within walking distance from school</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> Multi-component: Not reported</p> <p><i>Complex:</i></p> <ol style="list-style-type: none"> Students in intervention schools 1 and 2 participated in a 12-week nutrition program. Program curriculum provided lessons and activities combining nutrition and horticulture. Intervention school 2, students participated in garden-based activities (weeding, watering, harvesting, cooking). 	<p><u>DESIGN:</u> Non-randomized trial</p> <p><u>DURATION:</u> 12 weeks</p> <p><u>SAMPLE SIZE:</u> 99 students in 6th grade at 3 elementary schools (25 in intervention school 1; 45 in intervention school 2; 25 in the control school)</p> <p><u>PRIMARY OUTCOME:</u> Nutrition</p> <p><u>MEASURES:</u> 24-hour food recall workbooks (validated)</p> <p><u>DATA COLLECTION:</u> Students from the control school completed food recall workbooks before and after the intervention period. Students in intervention schools 1 and 2 completed three consecutive 24-hour food recall workbooks before and after the 12-week intervention. The workbooks were administered in assigned classrooms by the 6th grade teachers. Before the first food recall workbook administration, subjects received instructions from the principal investigator on how to report food intake accurately. The principal investigator checked the food recalls for completeness, ensuring confidentiality.</p> <p><u>LIMITATIONS:</u> Self reported data; factors such as eating at home, parental influences, and additional classroom activities could have affected the results; because this was a non-randomized trial, the scope of inference is limited to the specific study population</p>	<p>10-13 year olds</p> <p>Sample populations at each school contained a similar representation of ethnic, cultural, and socioeconomic traits.</p> <p><u>ELIGIBILITY:</u> The schools were a convenience sample. The intervention school 2 was selected because of garden availability. Participants were required to be in grade six attending Public School District 25 in Bannock County, Pocatello, ID. Subjects were only eligible if they had turned in signed parental consent and child assent forms. Participants who did not complete at least two food recall workbooks before and two food recall workbooks after the intervention were eliminated from the study.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> All 6th grade students at the intervention schools received the intervention.</p>	<p><u>LEAD AGENCY:</u> Research team</p> <p><u>THEORY/ FRAMEWORK:</u> Not reported</p> <p><u>EVIDENCE-BASED:</u> Not reported</p> <p><u>REPLICATION/ ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> Not reported</p> <p><u>IMPLEMENTATION:</u> Researchers trained the teachers before the study. Teachers delivered the intervention components to the participants. The control school received no intervention. Intervention school 1 received a 12-week nutrition program. Intervention school 2 received the nutrition program and hands-on garden-based activities. The garden was approximately 25x25 feet with two raised strawberry beds, a large herb garden and a variety of fall crops. Students maintained the garden over the 12-week period through weeding, watering, and harvesting. They also participated in salsa making, workshops, received a class cookbook, and shared food experiences with fruits and vegetables (F&V) harvested from the garden.</p> <p><u>FORMATIVE EVALUATION:</u> Not reported</p> <p><u>PROCESS EVALUATION:</u> Not reported</p>	<p><u>RESOURCES:</u></p> <ol style="list-style-type: none"> Teacher training Nutrition education curriculum (Nutrition in the Garden) Garden, garden materials and supplies Class cookbook <p><u>FUNDING:</u> Not reported</p> <p><u>STRATEGIES:</u> Not reported</p>	<p><u>NUTRITION:</u> <i>For students at intervention school 2:</i></p> <ol style="list-style-type: none"> Fruit consumption significantly increased (before to after the intervention) by 1.13 servings ($p < 0.001$), and vegetable consumption significantly increased by 1.44 servings ($p < 0.001$). Combined, the number of servings of fruits and vegetables more than doubled from 1.93 to 4.50 servings per day. The mean vitamin A intake increased significantly by 181.99 μg retinol activity equivalents (RAE) to 612.35 (SD= 359.60) μg RAE per day ($p < 0.004$). The dietary reference intake (DRI) of 600 μg RAE per day for 9 year old to 13 year old children was met. Vitamin C mean consumption also increased significantly by 85.27 mg/day ($p = 0.016$) and exceeded the DRI of 45 mg. The mean fiber intake of students at intervention school 2 significantly increased by 4.24 g to 16.90 (SD=7.40) g/day ($p = 0.001$). No significant changes occurred in fruit, vegetable, vitamin A, vitamin C, or fiber intakes of students at the control school or at intervention school 1. <p>Note: There is a discrepancy in the number of students listed in the article text (n=99) and the article table (n=95).</p>

