Health Impact Assessment

HB 2800: **OREGON FARM TO SCHOOL AND SCHOOL GARDEN POLICY**

A Health Impact Assessment detailing the potential impacts of Oregon's 2011 Farm to School and School Garden legislation

MAY 2011

A project of Upstream Public Health in collaboration with expert advisory committees and funded by the Health Impact Project -- a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts. This project was also supported through funding from the Northwest Health Foundation.

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UPSTREAM PUBLIC HEALTH

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EXECUTIVE SUMMARY

Health Impact Assessment of HB 2800
FARM TO SCHOOL AND SCHOOL GARDEN POLICY
EXECUTIVE SUMMARY OF FINDINGS

Farm to School and School Garden (F2S & SG) programs have gained momentum and visibility over the past decade for their potential contributions to stimulate local economies, foster healthy school food environments, support nutrition education, and build relationships among farmers and school districts.

Oregon House Bill (HB) 2800 would guarantee school districts could purchase Oregon produced, processed, packed and packaged foods with 15 cents for lunch and 7 cents for breakfast in reimbursement funds. The bill also ensures students learn how to choose healthy, local food options in their cafeteria through grants that support school gardens, agriculture and nutrition education.

From fall 2010 to spring 2011, Upstream Public Health collaborated with Farm to School and school garden stakeholders to conduct a Health Impact Assessment (HIA) on HB 2800, evaluating its potential effects on Oregonians' health. This report summarizes the findings of that assessment. The goal of the HIA is to inform legislative decision-making on HB 2800, focusing on the bill's impact upon five health determinants: **1. Employment, 2. Diet and Nutrition, 3. F2S & SG K-12 Education Opportunities, 4. Environmental Health** and **5. Social Capital.**

This HIA is supported by grants from the Health Impact Project (a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts) and the Northwest Health Foundation. The opinions are those of the authors and do not necessarily reflect the views of the Health Impact Project, the Robert Wood Johnson Foundation, The Pew Charitable Trusts or the Northwest Health Foundation.

A review of research evidence and an economic analysis establish that **HB 2800 will have significant positive public health benefits.**

KEY FINDINGS ON IMPACT OF HB 2800

Farm to School reimbursement funds would:
- Create and maintain jobs for Oregonians
- Increase student participation in school meal programs
- Improve household food security
- Strengthen connections within Oregon's food economy

Food, Garden & Agriculture grants would:
- Increase childhood food preferences for fruits and vegetables
- Shape long-term healthy diet choices that affect children's learning & academic achievement while preventing obesity

ABOUT HEALTH IMPACT ASSESSMENTS

A health impact assessment (HIA) is an information-gathering tool used to inform policy decisions and promote decisions that are the most beneficial for health. Understanding the health impacts of Farm to School and School Garden legislation is necessary to craft sound policy.

The World Health Organization defines Health Impact Assessment as "a combination of procedures, methods, and tools by which a policy or project may be judged as to its potential effects on the health of a population, and distribution of those effects within the population."

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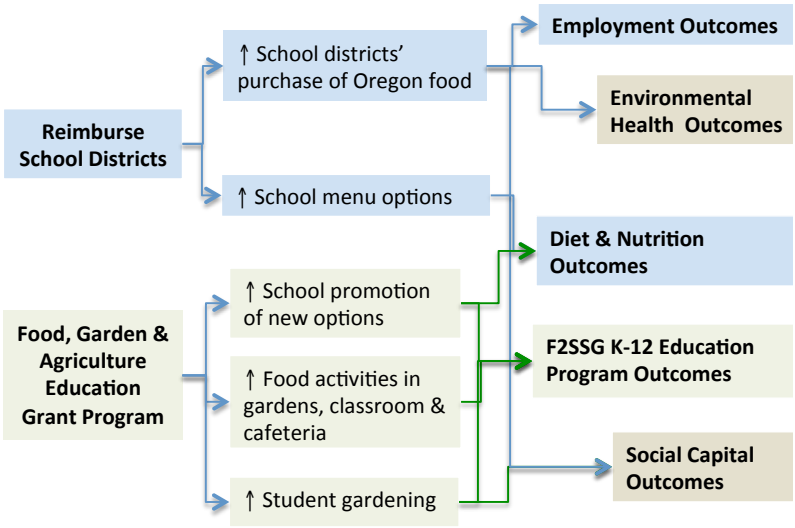


HIA health determinant pathways resulting from HB 2800 elements

MAJOR FINDINGS

CURRENT CONDITIONS

EMPLOYMENT OUTCOMES

- Oregon's unemployment rate was 10.5% in December 2010, higher than the national average of 9% .
- **The recession has hurt Oregon's farms**: almost 2/3 of farms reported net losses. Small & mid-sized farms especially are struggling to compete.

DIET AND NUTRITION OUTCOMES

- In 2009, **Oregon was one of the hungriest states** in the nation: 14% of households were food insecure and 6% of them were hungry.
- 19% of Oregon kids live in poverty.
- **Kids on free and reduced meals are more likely to be from food insecure families.**
- In the 2009-'10 school year 33% of kids eligible for free or reduced lunches did not participate.
- 22% of low-income kids did not graduate during the 2006-'08 school years.

F2S & SG K-12 EDUCATION OPPORTUNITIES

- Current Oregon learning standards do not require children to learn where food comes from or how it is made.
- Cafeterias are not connected to classroom curriculum.
- **1 in 4 Oregon adolescents are overweight or obese.**
- 2009: 58% of 11th graders eat three or less servings of fruits and vegetables a day.

IMPACTS

The meal reimbursement program would create jobs and stimulate economic growth.

- **Employment leads to health:** The unemployed are up to twice as likely to die earlier than others of the same age and sex.

Kind of Impact	New Jobs (Full & Part-time)
Direct effect	101
Indirect effect	101
Induced Effect	67
Total Effect	269
Multiplier	2.67

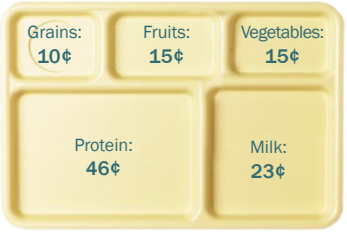
A 2.67 employment multiplier means that for every job created by school districts purchasing local foods, additional economic activity would create another 1.67 jobs.

Estimated economic effects of Oregon purchases during the first bieunnium ($19.6 million in reimbursements)

HB 2800 would improve child diet and nutrition.

- Students who participate in school meal programs learn better and have a better chance of academic achievement.
- HB 2800's reimbursement and garden grant programs improve the quality and diversity of food offered during school meals.
- Studies of Farm to School initiatives show increases in meal participation (for free, reduced, and full-priced meals) between 1.3% and 16%. This helps families buy more food at home, lowering household food insecurity.

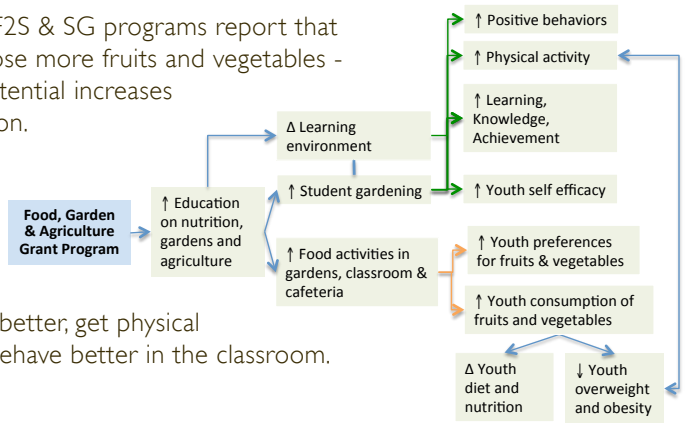
Oregon has been an innovator in finding creative ways to provide its children with fresh and healthy school meals. Without statewide infrastructure to support Farm to School efforts, limited funding for school meals can offer only inconsistent options to support Oregon's children and the farmers who feed them.



2009-'10 estimates for school lunch budget in Oregon

Food, Garden and Agriculture education grants would increase kids' understanding of what they eat, how it is grown and how it affects their bodies.

- Research of F2S & SG programs report that children choose more fruits and vegetables - leading to potential increases in consumption.
- Studies show that children who spend time in the garden learn better, get physical activity and behave better in the classroom.



MAJOR FINDINGS cont'd.

CURRENT CONDITIONS

ENVIRONMENTAL HEALTH OUTCOMES

Oregonians currently demand food produced and processed with alternative methods.

Between 2006 and 2008, the total land in organic production nearly doubled, an 86.7% increase from almost 70,000 to over 130,000 acres in response to this demand.

SOCIAL CAPITAL OUTCOMES

Social capital is a bank of resources, such as job referrals, that individuals gain through strong relationships to others. This improves people's health and access to opportunities.

If schools build connections with producers, other institutions can build upon these relationships, connecting with those who want to buy Oregon food.

IMPACTS

The reimbursement program gives more flexibility to buy sustainably produced food; this can impact environmental health factors.

- A stable product demand helps farmers and processors try new practices such as solar-heated greenhouses or integrated pest management plans. These practices reduce health issues from soil and water contamination.
- A more stable product demand also helps keep farmland in production, which can reduce greenhouse gasses. If all districts just served Oregon fruit or vegetables at lunch one day a month, it would support $756,000 in sales.
- Buying Oregon products does not reduce greenhouse gas emissions from transportation significantly, depending on the food source.

The reimbursement program will help farmers and nutrition staff build food system connections; the grants will help students work better together.

- Preliminary studies indicate school garden participants have positive changes in social skills and their ability to work with others.
- "Supporting local farmers" is a reported primary benefit for Farm to School programs; research is needed to examine the impact on social isolation and depression.

RECOMMENDATIONS for HB 2800: CHANGES TO IMPROVE HEALTH

1. The current policy allows food produced or processed in other states or countries to qualify for a reimbursement. Amend HB 2800 to specify that schools can only get reimbursed for foods produced or processed in Oregon to increase economic activity in our state.

2. To improve health outcomes for vulnerable populations, specify that while grants are open to all school districts, Food, Agriculture and Garden education grants will be preferentially given to school districts serving:
    - *a low-income student population, defined where 40% are eligible for free or reduced meals, or,*
    - *schools with a racially diverse student population, defined as 20% or more non-white, or*
    - *schools in rural or urban areas with limited food access, defined as 12% or more of residents are low-income and live more than 10 miles from a grocery store.*

3. To improve child health outcomes, specify funding criteria for Food, Agriculture and Garden education grants to support schools developing multiple-component programs that increase child health benefits. Garden grants should be preferentially awarded to programs working toward having at least one element in each of the following categories: **Education, Promotion, Procurement** and **Community Involvement**.