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
<p>Morris, Neustadter (2009) California</p>	<p>Establishment of a school garden</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p><i>Complex:</i></p> <ol style="list-style-type: none"> 1. Education lessons were provided on nutrition-specific topics, such as the food guide pyramid. 2. Students worked with school food-service staff to prepare dishes once the vegetables were harvested, including spinach, carrots, peas and broccoli. 	<p>DESIGN: Non-randomized trial</p> <p>DURATION: 8 months</p> <p>SAMPLE SIZE: 97 first grade children (48 intervention, 49 control)</p> <p>The intervention and control schools were selected by the California Department of Education and the US Department of Agriculture. The schools were matched based on ethnicity of the students and geographic locale. Three first-grade classrooms at both sites agreed to participate.</p> <p>PRIMARY OUTCOME: Willingness to taste vegetables</p> <p>MEASURES:</p> <ol style="list-style-type: none"> 1. Questionnaire (knowledge of and attitudes toward food through visual identification of food groups and which foods are healthy) 2. Vegetable tasting (willingness to taste, preference and knowledge of a variety of vegetables) <p>DATA COLLECTION: Questionnaires were completed at pre- and post-intervention through one-on-one interviews. The post-questionnaire was conducted 8 months after the pre-questionnaire in the intervention school and 6 months after the pre-questionnaire in the control school. The questionnaire took 12-15 minutes per student to complete and questions were asked in either Spanish or English. Vegetable tasting was completed along with the questionnaire.</p> <p>LIMITATIONS: Self-reported information from young children may limit accuracy; children answering questions from the interviewers may have had discomfort which could have prohibited them from interacting and discussing their vegetable knowledge; language translations seemed to have posed some complications since not all words translated well and other words had multiple substitutes</p>	<p>6-7 year olds</p> <p>ELIGIBILITY: Parental consent</p> <p>EXPOSURE/PARTICIPATION: All first grade students at the intervention school were exposed to the intervention.</p>	<p>LEAD AGENCY: University of California Davis</p> <p>THEORY/FRAMEWORK: Not reported</p> <p>EVIDENCE-BASED: Not reported</p> <p>REPLICATION/ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: The program was designed and implemented by researchers from University of California Davis. Lessons for the curriculum were developed by the teachers and approved by the primary study investigators. Teachers and food service staff helped children to prepare meals out of their harvested vegetables. Students were directly involved with all work done in the gardens. Parents and community members were encouraged to get involved. At the control school, no formal nutrition or gardening education was provided.</p> <p>FORMATIVE EVALUATION: Not reported</p> <p>PROCESS EVALUATION: Not reported</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> 1. Teachers and food-service staff 2. Parent and community member volunteers 3. Education curriculum 4. Garden and tools for gardening 5. Kitchen for preparing foods <p>FUNDING: This study was funded in part by the Nutrition Education and Training Program, California Department of Education, Sacramento.</p> <p>STRATEGIES: Not applicable – pilot study</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> 1. At the time of the post-questionnaire, the students in the intervention group were more willing to taste vegetables than students in the control group (F=11.012, p<0.005; intervention group mean: pretest= 4.07, SE=0.31, post-test= 4.83, SE=0.23; control group mean: pretest= 3.90, SE=0.30, post-test= 3.90, SE=0.29). <p>OTHER:</p> <ol style="list-style-type: none"> 2. Students at the intervention school showed a significant improvement in their ability to visually identify the food groups (pretest mean: 1.9, SE=0.2; post-test mean: 2.5, SE=0.2; p<0.02).

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<p>Koch, Waliczek (2006) Texas</p>	<p>Use of garden to deliver nutrition education, based on the program "Health and Nutrition from the Garden"</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> <i>Multi-component:</i> Not reported</p> <p><i>Complex:</i></p> <ol style="list-style-type: none"> The gardening and nutrition program taught six main concepts (thrifty gardens, basic gardening, growing techniques, ABCs of healthy eating, healthy snacks, and food safety), which were demonstrated by various activities (introducing fiber in the diet, budgeting, gardening, plant needs, healthy eating according to the food pyramid, label reading, storage methods). 	<p><u>DESIGN:</u> Time series study</p> <p><u>DURATION:</u> <6 months</p> <p><u>SAMPLE SIZE:</u> 56 students in grades 2 through 5 from 4 counties in Texas</p> <p><u>PRIMARY OUTCOME:</u> Nutrition (including knowledge and attitudes)</p> <p><u>MEASURES:</u></p> <ol style="list-style-type: none"> Written exam (specific knowledge of the activities presented); reliability for this section was $r=0.65$. Modified Fruit and Vegetable Preference Questionnaire (students' nutritional attitudes regarding fruits and vegetables); reliability for this section was $r=0.80$. Five interview questions (knowledge of activities performed, eating habits, type of snack eaten the day before); reliability for this section was $r=0.72$. <p><u>DATA COLLECTION:</u> Data were collected three times—prior to participating in the program, after completing the first 6 activities, and a post-test questionnaire was administered after children completed all 12 activities. For the interview questions, the agent/volunteer wrote down the children's answers.</p> <p><u>LIMITATIONS:</u> Not reported</p>	<p>7-11 year olds</p> <p><u>ELIGIBILITY:</u> Better Living for Texans (BLT) program clients volunteered their children - no further details were given.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> All BLT children who volunteered were exposed to the intervention.</p>	<p><u>LEAD AGENCY:</u> The Texas Agricultural Extension Services in cooperation with the BLT program</p> <p><u>THEORY/ FRAMEWORK:</u> Not reported</p> <p><u>EVIDENCE-BASED:</u> Using a garden to improve eating behavior is an evidence-based strategy. One evidence-based study showed improved nutritional attitudes and consumption of fruit for seniors participating in a gardening program. Another study of elementary children found improved snack preferences for those who participated in an education program on the nutritional benefits of citrus fruit.</p> <p><u>REPLICATION/ ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> Not reported</p> <p><u>IMPLEMENTATION:</u> The Texas Agricultural Extension and the BLT program developed this nutrition education program. The BLT targets food stamp recipients and applicants. The research team from the Department of Agriculture, Texas State University and from the department of Horticultural sciences, from Texas A & M University, visited each county participating in order to train the BLT agents and volunteers from participating counties in leading the activities. Program delivery times, availability, and format were at the discretion of each county. One county offered it in a 1 week summer camp format, another offered the program once per week over the course of 12 weeks, while a third offered it every morning for one week</p> <p><u>FORMATIVE EVALUATION:</u> Not reported</p> <p><u>PROCESS EVALUATION:</u> Not reported</p>	<p><u>RESOURCES:</u></p> <ol style="list-style-type: none"> Garden and gardening supplies Health and nutrition from the garden education program BLT agents and volunteers <p><u>FUNDING:</u> Not reported</p> <p><u>STRATEGIES:</u> Not reported</p>	<p><u>NUTRITION:</u></p> <ol style="list-style-type: none"> After participating in the nutrition program, students reported eating a healthy snack more often when compared to the number of youth who reported eating a healthy snack prior to starting the program (baseline mean 0.16, $SD=0.37$; follow-up mean 0.50, $SD=0.50$; $t=-3.644$; $p=0.001$). <p><u>OTHER:</u></p> <ol style="list-style-type: none"> Improvement in children's nutrition knowledge scores at posttest compared to pretest (3.69 point improvement, $t [55] = -8.686$, $p\leq 0.05$). There were no differences between age level, gender, ethnicity or county. Fruit and vegetable preference scores of children did not significantly improve during or after participating in the program. However, all of the preference test scores were high, indicating that children had a positive attitude toward fruit and vegetables before, during and after participating in the program.

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<p>Heim, Stang (2009)</p> <p>Location not reported</p>	<p>Development of a YMCA summer camp garden</p> <p>OTHER INTERVENTION COMPONENTS: Multi-component: Not reported</p> <p>Complex:</p> <ol style="list-style-type: none"> Promotion of fruit and vegetable consumption was done through weekly newsletters, recipes, and take-home activities. Children planted fruits and vegetables removed weeds, and observed/harvested the garden. Children were educated on the origins of food, plant parts and the nutrient needs of humans and plants. Tastings were done of fruits and vegetables from the farmers' market. Healthful snacks were prepared with produce from the garden, including 2 snacks for younger campers to promote peer modeling of fruit and vegetable intake. 	