CONCLUSIONS

SUMMARY OF HEALTH OUTCOMES AND IMPACTS
HIGHLIGHTS ON HB 2800 ($23 MILLION)

Health Outcome or Health Determinant	Magnitude of Impact† w/ HIA Recs.	Distribution	Quality of Evidence
Employment Impacts			
Health & life expectancy	▲▲▲▲	Farm sector and related jobs	****
Job creation	▲▲▲	~270 new jobs	****
Oregon product demand	▲▲▲▲	100—197 School Districts[4]	****
Workers' ability to pay bills	▲▲▲	~270 new jobs	****
Economic activity	▲▲▲▲	3.16 economic multiplier	****
Impacts on Child Diet and Nutrition			
Meal program participation	▲▲▲	561,698 public school children[1]	**
Child learning & academic attainment	▲▲▲	561,698 public school children[1]	****
Household food security	▲▲	210,446 households[2]	***
School meal nutrition	▲▲+	561,698 public school children[1]	*
Child overweight & obesity	▲▲+	1 in 4 children	**
Farm to School and School Garden Education Impacts			
Gardening education	▲▲▲▲	~15,000 new children[3]	****
Child fruit & vegetable consumption	▲▲▲+	561,698 school children[1]	****
Agriculture & nutrition education	▲▲+	~15,000 new children[3]	***
Child nutrition knowledge	▲▲+	~15,000 new children[3]	***
Nutrition staff knowledge	▲▲	100—197 School Districts	**
Child achievement	▲▲	~15,000 new children[3]	*
Child self-efficacy	▲▲	~15,000 new children[3]	*
Child physical activity	▲▲	~15,000 new children[3]	*
Impacts on Environmental Health			
Oregon fruit & vegetable crops maintained	▲▲	$756,000—$15,120,000 in school purchases[6]	***
Demand for food grown with sustainable practices	▲	Oregon food sectors	*
Greenhouse gas emissions from food transport	None	3,844,195 Oregonians[5]	**
Impacts on Social Capital			
Student relationships	▲▲	~15,000 new children[3]	*
Producer, processor & school staff connections	▲▲▲	~100 School Districts	***
Parent school participation	▲▲	~15,000 new children[3]	*

LEGEND

- ▲▲▲▲ Strong impact on many
- ▲▲▲ Strong impact for few or small impact on many
- ▲▲ Moderate impact on medium number or strong impact on few
- ▲ Small impact on few
- None No effect

- **** 10+ strong studies
- *** 5 -10 strong studies or data analysis
- ** 5 or more studies of weak and moderate quality; or studies have mixed results
- * <5 studies and claim consistent with public health principles

1 Enrolled children in Oregon public school system, Oregon Department of Education, 2009-10.

2 Household Food Security in the United States, 2009, US Dept. of Agriculture, Economic Research Service, 2010.

3 Low estimate based on 2007 ODE survey of reported participation in school gardens; would be over two year grant time period.

4 Low estimate from 2010 Oregon Department Education number of School Districts that purchase local.

5 Certified estimate of Oregon population from US Census data, Population Research Center, 2010.

6 Conservative estimates from: (280,000 school lunches served in 2009-10 x $.30 for fruits and vegetables) x 9 to 180 school days.

+ Indicates schools will have to take action beyond the reimbursement program in the policy.

† See report for full summary table, including impacts without HIA policy recommendations.

1. Introduction

This Health Impact Assessment (HIA) examines the potential health impacts of House Bill 2800 (HB 2800), the Farm to School and School Garden legislation, as introduced to the Oregon House of Representatives in January of 2011. An HIA is an information-gathering tool used to inform policy decisions and promote decisions that are the most beneficial for health. Farm to School and school garden programs have gained momentum and national visibility over the past decade for their potential to contribute to local economies, foster healthy school food environments, support nutrition education and build relationships among farmers and school districts[1-3]. National[4-7] and Oregon[8-10] initiatives recommend Farm to School programs as a strategy to support healthy food choices and address health challenges such as obesity. House Bill 2800 was amended in April, 2011. We discuss the revisions to the bill, and the potential impacts of the amended version, in Section 4.7.

About HEALTH IMPACT ASSESSMENTS

A health impact assessment (HIA) is an information-gathering tool used to inform policy decisions and promote decisions that are most beneficial for health. Understanding the health impacts of Farm to School and School Garden legislation helps to craft sound policy.

For the purpose of this HIA, we define Farm to School efforts as school-based programs that connect schools (K-12) and local producers in order to serve local, healthy foods in school cafeterias or classrooms, improve student nutrition, provide health and nutrition education opportunities through school gardens and support regional farmers and food processors[11]. Local here is defined as items produced, packed, packaged or processed within the state of Oregon. Farm to School programs use at least one of three primary strategies: 1) local food procurement, 2) promotion of local foods, nutrition, and local producers, and 3) food or agricultural education.

These components support the local economy and help students make connections between the foods they eat, where foods come from and how food affects their bodies. These elements influence health determinants, also known as the "root causes of health" that determine the health status of individuals or populations[12]. Health determinants such as employment, diet and nutrition, education, environmental health and social capital contribute to health outcomes[13-15]. Accordingly, the health outcomes of Farm to School and school garden initiatives can be assessed via these five determinant pathways of health[13-15]:

1. Employment
2. Diet & Nutrition
3. Farm to School & School Garden Education
4. Environmental Health
5. Social Capital

1.1 The 2011 Farm to School and School Garden Legislation

The 2011 Farm to School and School Garden proposed legislation contains two major provisions: a reimbursement program for school meals and a grants program for school gardens and agricultural education. The legislation would: (1) allocate $19.6 million in state funds, equivalent to 15 cents per lunch and 7 cents per breakfast, to reimburse schools for purchasing Oregon food products, and (2) provide $3 million in competitive education grants to support food, garden and agriculture activities, up to 150 school teaching gardens each fiscal year. The funding for the program would come from the Economic Development Fund, which is a portion of the Oregon Lottery Fund.

Meal Reimbursement

The first component of the bill affects the food served in school cafeterias and provides an incentive for schools to purchase Oregon food items. The meal reimbursement program would draw on Oregon's Economic Development Fund to reimburse school districts for purchasing Oregon food products. To get reimbursed, school districts have to show the food was produced, packed or processed in Oregon and used as part of the US Department of Agriculture's National School Lunch Program (NSLP) or School Breakfast Program (SBP).

This aspect of the policy would change the amount of money available to schools for meals spending and give school districts a local preference option. Currently, school districts' primary source of breakfast and lunch meal funds comes from the Federal government's SBP and the NSLP. In order to receive Federal reimbursement dollars, school districts are required to buy the lowest-cost option. As of 2009, school districts may also exercise a "local preference" for minimally processed agricultural products.

HB 2800 does not mandate that schools have to buy Oregon products. The bill gives schools the option to be reimbursed if they buy Oregon products. The legislation specifies that schools can only receive state dollars if they spend the same amount or more of federal dollars on Oregon foods, which effectively doubles the amount of money schools are required to spend within the state. The legislation also specifies that state dollars can only be used to purchase new foods and cannot be used to cover existing local food purchasing. This ensures that the state dollars will generate new economic activity. There is no requirement that any federal dollars are spent on new food purchases, so school districts could meet the requirement for federal dollars with existing food purchases from Oregon.

Up to two percent of the $22.6 million will pay for the Oregon Department of Education's (ODE) administrative costs of managing the program, including tracking the geographic origin of foods. The ODE will consult with the State Department of Agriculture (ODA) on developing the rules and standards related to the reimbursement program.

Figure 1.1 Portland Public School lunch (Image courtesy of Ecotrust)

Food, Agriculture and Garden Education Grants

The second portion of HB 2800 is a grant program to help children learn about what they are eating in the cafeteria, potentially influencing dietary preferences and future adult eating behaviors. This strategy is intended to improve children's knowledge of where their food comes from, how it is grown, and how it affects their bodies. While the reimbursement portion of the bill has primarily economic impacts, the grant program will most likely influence children's knowledge and food preferences.

Figure 1.2 Cucumber harvest from Seven Oaks Middle School in Lebanon, Oregon

The competitive grants will be used to initiate or to expand school gardens and to help schools develop food and agriculture-based activities. Schools will be able to use these funds to promote Oregon products served in the cafeteria. School gardens encourage students to grow, harvest and consume fresh, seasonal produce similar to items purchased from local farmers. The grant program will be administered by the Oregon Department of Education, in consultation with the Oregon Department of Agriculture. The two agencies will collaborate to determine the recipients and the amounts of each award. The legislation restricts a grant to $20,000, and no more than 150 grants (one per school) can be given out in a two-year period. Grants may be used for training, planning, purchasing garden equipment, building school gardens and developing partnerships to create new or support existing programs. The grants do not provide additional funds to cover the cost of food. The State Board of Education is responsible for adopting rules to establish the criteria for grant eligibility.

1.2 About this Health Impact Assessment

The World Health Organization defines Health Impact Assessment (HIA) as "a combination of procedures, methods, and tools by which a policy or project may be judged as to its potential effects on the health of a population, and distribution of those effects within the population"[12]. HIAs focus on how health determinants resulting from a policy or plan could affect long term health outcomes and health disparities. Health outcomes are changes in the health status of an individual, group or population, which are attributable to a planned intervention or series of interventions (as opposed to incidental exposure to risk), regardless of whether such an intervention was intended to change health status[12]. Health Impact Assessments are prospective, in that they forecast potential impacts based on relevant research, data and expert opinions. In this case, understanding the health impacts of Farm to School and School Garden legislation is useful in developing a sound final policy.

The primary goal of this HIA is to inform the legislative decision-making process on the Farm to School and School Garden policy by outlining the ways in which the two components of HB 2800 are linked to individual and community health outcomes. This HIA seeks to contribute new information to existing Oregon Farm to School and school garden programs and regional institutional procurement efforts. Furthermore,

this HIA will help states around the nation by having relevant Farm to School and school garden health research organized in such a way that it best informs policy and programmatic decisions.

Upstream Public Health received a grant from the Health Impact Project, a collaboration of the Robert Wood Johnson Foundation and The Pew Charitable Trusts, to conduct the HIA. Upstream Public Health received additional funding from the Northwest Health Foundation to support the HIA. The screening stage of the project was conducted from February through April of 2010. After securing grant funding, Upstream began conducting the assessment, beginning with the scoping stage in August of 2010. In the Fall of 2010, Upstream received additional funds from the Northwest Health Foundation to disseminate the assessment to policymakers.

Chapter 2 of this report provides background for the HIA, including a summary of the proposed legislation and pathways between the bill and health outcomes. Chapter 3 describes the methods we used to complete the HIA scope and assessment. Chapter 4 summarizes the evidence related to different health determinants; presents the health determinant pathways connected to health outcomes; and assesses the magnitude, direction and certainty of the potential impacts of the 2011 Farm to School and School Garden legislation; and discusses the potential impacts of the amended version of HB 2800. Chapter 5 concludes with key policy recommendations. Chapter 6 discusses monitoring and evaluation of the HIA. Relevant research data and resources are listed in the Appendices; see Appendices 6 and 7 for the original HB 2800 legislation and amendments.

2. Screening and Community Participation

In this section we describe the screening stage and our participatory research approach.

Figure 2.1
Steps in the HIA Process

1. SCREENING determines the need for and value of an HIA.
2. SCOPING develops a plan and timeline for the HIA that defines research questions, health outcomes and vulnerable populations.
3. ASSESSMENT involves using existing data, expertise and experience to profile existing conditions, evaluate the direction and magnitude of potential health impacts, and make policy recommendations.
4. RECOMMENDATIONS advocate in the most effective way possible actions that will improve health outcomes of the policy.
5. REPORTING communicates the HIA findings and recommendations.
6. MONITORING AND EVALUATION tracks the impact of the HIA on the decision making process.

The Research Team used guidelines from the North American HIA Practice Standards Version 2 to develop each stage of the HIA (see Figure 2.1). We used community-based participatory research principles to involve both advisory committees, composed of Farm to School and School Garden stakeholders and general community members, in the scoping, assessment and reporting stages of the HIA[16-18]. Community based participatory research is a collaborative approach to conducting research where community members and researchers work together to share their expertise. As Health Impact Assessments are research tools, we consider this HIA community-based and participatory (even though not all committee members engaged in the data analysis portion of the assessment stage).

2.1 HIA Participating Groups

This HIA involved extensive community stakeholder involvement through the two advisory committees as well as a survey of the state coalition of Farm to School supporters, stakeholder interviews, two community forums to develop HIA recommendations, and a communications workshop to train stakeholders in dissemination and reporting methods (see Figure 2.2). Details about community participation and advisory committee selection process are in Appendix 1. There were three different entities involved with the HIA process.

The HIA Research Team included members of Upstream Public Health, technical support staff from Human Impact Partners and advisors Brian Cole, Bruce Sorte and Yvonne Michael. Dr. Cole, Mr. Sorte and Dr. Michael also served on the Technical Advisory Committee (TAC). The Research Team coordinated the HIA, developed the assessment methods and conducted most of the assessment with input from advisory committees. The TAC included individuals with technical expertise on Farm to School and school garden programming, research experience in HIAs and background in one or more of the studied health outcomes. The TAC provided input on HIA research questions, health outcomes, research methods, data and vulnerable populations. The Practitioner Advisory Committee (PAC) included farmers, processors, distributors,

individuals who contribute to on-the-ground Farm to School and school garden programs, and representatives who advocate for vulnerable populations such as children, low-income families, the farming sector and farm workers. The PAC provided input on the operational logistics of organizations likely to be affected by the Farm to School and school garden policy, as well as on vulnerable populations and health outcomes.

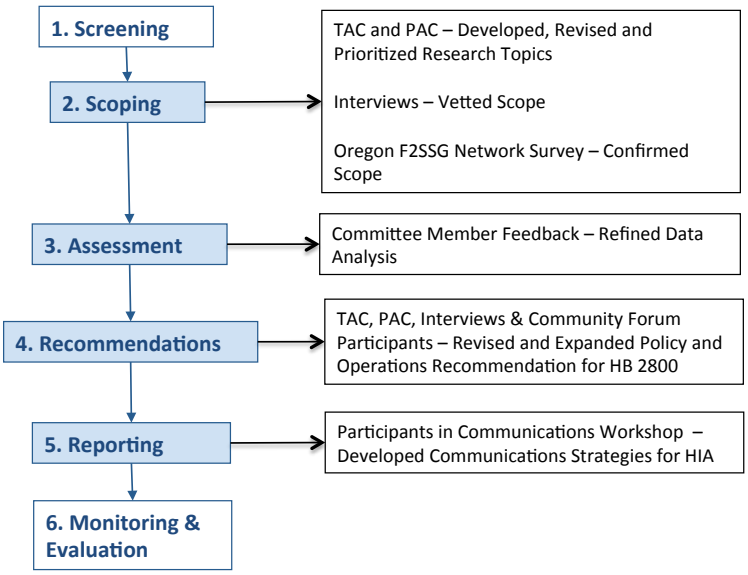


Figure 2.2 Community participation in the HIA on HB 2800

While all members of the TAC and PAC had the opportunity to give feedback on all HIA stages, a sub-set of volunteers from both groups helped make the final decisions about the scope and policy recommendations with the HIA Research Team based on their availability. A description of our process for developing policy and operations recommendations is in Section 4.3.1 and in Appendix 1.

The HIA Research Team includes partners who have taken publicly stated positions in support of the 2011 Farm to School and School Garden legislation. The Research Team followed HIA practice standards with guidance from HIA leaders, including Human Impact Partners, in order to manage potential sources of bias.

2.2 Screening

In the screening stage, a potential HIA is evaluated to determine whether the policy has significant health impacts that would be otherwise overlooked by decision-makers, whether the analysis is feasible and timely and whether the decision-making process would be receptive to the HIA findings and recommendations.

Potential Health Outcomes

The Research Team considered the existing conditions and potential impacts of HB 2800 as a framework for our approach in examining the health outcomes of the two components of the legislation. We hypothesized that the Farm to School and School Garden Bill would have the potential to increase jobs and stimulate Oregon's economy through stimulating school districts' demand of Oregon produced, packed, packaged and processed food. If schools serve more Oregon products, this has the potential to increase the

Figure 2.4 Oregon pears on the canning line
(Image courtesy of Peter Truitt.)

diversity of items offered in meals. We anticipated finding that if children like the new food they would be more likely to participate in school meal programs. This, in turn, could affect household food insecurity, because with children eating at school – for lower cost than at home – more money is freed up for parents to purchase food for the household's other meals. We also anticipated that if schools bought more food from Oregon suppliers, they might decrease the amount of food transported from great distances. These new buying practices could reduce greenhouse gas emissions and reduce climate change impacts.

We knew prominent reports identify Farm to School and school garden programs as viable strategies to address childhood obesity and hunger, including: Oregon's Call to Action 2010-2015: Oregon's five-year plan to reduce hunger; Promoting Physical Activity and Healthy Eating Among Oregon's Youth; the Statewide Physical Activity and Nutrition Plan: 2007-2012; the 2009 Obesity Prevention Task Force Report; and the 2010 Oregon Environmental Literacy Plan. We predicted that the food, agriculture and garden education grants component of the legislation would expose children to growing, harvesting and tasting fresh fruits and vegetables. We predicted that these experiences could influence child food preferences, food attitudes and diet[19, 20]. We hypothesized that HB 2800 would help grow children who know about Oregon food and maintain a preference for it into adulthood, while developing healthier eating habits that could offset the risk of childhood obesity.

Figure 2.3 Celebrating tomatoes
(Image courtesy of Jared Pruch of School Garden Project of Lane County)

After reviewing these potential impacts and deciding to conduct the HIA, the HIA Research Team worked with others to develop a research plan about which health determinants and health outcomes we would study; these are discussed in Chapter 3 of this report.

The HIA Would Assess Elusive Impacts

This legislation has both obvious health connections and more abstract health impacts. It is clear how an investment in school meal programs may improve the variety and nutritional content of school meals. Less obvious is the economic stimulus impact on depressed rural communities due to increased local purchasing. The Research Team determined that broad economic effects and potential impacts on low-income children and rural communities might go unexamined without data from the HIA. The HIA highlights linkages among overlooked health determinants. Partners determined that the HIA would fill a crucial gap in understanding the proposed legislation by rigorously analyzing the likelihood of its impact on these health outcomes.

Feasibility and Timeliness

In 2009, Upstream Public Health and partners decided to conduct an HIA on Oregon's Farm to School and School Garden legislation as a way to inform the 2011 legislative decision-making process. The HIA Research Team screened the proposed HIA and determined that there was adequate scientific evidence, enough time and sufficient resources available to conduct an HIA on Farm to School and School Garden. The Research Team also recognized that Farm to School and school garden legislation was pending in other states, and the results of the HIA would be relevant around the country.

Receptiveness of Decision-Making Process

There is strong and diverse support for Farm to School efforts in Oregon. A diverse group of organizations advocated for Farm to School and school garden Bills in the 2007, 2008 and 2009 legislative sessions. In each session, the Oregon Legislature supported the premise of building Farm to School and school garden programming into public institutions. The Oregon legislature approved funding for a Farm to School coordinator in the Oregon Department of Agriculture (ODA) in 2007 and a Farm to School program in the Oregon Department of Education (ODE) in 2008. Oregon school districts, advocacy groups and legislators have historically supported Farm to School and school garden programs. State wide non-government organizations, foundations and philanthropists have funded policy, program and research development; Oregon schools have established programs in the past decade; and numerous third-party organizations have helped schools establish gardens. Oregon has engaged national partners including the National Farm to School Network, the United States Department of Agriculture and School Food FOCUS. Oregon also has a Farm to School and School Garden Network community-based coalition that supports public schools' purchasing of Oregon sourced food and establishing learning gardens.

Given the supportive nature of the political landscape, the Research Team deemed the decision-making process receptive to the health impacts of Farm to School and school garden legislation.

3. Research Scope and Methods

In scoping this project, we created a workplan and research strategy that included prioritizing research questions and heath determinants. The research questions and pathways support the five distinct goals of the HIA, as outlined below:

- Inform the Oregon Legislature about the health impacts related to the proposed legislation.
- Outline the linkages and magnitude of interactions among this policy, potential health outcomes and economics.
- Inform agency work plans within the Oregon Department of Agriculture, the Oregon Department of Education, the Oregon Health Authority and Oregon county health departments.
- Inform regional food purchasing practices by institutions.
- Create a model HIA of a statewide food purchasing and garden education policy to inform Farm to School and school garden policy development around the country.

During the scoping stage, the Research Team determined which health determinants and health impacts to evaluate, identified the impacted and vulnerable populations, developed the methods for analysis and created a research plan to complete the assessment. The following section reviews that research plan. For a detailed scope of this project, visit www.upstreampublichealth.org/F2SHIA.

3.1 Scoping the HIA Research Framework

The geographic area included in this HIA is the state of Oregon. Vulnerable populations potentially affected by this legislation include public school children, low-income children, low-income communities and children from specific ethnic or racial groups. Other affected populations are teachers, school nutrition services staff, school community members, farmers, processors, food sector workers, metropolitan communities and non-metropolitan communities.

In the scoping stage, the Research Team looked to preliminary research, Research Team knowledge, and advisory committee expertise and experience. We also conducted informal, unstructured interviews with local, state and national experts on different health outcomes resulting from HB 2800 (see Acknowledgments section for list of interviewees). The health determinants included in the final scope are: 1) Diet and Nutrition, 2) Employment, 3) Farm to School and School Garden K-12 Education, 4) Environmental Health, and 5) Social Capital. All five determinants and their related health outcomes and populations are in Table 3.1. Each health determinant connects to multiple health outcomes; these are depicted in health determinant pathway diagrams in the Assessment section.

Table 3.1
HIA scope elements

Determinant Pathway	Examined Health Outcomes	Vulnerable Populations
Employment	mental health, life span, chronic disease, food insecurity and hunger, educational attainment for children of employed	farmers, processors, distributors, food sector workers, low-income and moderate income families, metropolitan and non-metropolitan communities
Diet & Nutrition	educational attainment, cognitive development, learning outcomes, behavior, overweight and obesity, risk of chronic disease, stress, skill attainment	public school students, low-income students (includes vulnerable ethnic and racial populations i.e. Latino, African American, Native American, Asian American), school nutrition services staff
Farm to School and School Garden K-12 Education	dietary preferences and changes, physical activity, self efficacy, knowledge gains, academic achievement, overweight and obesity, class behaviors, physical activity	garden participants: students, teachers, school staff, families, community members
Environmental Health	climate change health issues (e.g. heat stress, respiratory disease), water and soil contamination and related health outcomes	farmers, farm workers, farmer/worker families, rural communities, students
Social Capital	trust, stress, relationships, social isolation	garden participants, school nutrition services staff, farmers

3.2 HB 2800 Health Determinants and General Research Questions

In this section we review the individual health determinants assessed in the HIA and the overarching research questions. We examined what health outcomes would likely occur based on the reimbursement program or the educational grant program in HB 2800 (see the summary pathway in Figure 3.1). We mapped potential health determinants and health outcomes in pathway diagrams, which appear in Chapter 5 as part of the assessment summary.