<p>DESIGN: Before and after study</p> <p>DURATION: 12 weeks</p> <p>SAMPLE SIZE: 93 children entering 4th to 6th grade participating in a 12 week YMCA summer camp</p> <p>PRIMARY OUTCOME: Nutrition</p> <p>MEASURES: Surveys (current fruit and vegetable consumption, preferences, self-efficacy, asking behavior, home availability, and demographics)</p> <p>DATA COLLECTION: Children's baseline surveys were completed before participating in the garden-based activities. Follow-up surveys were completed during the last week of camp. Those who did not complete follow-up surveys during the last week of camp received a mailed survey.</p> <p>LIMITATIONS: The study included a relatively homogenous convenience sample of children with no control group; insufficient statistical power made it difficult to determine to what extent covariates such as age, sex, race/ethnicity, and program length may have affected youth in different groups; due to measuring outcomes by self-report, social desirability may have influenced results</p>	<p>8-11 year olds</p> <p>Participants were equally distributed by sex (51% boys, 49% girls) with a mean age of 9.7 years (range 8 to 11 years). Most children were white (78%), followed by Hispanic (8%), Asian American (6%), mixed/other (5%), and African American (3%).</p> <p>ELIGIBILITY: Written consent was required for participation. Children who enrolled in camp at week 9 or later were excluded, and surveys received more than 2 weeks after the completion of the intervention were excluded.</p> <p>EXPOSURE/ PARTICIPATION: All children entering 4th to 6th grade enrolled in the summer camp were exposed to the intervention.</p>	<p>LEAD AGENCY: YMCA Camp Counselors and Research Team</p> <p>THEORY/ FRAMEWORK: Social cognitive theory (SCT)</p> <p>EVIDENCE-BASED: Several studies have demonstrated an increase in children's fruit and vegetable intake, willingness to taste, and preference for fruits and vegetables after participation in garden-based nutrition education programs.</p> <p>REPLICATION/ ADAPTATION: Not reported</p> <p>ADOPTION: Not reported</p> <p>IMPLEMENTATION: Before the intervention began, community leaders and organizations met to align interests and determine organizational roles within the intervention. The research team from the University of Minnesota, Minneapolis and the Mayo Clinic worked with a Master Gardener to facilitate intervention activities. The intervention was conducted at a YMCA summer camp. The intervention was administered by YMCA camp counselors, and a garden training was provided for all YMCA counselors. A 25-foot x 25-foot plot was designed and prepared. Beans, beets, carrots, cabbage, cucumbers, eggplant, kohlrabi, leaf lettuce, okra, onions, peppers, radishes, strawberries, Swiss chard, summer squash, tomatoes, zucchini, and herbs were planted by children in the first and second weeks of the intervention.</p> <p>FORMATIVE EVALUATION: The intervention activities were adapted from several garden, cooking, and nutrition education curricula and were reviewed for developmental appropriateness by the senior program director, youth development supervisor, and camp director at the YMCA.</p> <p>PROCESS EVALUATION: Four open-ended questions asked children to explain what they liked and disliked about the intervention, how they would improve it, and whether they would be interested in participating the following year.</p>	<p>RESOURCES:</p> <ol style="list-style-type: none"> Postage YMCA counselors Master Gardener Newsletters, recipes, and take-home activities Soil, seeds, water, and tools for garden maintenance Produce for taste testing Cookbooks for children Materials for preparing healthful snacks <p>FUNDING: The JB Hawley Student Research Award through the Leadership Education in Adolescent Health (LEAH) Fellowship Training grant funded this intervention.</p> <p>STRATEGIES: Not applicable – pilot study</p>	<p>NUTRITION:</p> <ol style="list-style-type: none"> At follow-up, children reported a significant increase in the number of vegetables ever eaten (from 7.80±2.24 to 9.17±2.09; p<0.001) and fruits ever eaten (from 4.72±0.61 to 4.86±0.41; p=0.0187). Specifically the amount of cucumbers (from 77.6% to 92.6%), spinach (from 58.5% to 74.5%), sugar snap peas (from 62.0% to 77.2%), radishes (from 48.4% to 67.7%), peppers (from 70.7% to 81.5%), zucchini (from 48.4% to 67.7%), beets (from 45.2% to 79.6%), and cantaloupe (from 90.4% to 96.8%) increased from baseline to follow-up, p<0.05 for all. <p>ENVIRONMENT CHANGE:</p> <ol style="list-style-type: none"> Reported availability of fruits and vegetables in the home was high at baseline and there were no significant changes at follow-up (from 3.11±0.54 to 3.12±0.57, p=0.721). <p>OTHER:</p> <ol style="list-style-type: none"> Children reported a significant increase in vegetable preferences from baseline to follow-up (from 3.17±0.75 to 3.40±0.71, p<0.001). Fruit preferences were high at baseline and remained unchanged from baseline to follow-up. Nearly all of the children (97.8%) enjoyed taste-testing different fruits and vegetables. Children liked preparing fruit and vegetable snacks (93.4%), working in their garden (95.6%), and learning about fruits and vegetables (91.3%).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/ Sustainability	Impacts and Outcomes