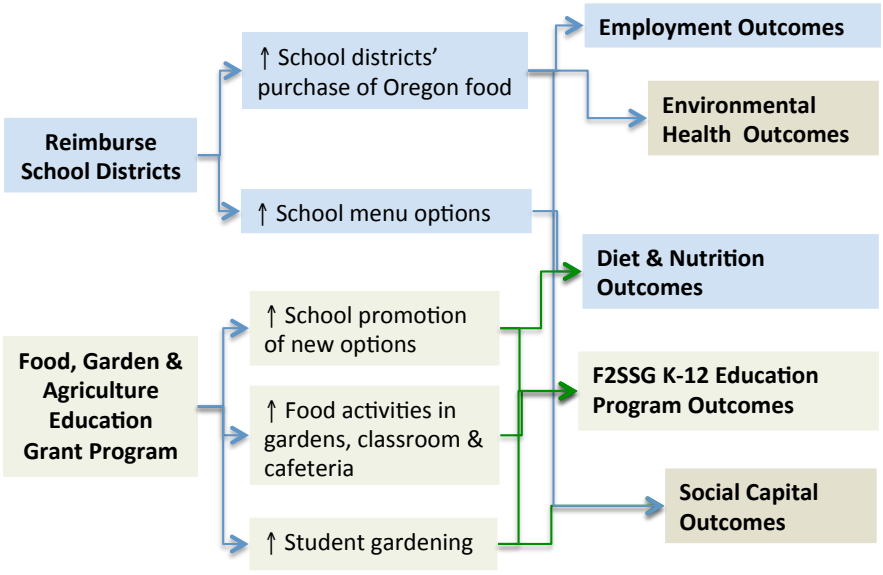


Figure 3.1 Summary of the health determinant pathways from HB 2800

Figure 3.2 Students learning to shuck Oregon -farmed corn (Image courtesy of Fort Vannoy Farms)

Employment

Employment is a health determinant that has been studied for more than a century, because it impacts mental and physical health, life span and chronic disease. Employment is a health determinant that has been studied for more than a century, because it impacts mental and physical health, life span and chronic disease. A chronic disease or condition is one that lasts or reoccurs over a long time period, for example arthritis, hypertension, and diabetes. Having employment also contributes to a worker's income stability, which affects food insecurity.

The employment determinant pathway considers how reimbursement money to schools in HB 2800 will impact job growth, the health of the employed and the general statewide economy. We expected reimbursement funds money would directly influence job availability and indirectly influence economic stimulus through induced spending[22, 23]. We thought added economic stability would contribute to workers' children being able to complete more years of school.

Diet and Nutrition

HB 2800's food reimbursement funds affect the health determinant Diet and Nutrition. We expected to find that schools would purchase a greater volume and a larger diversity of Oregon foods. We hypothesized these food purchase changes would affect children's diet and nutrition, school meal participation, classroom behaviors, ability to learn, cognitive development, educational attainment, and obesity. HB 2800's educational grants also affect this determinant as the grants encourage schools to promote the Oregon products served on the lunch line, and in the cafeteria or in the classroom.

Farm to School and School Garden K-12 Education

The Farm to School and School Garden Education pathway focuses primarily on the impacts of the food, garden and agriculture education grants in HB 2800. This determinant overlaps with the Diet and Nutrition determinant. Farm to School and school garden education includes field trips, visiting speakers, promotional materials about Oregon farms and food in the cafeteria, and food tastings that help children understand the connections between food and health. We predicted this learning would affect children's dietary choices, student fruit and vegetable preferences and consumption, student learning and knowledge gains, academic achievement, student class behaviors, and that this could affect youth overweight and obesity. We examined how grant-based educational opportunities potentially affect classroom behaviors, physical activity, mediators of learning, learning outcomes such as academic achievement, and self-efficacy.

Environmental Health

The Environmental Health pathway is focused on the impact of schools' purchasing preferences using reimbursement funds. The reimbursement program in the Farm to School and School Garden legislation could influence transportation of Oregon food. Changes in agricultural and transportation practices could impact climate change-related health outcomes. Although HB 2800 does not include language about agricultural or processing practices, we hypothesized that if schools had a little more money, they might exercise preferences and increase demand for sustainably produced products. There is not one undisputed definition for sustainability; we introduce a definition from the Farm Bill in the Assessment section of the report.

Figure 3.3 School garden, Seven Oaks Middle School in Lebanon, Oregon

Social Capital

The Social Capital determinant examines the health impacts from new connections among people and organizations that result from HB 2800. Social capital is a health determinant related to the benefits of having relationships through social groups. We measure this determinant by examining the following health outcomes: social cohesion, social isolation, stress and trust. We introduce a technical definition of social capital in the Assessment Section 4.5. PAC and TAC committee members felt that Farm to School and school garden programs help with relationship building among students, between farmers and school district personnel, among garden community participants and parents, between students and teachers, and between parents and their school aged children.

The advisory committees and Research Team developed and prioritized research questions, relevant health determinants and health outcomes in a collaborative process; see Appendix 2 for details. In Table 3.2, we list the general questions connected to the five identified pathways. The HIA Research Team developed two types of research questions: those that predict the direction and magnitude of impact on a specific population's health outcome and those that provide background to address prediction questions. The detailed lists of these questions are in Appendix 2: Scoping and Assessment Methods.

Table 3.2
HB 2800 health determinant pathways and general research questions

Health Determinant Pathway	Central Research Question
Employment	How will the policy's reimbursement program affect employment and related health outcomes?
Diet & Nutrition	How will the policy's reimbursement program affect children's dietary and nutrition related health outcomes?
Farm to School and School Garden K-12 Education	How will the policy's food, agriculture and garden education grant program affect student learning and health outcomes?
Environmental Health	How will the policy's reimbursement and grant program affect environmental health?
Social Capital	How will the policy's reimbursement and grant program affect relationships?

3.3 Assessment and Recommendations Methods

This HIA employed mixed research methods, including a review of empirical literature, secondary data analysis, IMPLAN economic analysis and unstructured interviews with field experts. Figure 3.4 depicts a brief description of these methods. This section describes the literature review and IMPLAN methodology. Please see Appendix 2 for the specific tools used in each method.

Figure 3.4
Farm to School and school garden HIA Research and Assessment Methods

1. **LITERATURE REVIEW: Review of peer-reviewed and available empirical research studies for all five pathways.**

2. **SECONDARY DATA ANALYSIS: Summary of statistics available on food insecurity, school meal eligibility and completion, school gardens, school nutrition services' procurement of Oregon food, unemployment.**

3. **ECONOMIC PROCUREMENT ANALYSIS: Analysis of relationship between Farm to School legislation components and specific employment outcomes and the effect on Oregon's economy.**

4. **INTERVIEWS, COMMITTEE FEEDBACK, COMMUNITY FORUMS AND COMMUNICATION WORKSHOP: Solicitation of expertise on Farm to School and school garden program operations and policy implementation from state and national experts.**

3.3.1 Literature Review

The Research Team employed a structured literature
review approach for each health determinant pathway. We used search terms specific to each pathway's health outcomes and health determinants in a sub-set of ten electronic databases (EBSCO, PubMed or Medline, Academic Search Complete, ERIC, WilsonWeb, JSTOR, BIOSIS, Cochrane Reviews, Health Reference Center Academic, and PsychINFO) and through Google Scholar. We included English-language literature from 1980 to 2010 from the United States, Europe and Australia. We included quantitative findings for health outcomes where available and qualitative literature for health outcomes with minimal existing quantitative evidence. Four Research Team members ran searches independently in each pathway.

In addition, we examined reference lists, review articles, database-generated related article lists, grey literature and related author publication lists for eligible articles. Many articles had findings relevant to other pathways; some articles are referenced in more than one pathway. We examined Farm to School programs that focus on cafeteria or classroom food offerings, programs that incorporate gardens, and programs that include nutrition or agriculture education in order to change the school food environment in a method similar to Farm to School and school garden programs. The key terms for each pathway are listed in Appendix 2. To evaluate the quality of each piece of literature, we expanded existing scoring criteria from two sources intended for epidemiological literature[24, 25]. We used these criteria to create a scoring matrix. See Appendix 2 for the scoring criteria and sample matrix.

In the Assessment chapter, we report the major findings most relevant to HB 2800 resulting from the literature review. The literature on most health outcomes included positive findings, negative findings and mixed results. The literature was also limited for certain health outcomes including social capital and the linkage between school gardening and physical activity. Our assessment findings are based on weighing the quality of studies, the quantity of the effect, and the consistency of findings. For example, while decades of research indicates being employed is positively associated with human health outcomes at the individual and population levels, researchers describe limitations to the types of studies, inconsistencies for positive outcomes related to type of work, and mental health conditions being a contributing factor to retaining employment. In that section, we report the general positive conclusion described in systematic literature reviews.For details about the literature review process, see Appendix 2, Section B, Literature Review Methods.

3.3.2 Economic Procurement Analysis of School Purchasing

We used the IMpact PLANning (IMPLAN) input-output economic model produced in Stillwater, Minnesota by the Minnesota Implan Group, Inc. (MIG). MIG uses public and private databases to calculate all the goods and services that are imported to, used internally, and exported from an economic area (U.S., state, county or zip code). MIG includes data related to industry sectors. Industry sectors are represented by North American Industry Classification System (NAICS) codes, which Federal statistical agencies use in classifying business establishments for the purpose of collecting, analyzing and publishing statistical data related to the U.S. business economy. We categorized food purchases from two data sources into 38 possible food production agricultural sectors in our model. The IMPLAN model is a matrix of Oregon's economy and allows us to estimate the economic effects of HB 2800. The effects are represented as:

- DIRECT EFFECTS: the sales, jobs, or income attributed to the primary producers,
- INDIRECT EFFECTS: the suppliers to those producers, and
- INDUCED EFFECTS: the income spent by suppliers, employees, and business owner at grocery stores, health clinics, or other places in the general economy.

The direct, indirect and induced effects contribute to total job creation and total economic effects. For more details on the methods, see Appendix 5.

Table 3.3
Oregon school district nutrition services' purchasing data sources

Source	Ecotrust	Sodexo***
Districts	2	26
Enrolled Students (2008-09)*	46,026	167,928
Percent of Oregon Enrollment	8%	29.7%
Eligible Free and Reduced Students (2008-09)	19,975	81,719
Total Oregon purchases	$1,976,698 (with $.07 incentive)	$260,006 (without incentive)
Total agricultural sectors**	18	21

* Enrollment for Oregon public schools was 564,064 in the 2008-09 school year.
* * Agricultural sectors, such as Dairy cattle and milk production or Vegetable and melon farming represent groups of economic activity that are assigned industry classification codes and are tracked by Federal statistics agencies.
*** ~10% of purchases were from meal programs other than school breakfast and lunch.

We used two sources of school food purchasing data for the IMPLAN analysis. One data set is from a study completed by Ecotrust, with funding from the Kaiser Permanente Community Fund at the Northwest Health Foundation[26]. Ecotrust provided a 7 cent meal subsidy for two school districts to buy Oregon products to determine the effects that added money – similar to that in HB 2800 – would have on school district purchasing. Ecotrust worked with the Portland Public School District and the Gervais School District to track school nutrition services' purchasing for the 2008-09 school year as part of a larger Farm to School and School Garden analysis[26]. This portion of data represents the impact of schools with additional funds to buy Oregon products. The second source of data comes with permission from Sodexo detailing twenty-six school districts' purchases for the 2008 calendar year. Ten percent of the purchases in 2008 represent meals and snacks outside of the school year NSLP and SBP. This portion of the data set represents school purchasing without additional funds to buy Oregon products.