Lautenschlager, Smith (2007) Minnesota	<p>Garden-based program at three inner city locations, using hands-on experiences in planting, cultivating, harvesting techniques and the food system during a 10 week session (3 days per week) with the Youth Farm and Market Project (YFMP).</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> <i>Multi-component:</i> Not reported</p> <p><i>Complex:</i></p> <ol style="list-style-type: none"> Nutrition education included weekly topics (e.g., the food cycle, nutrients), followed by an activity (e.g., role playing) to foster participatory learning. The cooking curriculum emphasized ethnic foods and various kitchen skills. 	<p><u>DESIGN:</u> Before and after study</p> <p><u>DURATION:</u> 10 weeks</p> <p><u>SAMPLE SIZE:</u> 66 multi-ethnic, lower income youth</p> <p><u>PRIMARY OUTCOME:</u> Nutrition</p> <p><u>MEASURES:</u></p> <ol style="list-style-type: none"> 24-hour recalls (food consumption during previous day) A 177-item, 5 point Likert scale survey (gardening, dietary habits, social influences, nutrition knowledge and cooking). After development, the survey was reviewed by experts in the fields of public health, nutrition, and agriculture for content and face validity, and pilot tested. Cronbach's alpha coefficient ranged from 0.67-0.92. <p><u>DATA COLLECTION:</u> Surveys were self-administered to youth at three YFMP sites and took an average of 20-30 minutes to complete. Research assistants helped any youth who had difficulties reading or understanding the questions. All surveys were rechecked for multiple and missed responses and were corrected prior to the youth departing. Recalls were collected by trained researchers and analyzed using the ESHA Food Processor for Nutrients and Food Groups. Youth were asked to describe foods consumed the previous day and three-dimensional food models were used to improve estimation of portion size.</p> <p><u>LIMITATIONS:</u> Small sample size and lack of a control group</p>	<p>8-15 year olds</p> <p>Lower-income</p> <p>6.4% African American, 42.4% White, 10.6% Hispanic, 7.6% Hmong, 1.5% American Indian, 1.5% Other (evaluation sample)</p> <p><u>ELIGIBILITY:</u> Children who did not complete the post survey were excluded.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> All youth were exposed to the same curricula; however, attendance was voluntary, therefore the amount of program exposure varied between youth.</p>	<p><u>LEAD AGENCY:</u> Researchers from the University of Minnesota in cooperation with the Youth Farm and Market Project (YFMP).</p> <p><u>THEORY/ FRAMEWORK:</u> Theory of Planned Behavior</p> <p><u>EVIDENCE-BASED:</u> Not reported</p> <p><u>REPLICATION/ ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> Not reported</p> <p><u>IMPLEMENTATION:</u> The nutrition curriculum was taught by a nutrition educator and each week a new topic was introduced (e.g. the food cycle, nutrients) and followed with an activity (e.g. role playing) to foster participatory learning. Each week a new gardening lesson was introduced that focused on planting, cultivating, and harvesting techniques and the food system. The cooking curriculum emphasized ethnic foods and various kitchen skills.</p> <p><u>FORMATIVE EVALUATION:</u> Information from 6 focus groups with inner city youth and a review of the literature helped develop the survey, which was pilot tested with 25 program eligible youth.</p> <p><u>PROCESS EVALUATION:</u> Not reported</p>	<p><u>RESOURCES:</u></p> <ol style="list-style-type: none"> Three gardens, garden tools, and supplies Nutrition and cooking curriculum Kitchen, kitchen tools and cooking supplies Nutrition educator <p><u>FUNDING:</u> Not reported</p> <p><u>STRATEGIES:</u> Not reported</p>	<p><u>NUTRITION:</u></p> <ol style="list-style-type: none"> For girls that indicated that they intended to eat three servings of vegetables a day on the pre-survey, many did not follow through with this intention (difference between pre-survey intention and post-survey behavior= -0.51, p=0.003). Girls also did not follow through with their pre-survey intentions to eat fast food in the last month (difference between pre-survey intention and post-survey behavior= -0.54, p=0.0.005) or eat foods like pop, chips, and/or sweets in the last month (difference between pre-survey intention and post-survey behavior= -0.43, p=0.0.006). There were no significant differences between pre-survey intentions to eat fruit and vegetables daily, fast food, pop, chips and/or sweets in the last month and post-survey behavior among boys.

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
<p>Hermann, Parker (2006) Oklahoma</p>	<p>Establishment of a garden in an after-school program</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> <i>Multi-component:</i></p> <ol style="list-style-type: none"> Physical activity education was provided to the children. <p><i>Complex:</i></p> <ol style="list-style-type: none"> A variety of after school curricula were used for nutrition education sessions, including Junior Master Gardeners, Agriculture in the Classroom, and United States Department of Agriculture Team Nutrition. Gardening activities included: planting, watering, weeding, fertilizing, mulching and harvesting. Produce grown included corn, beans, squash, onions, peppers, tomatoes, carrots, okra, zucchini, cucumbers, lettuce and spinach. Children participated in food preparation activities emphasizing garden produce. 	<p><u>DESIGN:</u> Before and after study</p> <p><u>DURATION:</u> 6-12 months</p> <p><u>SAMPLE SIZE:</u> 43 students in kindergarten through 8th grade in one rural Oklahoma school</p> <p><u>PRIMARY OUTCOME:</u> Dietary consumption and physical activity</p> <p><u>MEASURES:</u> Two pre/post questions (vegetable consumption, physical activity) from an Oklahoma Cooperative Extension pre-/post-questionnaire previously tested for reliability with children in 3rd through 5th grade, $r=0.94$</p> <p><u>DATA COLLECTION:</u> Not reported</p> <p><u>LIMITATIONS:</u> Not reported</p>	<p>Rural, 5-13 year olds</p> <p>72% Native American, 25% White non-Hispanic and 3% Hispanic (school demographics)</p> <p><u>ELIGIBILITY:</u> Participants had to be students at the participating school and participate in the after-school program.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> All kindergarten through 8th grade children participating in the after-school program were exposed to the intervention.</p>	<p><u>LEAD AGENCY:</u> The county Oklahoma Cooperative Extension Service (OCES)</p> <p><u>THEORY/ FRAMEWORK:</u> Not reported</p> <p><u>EVIDENCE-BASED:</u> Using a school garden is an evidence-based strategy, based on two other studies about school gardens effects on children's diets.</p> <p><u>REPLICATION/ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> Not reported</p> <p><u>IMPLEMENTATION:</u> The OCES project coordinator implemented the program by providing gardening, nutrition, food preparation, food safety and physical activity education in the after-school program. Parents and volunteers from the county OCES Master Gardeners volunteered their time to help with gardening activities. Local stores donated gardening materials and supplies. The gardening program lasted 90 minutes and operated 5 days each week. Education and gardening were provided one day each week. Each day was directed towards a different specific age group. Children participated in gardening activities including planting, watering, weeding, fertilizing, mulching and harvesting. Children received education on the pyramid food groups, portions, snacks, breakfast, eating-out, food labels, hand washing, food safety and physical activity. Children also participated in food preparation activities.</p> <p><u>FORMATIVE EVALUATION:</u> Not reported</p> <p><u>PROCESS EVALUATION:</u> Not reported</p>	<p><u>RESOURCES:</u></p> <ol style="list-style-type: none"> Educational materials (Junior Master Gardeners, Agriculture in the Classroom and United States Department of Agriculture Team Nutrition) OCES project coordinator School garden, gardening materials and supplies Parents and other volunteers to help with gardening activities Food preparation space and utensils <p><u>FUNDING:</u> United States Department of Agriculture Children, Youth and Families at Risk</p> <p><u>STRATEGIES:</u> Not reported</p>	<p><u>NUTRITION:</u></p> <ol style="list-style-type: none"> There was a significant increase in the proportion of children reporting "I eat vegetables every day" from 21% to 44% ($\chi^2= 6.8, p<0.02$). <p><u>PHYSICAL ACTIVITY:</u></p> <ol style="list-style-type: none"> There was a significant increase in the proportion of children reporting "I am physically active every day" from 51% to 79% ($\chi^2= 4.8, p<0.05$).

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Johnson, Smith (2006) Washington	<p>Establishment of community gardens, as a part of the broader Washington State Nutrition and Physical Activity Plan</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> <i>Multi-component:</i></p> <ol style="list-style-type: none"> Enhanced network of linked walking/biking trails (e.g., improvements in signage, safety features and amenities; improvements in existing trails; donation of land by businesses; modifications in regulations to include trail development as part of construction projects). <p><i>Complex:</i></p> <ol style="list-style-type: none"> Master Gardeners provided classes and consultations. Seeds, equipment, and labor were donated from local businesses. Increased breastfeeding among women through promotion, education, training and access to supportive environments for breastfeeding. 	