For each food purchase, Sodexo or school districts retrieved information on the vendor/brand, item description, purchase unit (e.g., flat, package, loaf, etc.), price per purchase unit, total units purchased and total amount spent. We categorized school purchases by agricultural industry sector using North American Industry Classification System codes from the U.S. Census before loading them in the IMPLAN model. The combined data represent meals served to approximately one-third of the state's public school children (see Table 3.3). The data set also represents a mixture of school purchases with incentive to buy local, and a mixture of purchases without the added incentive.

3.3.3 Recommendations Development

We developed the policy and operations recommendations with community input from three avenues: 1) ongoing feedback from members of the PAC and TAC, 2) unstructured interviews with key stakeholders, and 3) two community forums held in different parts of the state. Similar to the scoping stage, we revised drafts of the recommendations with the advisory committees and in interviews with stakeholders. The list of interviewed individuals can be found in the Acknowledgements section. Additional details regarding the criteria each advisory committee used to evaluate the policy and operations recommendations is in Appendix 1.

Figure 3.5 Umatilla community forum

We also hosted two community forums to expand the reach of our recommendation development process. The Research Team, following revisions from advisory committee members, presented a draft set of recommendations for how HB 2800 would be amended and implemented. The Research Team hired two coordinators to host two community events in Eastern Oregon and the Central Willamette Valley. These were held on February 4th, 2011 in the rural community of Umatilla and on February 10th, 2011 in the urban

area of Eugene (see Table 3.4 for details on each event). Representatives of school nutrition services, farmers, health advocates, parents, teachers, school administrators and citizens attended both events. Each forum involved: 1) a presentation of the preliminary findings of the HIA, 2) group discussions of the draft recommendations, and 3) a participant feedback process where we gathered suggested revisions, additions and recommendation priorities. See Appendix 1 for the feedback worksheet and summary of comments.

Table 3.4
Community forum events

Date	February 4, 2011	February 10, 2011
Location	Umatilla in Umatilla County	Eugene in Lane County
Coordinator	Andi Sexton, Oregon Rural Action	Megan Kemple, Willamette Farm and Food Coalition
Attendees	32	38

4. Assessment – A Synthesis of Findings

This chapter is split into sections by pathway and is organized as follows:

- Introduction to each health determinant and its pathway to health,
- Background on how each pathway relates to HB 2800 and current Oregon conditions, and
- Findings on different health outcomes.

We organized findings around specific health outcomes to address multiple research questions at the same time. For a detailed list of all primary and context research questions see Appendix 2. In some instances, several research questions are combined, as their literature overlaps. For the literature scoring criteria and matrix template, see Appendix 2.

4.1 Employment

This health determinant is centered on employment and related health outcomes resulting from the reimbursement funds of the Farm to School and School Garden legislation. As schools purchase local foods, we expect dollars spent on Oregon food products to promote job creation and stability in the general economy and specifically in food related industry sectors. We review school food budgets and the potential impact HB 2800 reimbursement funds could have on school demand for Oregon food items. We anticipated that increased employment opportunities would affect household poverty, food insecurity and child eligibility for federal meal programs in urban and rural communities.

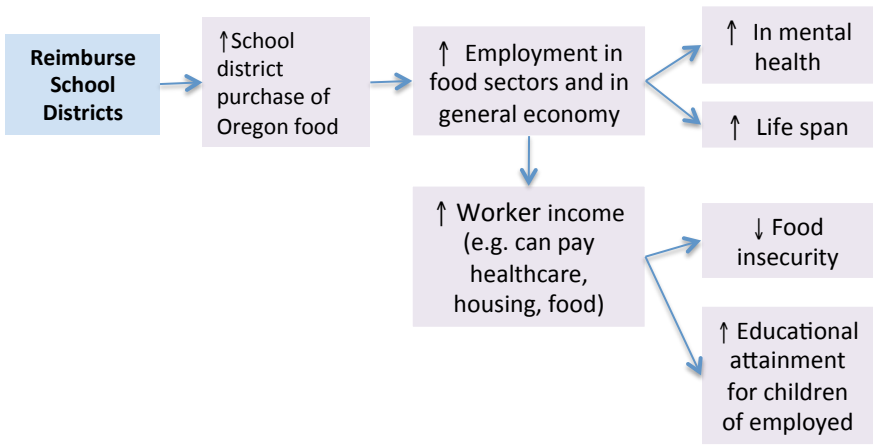


Figure 4.1 Employment health determinant pathway

Employment is a major health determinant (see Figure 4.1 for a depiction of the pathway). Employment has been shown to affect individual and population mental health and physical well being[27, 28]. The reimbursement investments have the potential to create and maintain jobs in agriculture and related food industries, such as processing.

Employment affects individuals with jobs and the families that depend on them. Food security is defined as access by all people at all times to enough food for an active, healthy life[29]. Food insecure (FI) households have difficulty, at some time during the year, providing enough food for all their members due to lack of resources. Very low food secure (VLFS) households are those in which the food intake and normal eating pattern of at least one member was reduced because of household food insecurity[29]. In this report, we use the term very low food secure households and hunger interchangeably. A household's level of food security is linked to income; one's wages determine one's ability to meet basic needs such as food, shelter, clothing and transportation[30, 31].

Although HB 2800 does not affect wages, it creates jobs for skilled and semi-skilled workers, so we visit this briefly. A discussion of the impact of HB 2800 on food security/insecurity is in Section 4.2, Diet and Nutrition. We base our conclusions about job creation from an economic IMPLAN model using existing school district food purchasing data and statewide economic sector information. For details, see Section 3.3.3 and Appendix 4. We examine general economic effects, jobs created and worker health outcomes including mental health and life span. In addition, we look at the impact on children of the employed, specifically regarding food insecurity and educational attainment. Our conclusions on employment-related health outcomes are based on a literature review.

4.1.1 Current Employment and Related Health Conditions in Oregon

Oregon's unemployment rate jumped from 6.4 percent in 2008 to 10.5 percent in December 2010; this is more than the national average of 9.3 percent[32], with rural counties in particular experiencing a rate of 12.3 percent (see **Table 4.1**)[32]. Unemployment is closely related to poverty and food insecurity. In 2010, 14.3 percent of Oregon's population lived in poverty[33]. Rural counties were hit especially hard by the recession; **Table 4.1** shows that rural areas had an average poverty rate of 17.2 percent and **Figure 4.2** reveals that 19.6 percent of people in many rural areas were in poverty in 2009[33].

Table 4.1
Oregon unemployment and poverty rates for 2009 and 2010[32, 33]

	Oregon	Urban	Rural	US Average
Unemployment	10.6%*	10.7%	12.3%	9.5%
Poverty	14.3%	13.5%	17.2%	14.3%

*2010 December seasonally adjusted estimate; all other numbers reflect 2009 values.

Food insecurity also affects rural areas more. In a study using data from 2002-2004, non-metropolitan food insecurity was higher than in metropolitan areas among households with a full-year full-time worker, households with women working in administrative support/sales occupations and two-adult households with children[34]. One adult experiencing unemployment in a household increases the likelihood of hunger and food insecurity. Researchers found that Oregon has a uniquely high rate of hunger among all of Oregon's income groups[30, 34-36]. Using data from the Current Population Survey and the American Community Survey from 2006 to 2009, researchers note

Table 4.2
Oregon food insecurity[29, 35]

	Oregon	Metropolitan areas	Non-metropolitan areas
Food insecure households	13.9%	13.8%	10.9%
Food insecure household with very low food security	6.6%	7.0%	5.1%

*13.8% FI, 7.0% VLFS of 1,127,020 +/- 3,312 and 10.9% FI, 5.1% VLFS of 337,166 +/- 1,970.

that in non-metropolitan areas, 10.9 percent of households were FI, and 5.1 percent of them experienced hunger[35]. This equates to 234,420 FI and VLFS metropolitan households and 53,946 FI and VLFS non-metropolitan households in Oregon.

The Census Bureau determines who is in poverty by establishing income thresholds that vary by family size and composition. If a family's total income is less than the family's threshold based on the number of family members, then that family and every individual in it is regarded as living below the poverty line, or as in poverty.

Employment affects mental health. In 2010, Oregon's suicide rate was 35 percent higher than the national average, with highest levels in rural counties[37]. The rate of suicide among Oregonians has been increasing since 2000. In 2010, men were 3.7 times more likely to die by suicide than women. White males had the highest suicide rate among all races (25.6 per 100,000)[38]. Of all physical health outcomes, suicide has been the most extensively studied through its association with depression[39]. We examine this measure, because researchers have studied suicide in relation to unemployment. Job or wage loss can contribute to depression in those at risk[39-41]. The average life expectancy in Oregon is 77.8 years. Men live to be, on average 74.95 years, while women live to be 80.26 years[38].

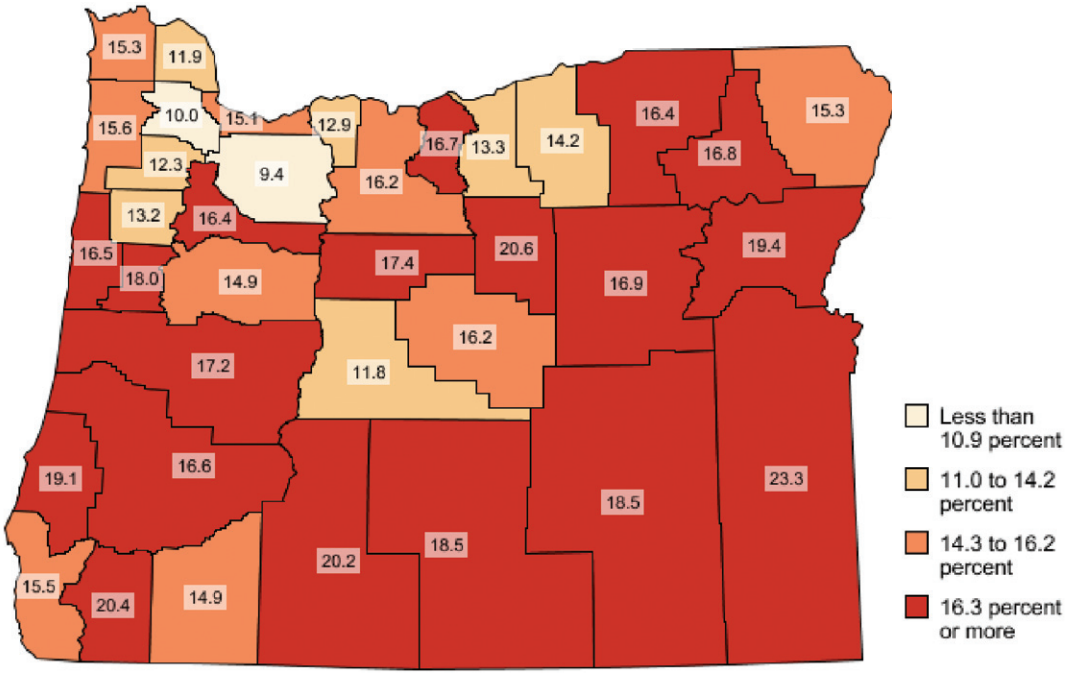


Figure 4.2 Percent of Oregon population in poverty, 2009

Oregon's agricultural sectors, such as fruit and vegetable farming, have suffered from the economic downturn. According to the 2007 Census of Agriculture, nearly two-thirds of Oregon's farms reported losses. Small and mid-sized farms are struggling to compete in an increasingly competitive agricultural economy. Market concentration is a measure of competitiveness for an industry. In 2002, 4.35 percent of farms in Oregon accounted for 75 percent of total agricultural sales, an indicator of a trend toward fewer farms providing more food[42]. Unlike other parts of the country however, the majority of farms in Oregon are not commercial operations: in 2007, 32 percent of the commercial farms (greater than $10,000 in annual sales) accounted for 98.7 percent of the agricultural sales[43]. This means while Oregon has a small number of farms generating high sales and maintaining market share, it also has a moderate number of farms yielding mid-sized sales.