<p><u>DESIGN:</u> Before and after study</p> <p><u>DURATION:</u> >24 months</p> <p><u>SAMPLE SIZE:</u> Estimated 29,000 residents of Moses Lake (15,000 in the city, 14,000 in surrounding areas)</p> <p><u>PRIMARY OUTCOME:</u> Dietary consumption and trail use</p> <p><u>MEASURES:</u></p> <ol style="list-style-type: none"> Laser counting system (trail use) Evaluation surveys (healthy eating) Telephone surveys (the process of community organizations; awareness of diabetes campaign) Behavioral Risk Factor Surveillance System data (long term population changes in behavior and health outcomes) <p><u>DATA COLLECTION:</u> Laser counts on trail use were collected at 9 trail sites for a week in spring 2003 and 2004. Gardeners completed surveys in 2003 and 2004. However, the surveys in 2003 and 2004 were different so it did not allow for comparison between years. In 2004, a random digit dial telephone survey of 350 adults was conducted.</p> <p><u>LIMITATIONS:</u> Community members were not interested in the evaluation activities; evaluation was never fully integrated into the projects; original team members were no longer involved after 2 years; trail use data in the control community were collected in 2003 but not in 2004 because of a staff error</p>	<p>General Population</p> <p>Moses Lake population (self-identified): 80% White, 26% Hispanic, 2% African American, 1% American Indian or Asian, 3% two or more races.</p> <p>In 2003, the unemployment rate was 9.6%. Of the estimated 7000 children enrolled in the school district, 54% of them were enrolled in the free and reduced price lunch program.</p> <p><u>ELIGIBILITY:</u> After the state Department of Health conducted interviews in 5 cities, government leaders were asked to write letters if they were interested in serving as a pilot site. The city of Moses Lake was chosen as the first Healthy Communities site based on its demographics and readiness to make environmental changes.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> Residents living close to the trails and gardens were exposed to the intervention.</p>	<p><u>LEAD AGENCY:</u> The City of Moses Lake, the Moses Lake Business Association, the Grant County Public Health District, the National Park Service's (NPS) Rivers, Trails, and Conservation Assistance Program, the Washington State Department of Health (DOH), University of Washington (UW) Center for Public Health Nutrition and Health Promotion Research Center</p> <p><u>THEORY/ FRAMEWORK:</u> Not reported</p> <p><u>EVIDENCE-BASED:</u> The plan included 15 evidence based strategies.</p> <p><u>REPLICATION/ ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> The NPS led a charette with residents and organizations, which produced a master plan for an integrated trail system, later adopted by the Moses Lake City Council. In 2004, a youth wellness team from the Columbia Basin Job Corps began helping with the main garden and also developed a community garden on the Job Corps site.</p> <p><u>IMPLEMENTATION:</u> An advisory committee participated in the planning process. An ad hoc work group was formed to develop policies for Healthy Communities in Moses Lake, selecting 3 projects for the area, a timeline, and short and long-term goals. An action plan was written with technical assistance from NPS, UW and DOH staff. The Moses Lake Breastfeeding Coalition implemented the activities focused on breastfeeding.</p> <p><u>FORMATIVE EVALUATION:</u> An inventory of existing policies and environments in Moses Lake was conducted by volunteers prior to the development of the plan. Focus groups, interviews and a mailed questionnaire raised awareness among residents of existing trails, local needs and opinions.</p> <p><u>PROCESS EVALUATION:</u> Not reported</p>	<p><u>RESOURCES:</u></p> <ol style="list-style-type: none"> Trail amenities (water facilities, bike racks, benches, restrooms, lighting, and trail maps) Breastfeeding coalition activities (web site, training of licensed child care providers, luncheon for human resources staff, breastfeeding equipment, awards for employers, and nursing rooms) Community garden resources (gardens, gardeners, composting system, benches, paths, volunteers, tool shed, soil, tools, and watering system) <p><u>FUNDING:</u> The Centers for Disease Control and Prevention's Division of Nutrition and Physical Activity</p> <p><u>STRATEGIES:</u> A local leadership team has sustained the program (leaders from each of the projects, representatives from Moses Lake and the Grant County Public Health District and the Moses Lake Business Bureau). Local government plans and budgets for trails and community gardens have been established. Moses Lake received \$340,000 from an outdoor recreation grant for the Heron trail project. There are now several projects in the design and funding stages that will result in 10 or more miles of new trails and connections between existing trails.</p>	<p><u>NUTRITION:</u></p> <ol style="list-style-type: none"> 29 of 61 gardeners completed surveys. 21 of these 29 reserved gardening plots. More than half of the gardeners reported eating more fruits and vegetables while participating in the garden (no statistics). <p><u>TRAIL USE:</u></p> <ol style="list-style-type: none"> Mean daily trail use was 182 individuals in 2003 and 191 individuals in 2004, with a mean increase in trail use of 8.7 (SD=6.2) individuals per day. Control data were not available. <p><u>UNINTENDED POSITIVE EFFECTS:</u></p> <ol style="list-style-type: none"> 17 of the 21 participants who responded to a question about finances stated that they used the garden to stretch their food dollars. The garden built a sense of community and provided access to garden space. Job corps participants advocated for changes at the job corps campus (e.g., serving fresh fruits and vegetables in the dining room; healthy snacks in the vending machines).