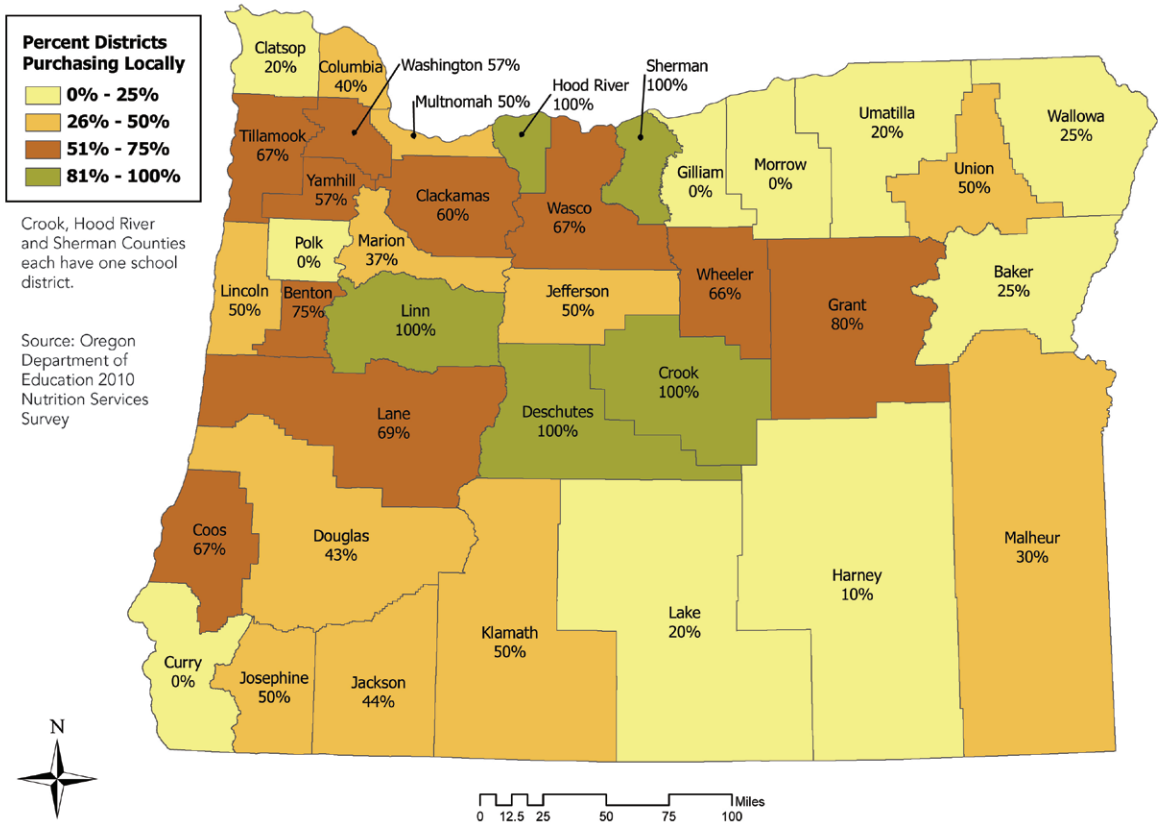


Figure 4.3 Oregon school districts currently purchasing Oregon products[44]

Under HB 2800, schools will have more funding earmarked specifically for local food products, potentially adding support for small and mid-sized local farmers. As of 2010, nearly half of the school districts report buying Oregon products[44]. Those districts feed over half of all the public school students in the state. Surveys of Oregon school district nutrition service directors indicate they want to buy more Oregon food products[45, 46]. In Oregon, school nutrition services receive money from the federal government for their meals. Some districts have other financial arrangements with city or county government to add a little extra to the funds.

Table 4.3 indicates the amount of money that Oregon school nutrition services receive from the federal government that is part of the overall school meal budget[47]. A meal must offer all four food groups to qualify as reimbursable for federal funds.

These food groups include meat/meat alternatives, grains/breads, fruits and vegetables, and milk. This budget is used to pay employees, buy equipment and supplies, purchase food and prepare school meals (i.e. energy, gas). After deducting other costs, schools in Oregon have between $1.09 and $1.20 to spend on the actual food items that go in to each school lunch. Some schools receive funds from local city or county initiatives. If schools choose to use the reimbursement in HB 2800 and buy more Oregon products, this will create jobs in agricultural food sectors.

Table 4.3
Federal reimbursement rates 2010-2011

	Lunch[2]	Breakfast[1]
Free	$2.74	1.76
Reduced Price	$2.34	1.46
Paid	$0.28	0.26

1. These numbers reflect schools where 60% or more of school lunches were free or reduced price. This does not include commodity reimbursements which was $.2025 for 7/10—6/11.

2. These numbers are for schools where at least 40% of lunches served during the second preceding school year were free or reduced qualified, they are "severe need".

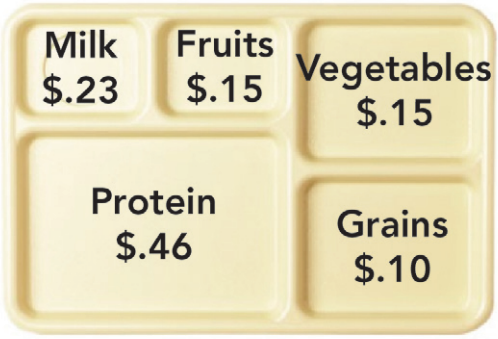


Figure 4.4 School lunch food budget, 2009-10 estimate for Oregon School lunches

4.1.2 Assessment of Employment Health Determinant Outcomes

Demand for Oregon Food

In repeated surveys, Oregon school district nutrition service directors name price as a main barrier to purchasing Oregon produced, packed and processed food[45, 46]. As described in the previous pages, one limitation schools face in buying local food is a tight food budget. School nutrition services purchase low-cost food items in order to build nutritious school meals.

In Figure 4.4, we see that schools must stretch the $1.09 to $1.20 among fruit, vegetable, grain, protein and milk components. Schools buy food from options available through various markets including wholesalers, distributors, local school vendors and commodity foods. In Oregon, commodity items make up only 15-18 percent of the food schools use (Beverly Hassell of Oregon Department of Education, Personal Communication, March 30, 2011). HB 2800 will help schools gain more purchasing power through an additional 15 cents for lunch and 7 cents for breakfast in reimbursement to select local fresh items.

In 2007, 40-43 percent of Oregon's nutrition service providers indicated they would buy local products if price and quality were competitive and a source was available and/or if their vendors offered local foods as part of their contract services[45]. This preference reflects similar attitudes in two Oregon communities where 80 percent of surveyed consumers buy Oregon products because it is important to them to support the local economy and keep farmers in the area[48].
One review of programs across the nation showed an initial increase in local pur-

chasing as the Farm to School program becomes established in five studies[11]. As the programs progressed, local purchasing decreased or leveled off due to financial constraints[11, 49]. These programs involved purchases without external funding support such as that provided by HB 2800.

Figure 4.5 Oregon baked potato with Oregon chili and fresh salad

We estimate that school districts currently buying local foods will increase the volume and diversity of purchases based on responses from the 2007, 2009 and 2010 School Food Service Director surveys. We estimate 15-25 percent of school districts not currently buying local foods will participate in the reimbursement program. The actual number of school districts involved can only be estimated, as the decision relates to several key factors including 1) price of items, 2) quality of items, 3) availability of items (e.g. producer offerings, consistency, seasonality, volume) and 4) accessibility of items (e.g. prepared, packed, distribution system and delivery). We discuss these further in Appendix 3. HB 2800 will lead to more than half of the state's children consuming local foods beyond the locally produced fluid milk which school districts already purchase.

Economic Effects

School purchases of Oregon food would support and encourage growth for food production and processing sectors. In four studies of Farm to School procurement that provided direct sales data, total annual sales resulting for farmers ranged from $8,000 to $55,000, with programs varying considerably in size and number of operational sites[49-52]. Sales were spread over 2 to 27 farmers, with estimated average annual sales per farmer ranging from $845 to $7,650[11]. We expect to see the same range of annual sales in Oregon. A Minnesota study found the potential annual economic impact of Farm to School programs in central Minnesota ranges from $20,000, for a monthly special meal buying a limited number of food items, to $427,000, for sourcing a large amount of easily adapted products[22]. These ranges are based on 20,840 students in the region – 7,400 eating breakfast, 19,300 eating lunch and a total regional food budget of $4.2 million. Oregon has a 96 percent larger school population, so these Minnesota numbers are difficult to compare. A basic, conservative estimate of economic activity suggests a $756,000 economic impact if schools buy a limited number of food items, 30 cents per lunch, for 280,000 school lunches one day a month during a school year.

Figure 4.6 HB 2800 creates production and processing jobs
(Image from Peter Truitt)

Our IMPLAN analysis indicates HB 2800 reimbursement investments would create 269 total jobs in agricultural sectors and the general economy in the first biennium, including full and part-time jobs. Table 4.4 shows the estimated economic effects of the incentive funding to school districts so they can purchase more local foods. The funding level from HB 2800 ($19,580,000) can be found in the upper right corner of the table.

These estimates are based on the assumption that all of the $19.48 million in sales would come from new production, so the estimates reflect a net increase to the sectors that we analyzed. If the producers, packers and/or processors just shift their sales from other customers to schools the effect could be less or zero. Advisory committee members engaged in producing and processing food confirmed these sales would support additional production that would require more production capacity and therefore be a net increase. Initial purchasing practices could also establish market and distribution connections within Oregon that other institutions such as hospitals, prisons and colleges can build on.

The employment and value added measures only count the effort and value, respectively, that are contributed by each industry and represent a unique contribution. In 2009, the output or sales in the Oregon economy were approximately $278 billion. The Oregon value added or state product was $153 billion. Table 4.4 shows that we expect the impact of HB 2800 over a two year time period to add approximately $15 million to the existing value added or state product.

Table 4.4
Estimated economic effects of HB 2800 reimbursement investment of $19,580,000 in first biennium*

Impact Type	New Employment Full & Part-time	Labor Income	Total Value Added	Output
Direct Effect	101	3,427,673	4,854,724	19,580,000
Indirect Effect	101	4,075,845	6,478,575	13,025,502
Induced Effect	67	2,226,388	3,993,000	6,693,837
Total Effect	269	$9,729,906	$15,326,299	$39,299,339
Multiplier	2.67	2.84	3.16	2.01

*Note these quick analyses presumes that production will increase or that the effects are net effects and producers will not substitute, or switch from current customers to schools and maintain the same level of production. Purchases did not include milk and butter.

The IMpact PLANning (IMPLAN) economic model that we used is linear. Because of this, we can estimate how HB 2800 would affect jobs after being in place for five to ten years. We estimated that over a five to ten year time period, schools will be inspired to expand their initial use of 15 cents buying one or two local products with funding from HB 2800 to using more of their federal food budget to purchase Oregon products. This assumption is based on the initial 15 cents in reimbursements from HB 2800 contributing to the total school food budget. Schools receive funds from the federal government to cover the cost of school meal programs. Schools in Oregon currently have between $1.09 and $1.20 to spend on the food items that go in to each school lunch. This range reflects some school districts receiving additional funds from local or

county government support.

With HB 2800, this budget would increase from $1.24 to $1.35. As schools develop and expand market relationships and more vendors offer Oregon products to meet increasing demand, we expect schools to expand their total spending on Oregon products from 15 cents to at least 45 cents while schools continue to receive this investment. We applied this rationale to the IMPLAN model results, tripling the expected outcome in the first biennium (see Table 4.5). This results in a potential for a total of 806 jobs after the first biennium.

Table 4.5

Estimated economic effects of HB 2800 in 10 years with inspired increases*

Impact Type	New Employment Full & Part-time	Labor Income	Total Value Added	Output
Direct Effect	302	$10,283,020	$14,564,172	58,740,000
Indirect Effect	302	$12,227,534	$19,435,725	39,076,506
Induced Effect	201	$6,679,163	$11,979,001	20,081,510
Total Effect	806	$29,189,717	$45,978,898	117,898,016

*Numbers rounded to nearest whole number. This represents approximately 45 cents spent on Oregon products for each meal.

Job Stability

The increase of school district purchasing could provide more stable demand and assured return for a product if schools maintain demand levels. We heard from producers on our committees and in community forums that consistent demand could help producers accomplish several outcomes: 1) obtain higher crop yield at the end of seasons, 2) extend seasonal jobs longer than normal and 3) provide flexibility for producers and processers to experiment with value added innovation, which can bring a price premium to their product in other markets. Added demand for Oregon products can also help unskilled and semi-skilled workers learn new skills on the job. The demand for unskilled workers has been decreasing over the last few decades[53].

Farm to School Initiatives lead to entrepreneurship

USDA has initiated a nationwide "know your farmer, know your food" campaign. In many Oregon schools, students are having the opportunity to do just that. In Condon, Oregon, Donna Bates of Wheat Springs Bakery and the Bates Ranch was looking for a way to diversify her family farm's wheat products. Donna began experimenting with popped wheat, and with help from the Oregon Food Innovation center, developed a light and nutritious snack. Condon Elementary school, where Donna already worked as a librarian, began serving her product. Now, if the students don't see the air-popped wheat they ask, "where are the salad bar crunchies?"

Food Security and Insecurity

We examine food security in more detail in the Diet and Nutrition Section 4.2 as it relates to school meals. Here, we consider how employment affects household food security. Research indicates new job creation will be especially beneficial to couples with children and households where at least one member is experiencing unemployment, as the jobs will help some workers pay for essentials including food and rent. In a study examining food insecurity and hunger rates between

1996 and 2002, Oregon's male blue collar workers (including craftsmen, laborers, operators, farm managers, timber workers, and fishermen), single mothers, two-parent households with children and households above the poverty line were more likely to experience food insecurity and hunger than in other states[30].

Food insecurity also relates to food access, or the availability of food in a community. According to the 2006 Food Environment Atlas, many parts of the state have populations where a relatively large percentage of the population are both low-income and live more than ten miles from a grocery store (see Figure 4.7). If schools in these areas buy more food from Oregon sources, rural areas may have to expand their processing capacity in order to provide schools with cleaned, sliced and packaged fruits and vegetables, for example.

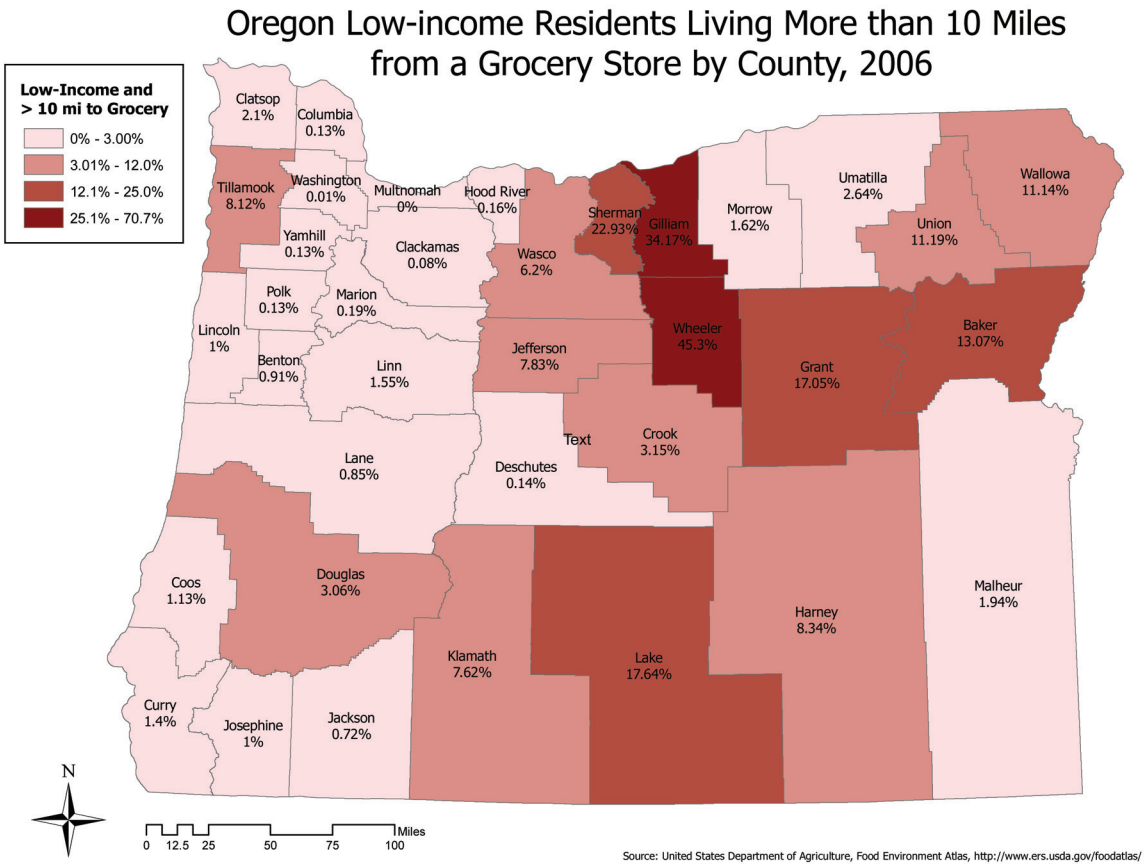


Figure 4.7 Access and proximity to a grocery store, 2006

Increased processing of food in areas that are the most food insecure could lead to more food availability and donations to food banks. In 2010, Economic Development Officials in nearly 40 Oregon communities identified local food processing as a priority strategy to drive local economic activity. As a result, the Oregon Economic Development Association, along with Business Oregon, prioritized value-added agriculture as the next industry that they will take a statewide approach to in business recruitment and development [Erik J. Andersson, personal communication, April 4, 2011].

Mental Health, Chronic Disease and Life Expectancy

This policy will have a strong impact on mental and health outcomes through new employment. Seven review articles spanning two decades of research, including a meta-analysis, and seven moderate to strong quality individual studies indicate that individuals experiencing unemployment suffer from poorer mental health (e.g. psychological distress, depression, admittance to a mental hospital, suicide) and poorer physical well-being (e.g. chronic disease such as high blood pressure and diabetes, functional health, health care service use) than employed individuals[39, 41, 54-63]. Studies also indicate that being reemployed leads to improvements in well-being in longitudinal studies[56, 64]. Studies on immediate mental health gains from reemployment are mixed, finding that workers experience stress from new job tenure and that individuals suffering from mental health issues are less likely to find employment[40, 41, 56, 59, 62-67].

One review found that among individual-level studies, all of the published effect estimates indicated greater use of health care services (range of most relative risks 1.2 to 2.9) and increased mortality (most standardized mortality ratios ranged from 120 to 200) for those experiencing unemployment, compared to the employed[58].This means people experiencing unemployment were up to twice as likely to die than employed individuals, and there were more deaths among people experiencing unemployment than expected based on age and sex specific death rates among employed individuals. In an unusual dose-response study in London, Franks and colleagues (1991) found that the rate of death due to stroke among men increased by 5.4 per 100,000 for every one percent rise in the unemployment rate[68].

4.2 Diet and Nutrition

Diet is a health determinant that contributes to major health outcomes such as food insecurity, educational attainment, cognitive development, child learning, class behavior and risk of chronic conditions such as obesity (see Figure 4.8 the Diet and Nutrition Health Determinant Pathway). We predicted that the reimbursement component of HB 2800 would positively affect school meals. HB 2800 provides an opportunity for schools to increase the frequency of local food purchases and to vary the types of local

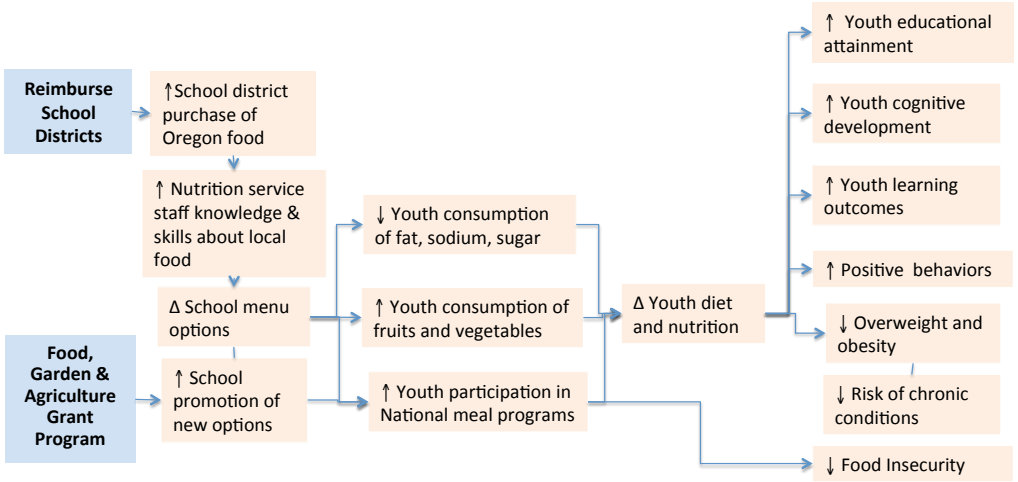


Figure 4.8 Diet and Nutrition health determinate pathway

food they buy and serve in school breakfast and lunch meal programs. With additional reimbursement funds, schools can elect to diversify or increase the quality and type of fruits, vegetables, meat or other Oregon products they serve. Schools may choose to start using salad bars, expand the type of salad bar food they offer or promote menu items through funds in the education grant program. Changes in student diet and nutrition could result from new food offerings and evolving student preferences. The health outcomes in this pathway are most directly related to changes in children's diet and nutritional intake. The impact food, agriculture and garden-based educational activities have on children's diet and nutritional intake is discussed in the next section.

Figure 4.8 shows the linkage between the policy elements of HB 2800 and the resulting health outcomes in the Diet and Nutrition pathway. In the bottom portion of the diagram the Education grants are shown leading to school nutrition services promoting more Oregon food items in cafeterias. Promotional elements include menus, posters, signage on the lunch line, table tents or other communications that can help children learn to recognize locally produced foods. Because procurement is the focus of this pathway, we also discuss operational barriers schools face when they want to buy locally produced or processed foods in Appendix 3.