Source	Intervention Components	Study Design and Execution	Reach	Adoption, Implementation and Process Evaluation	Enforcement/Sustainability	Impacts and Outcomes
International						
Somerset, Markwell (2008) Australia	<p>A garden and garden instructor were introduced to a school.</p> <p><u>OTHER INTERVENTION COMPONENTS:</u> <i>Multi-component:</i> Not reported</p> <p><i>Complex:</i> 1. Students were engaged in the following activities related to the school garden: infrastructure (designing, building, making compost); food production (propagating seeds, planting seeds, weeding, watering, mulching, caring for and harvesting plants, identifying foods, observing plants grow, counting and graphing growth of plants); food provision, preparation, and consumption (cooking and preparing foods, sharing recipes, eating foods, selling food in tuck shop, catering for special events); communications (writing newspaper articles, conducting tours of garden); learning materials (cooking workshops, drawing maps of gardens, holding gardening workshops); and peer/community support (family days at peak harvest times, organizing market days to sell produce, working with adults from the community).</p>	<p><u>DESIGN:</u> Before and after study</p> <p><u>DURATION:</u> 12 months</p> <p><u>SAMPLE SIZE:</u> Approximately 120 students</p> <p>All students from a single elementary school in grades 4 to 7 involved with two consecutive data collection years were included in the study.</p> <p><u>PRIMARY OUTCOME:</u> Food preferences (including knowledge and attitudes)</p> <p><u>MEASURES:</u> Two questionnaires were designed: 1. Attitudes Questionnaire: 38 items using a 3 point Likert scale regarding attitudes toward fruits and vegetables. The questionnaire was based largely on the format of a survey tool previously validated and used by Miller and co-workers in Australian elementary school children. 2. Vegetable and Fruit Identification Survey: required a one word answer to test the ability of identifying 31 different fruits and vegetables.</p> <p>A test-retest assessment of reliability of the questionnaires in a subsample of 20 students in the control group showed no difference in responses ($p < 0.05$).</p> <p><u>DATA COLLECTION:</u> Questionnaires were completed in the early fall of the first data collection year, within one month prior to the start of the intervention. These data were used as a control for subsequent data collection, in early fall of the second data collection year (approximately one year after the introduction of the garden to the school). Data collection was conducted as a series of class exercises by the teacher of each class, with each teacher supervising completion of questionnaires. The research team analyzed the data.</p> <p><u>LIMITATIONS:</u> Not reported</p>	<p>8-13 year olds</p> <p>The school was located in a northern Brisbane suburb, designated as a socio-economically disadvantaged area characterized by high unemployment rates and high Indigenous and migrant populations.</p> <p><u>ELIGIBILITY:</u> Students had to have been attending the school for at least 6 months prior to the start of the intervention.</p> <p><u>EXPOSURE/ PARTICIPATION:</u> All children grades 4 to 7 in the intervention school were exposed to the intervention.</p>	<p><u>LEAD AGENCY:</u> School and research team</p> <p><u>THEORY/ FRAMEWORK:</u> Not reported</p> <p><u>EVIDENCE-BASED:</u> The intervention is based on a number of other studies supporting the evidence that school gardens can be an effective tool to improve fruit and vegetable intake.</p> <p><u>REPLICATION/ ADAPTATION:</u> Not reported</p> <p><u>ADOPTION:</u> Not reported</p> <p><u>IMPLEMENTATION:</u> The garden instructor (employed by the project, not the school) was responsible for the scheduling of class access to the garden, coordinating weekly activities in the garden, promotion of the garden throughout the school, conducting sessions on specialized aspects of garden maintenance for classes, and identification and development of garden-related curriculum resources, which could be used by teachers. Relationships with a local adult permaculture education facility, a community garden and a police citizens youth club were important for the development and consolidation of the garden. The research team from Griffith university designed the intervention.</p> <p><u>FORMATIVE EVALUATION:</u> Not reported</p> <p><u>PROCESS EVALUATION:</u> A list of activities with which students were engaged emerged from an independent process evaluation.</p>	<p><u>RESOURCES:</u> 1. Garden instructor 2. Garden and gardening tools 3. Project coordinator</p> <p><u>FUNDING:</u> The project was supported in part by a grant from Health Promotion Queensland.</p> <p><u>STRATEGIES:</u> Not reported</p>	<p><u>NUTRITION:</u> 1. More children said they liked to eat vegetables every day in grade 4 (33% to 50%), grade 5 (47% to 65%) and grade 6 (26% to 35%). Grade 7 responses decreased from 23% to 18% in 'yes' responses, but also decreased in 'no' responses from 46% to 35%. 2. Grades 5 and 6 scored slightly higher post-intervention for answering affirmatively that they would like to taste fruit and vegetables in class (67% to 76% and 45% to 47%, respectively). Grades 4 and 7 decreased (70% to 59% and 55% to 41%, respectively) post-intervention.</p> <p><u>OTHER:</u> 3. There were significant improvements following the intervention in recognition of the following vegetables and fruit by children: capsicum, potato, cucumber, aubergine, chili, shallot, garlic, onion, beetroot, radish, courgette, avocado, grape, coconut, star fruit, peach, cherry, mandarin, watermelon, and kiwifruit ($p \leq 0.05$ for all). 4. More children in grade 6 preferred fresh fruit to canned fruit ($p < 0.01$). Following the intervention, students in grades 4 and 6 thought vegetables from the garden tasted better than from the shop ($p < 0.05$), however more 4th grade students reported they hated cooked vegetables ($p < 0.01$). 5. After the intervention more students reported their friends ate lots of vegetables (from 11% to 32% in grade 6; from 19% to 23% in grade 7).</p>

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