4.2.1 Current Diet and Nutrition Conditions

Schools shape childhood food preferences by providing access to meal programs and nutrition education during the first two decades of life[69]. Schools help meet children's need for nutrition by offering food through the National School Lunch Program (NSLP) and the School Breakfast Program (SBP)[70, 71]. All meals are required to meet calorie and nutrient levels recommended by the United States Department of Agriculture. Some school districts use the standards as guidelines in menu planning[72]. Breakfasts aim to serve students a quarter of the calories and nutrients recommended by the USDA, and lunches are intended to provide one-third of that daily allowance. Many researchers and health advocates believe that both the federally subsidized school meal programs and the "competitive" foods offered through a la carte sales in cafeterias, vending machines or other school activities may be important areas for policy change to prevent childhood obesity[73-75]. Oregon is ahead of the national curve in improving the school food environment. In 2007, Oregon passed HB 2650, Oregon Revised Statute 336.423 that removes high-calorie, high-fat snack food from school vending machines, student-run stores and competitive cafeteria options and replaces it with lower-calorie, lower-fat options. The legislation does not affect food served in the NSLP or the SBP.

For many low-income children, or for those living in food insecure households, school meals provide a consistent source of nourishment, so it is critical to serve them meals with the highest nutritional content and quality. As described in Section 4.1, A household is considered food insecure when members do not have access, at all times, to food for active, healthy lives.

Oregon has consistently had one of the highest rates of hunger in the nation[29, 34, 36]. In 2009, Oregon was one of the top five hungriest states with 13.9 percent of households (more than 500,000 individuals) suffering from food insecurity and 6.6 percent

of those households suffering from VLFS, or hunger[29]. Food security is closely related to household income and access to other resources. As mentioned in the Employment section, 14.3 percent of Oregonians and 19.4 percent of children experienced poverty in 2009[33].

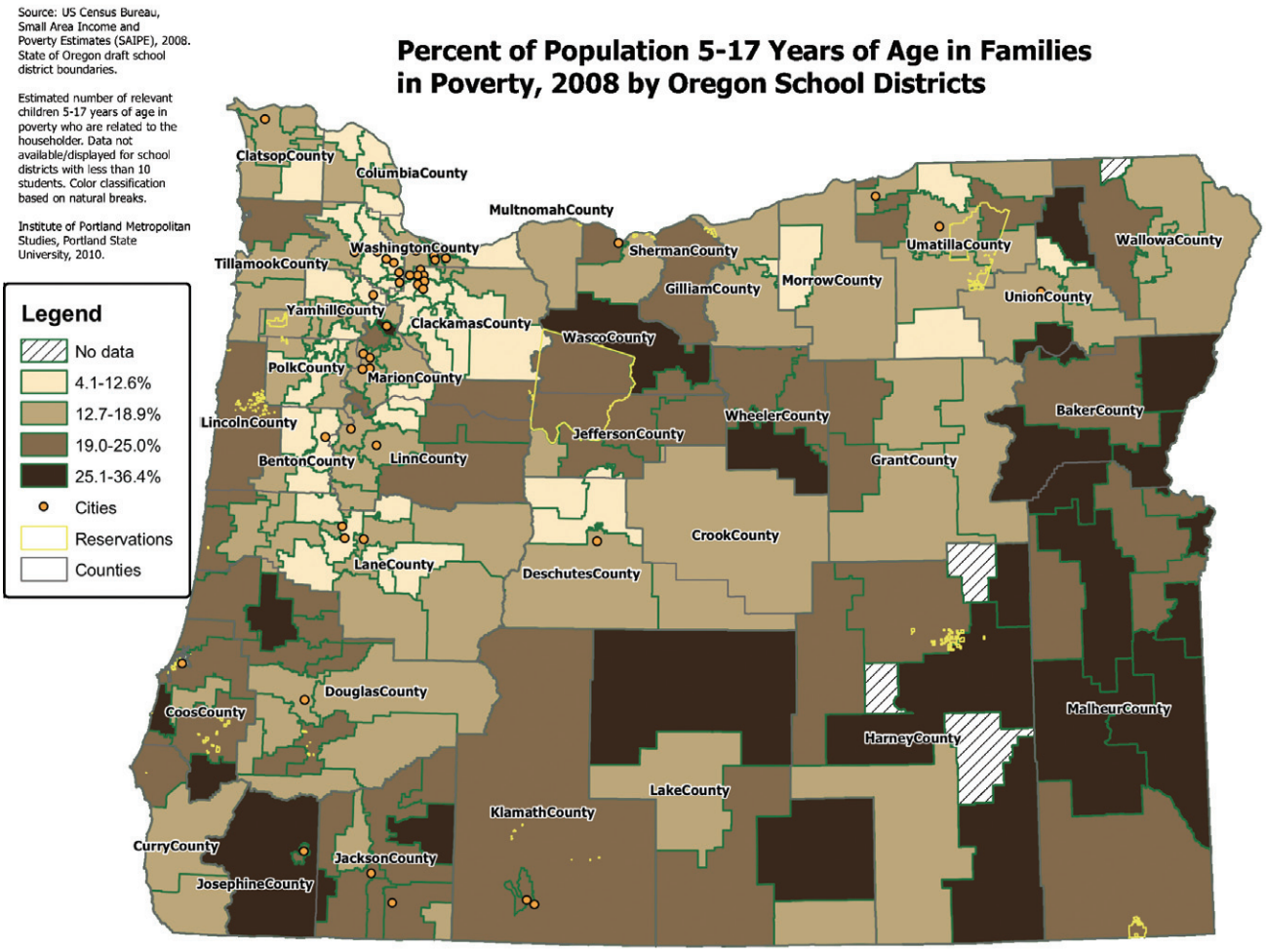


Figure 4.9 Oregon childhood poverty by school district, 2008

This poverty is not equally distributed across the state. In some school districts in non-metropolitan counties such as Josephine, Wasco, Wheeler, Malheur, Baker, Harney, Lake, Jackson and Coos, 25.1 to 36.4 percent of children ages 5-17 were in poverty in 2008 (see **Figure 4.9**). Poverty and food security also have a disproportionate effect on specific ethnic and racial groups (see **Figure 4.10**). In the 2009-2010 school year, 31.6 percent of enrolled Oregon students were from disproportionately affected ethnic or racial populations including multi-ethnic, Black, Hispanic, Asian/Pacific Islander, and American Indian/Alaskan Native[76].

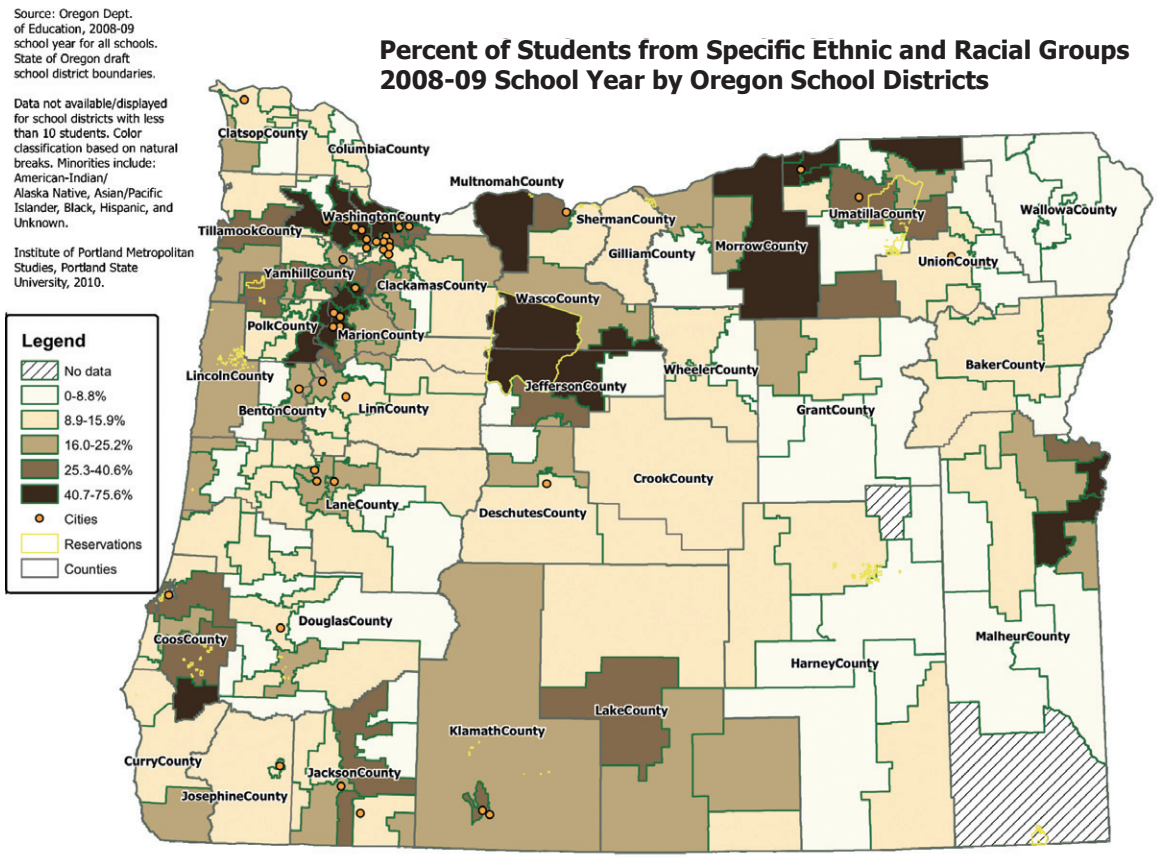


Figure 4.10 Oregon students from specific racial and ethnic groups in 2008-09 school year

Food insecurity and hunger affect health. One review indicates that household food insecurity is associated with nutrient deficiencies, poor cognitive development, behavioral and psychosocial dysfunction in both children and adults, and generally poor health (see Table 4.6)[77-80]. Table 4.6 indicates the effects of childhood food insecurity.

Table 4.6
Effects of childhood food insecurity[80]

Physical Health	Mental Health	Academic Performance
Hunger and food insecurity among children are linked to:		
Low-birth weight	Behavioral & emotional problems	Academic problems
Fair/poor health	Lower social skills	Lower arithmetic scores
Hospitalization	Difficulty getting along with others	Repeating a grade
Iron deficiency anemia	Psychosocial dysfunction	Suspension from school
Chronic illness	Aggression and anxiety	Higher levels of hyperactivity
Stomaches, headaches, colds	Depression, thoughts of death, attempted suicide	Higher levels of absenteeism & tardiness
Increased BMI, weight gain		

Between 2005 and 2010, the number of students eligible for free lunch in Oregon increased by 20 percent[81]. In the 2009-10 school year, approximately half of all school children were eligible to eat free or reduced priced meals (see Table 4.7). Of those eligible, 33 percent did not participate in the free or reduced lunch program and 65 percent did not participate in breakfast in the month of October[76]. About three percent of schools in the state do not offer the School Breakfast Program, affecting breakfast participation numbers [Alexander Clifford, Personal Communication, February 16, 2011].

Table 4.7

School meal eligibility and participation, 2009-10*[76]

	Eligible Oregon Students	Student Participation
Free/Reduced Lunches	288,770	67%
Free/Reduced Breakfast	285,482	35%
Total Enrollment	561,698	

*Enrollment figures for breakfast are not completely independent from the lunch enrollment figures; over 16,000 children attend schools that do not offer the SBP.

Diet is one of many contributing factors associated with educational attainment. Child hunger, poor diet and nutrition is associated with lower academic achievement and contributes to a less competitive workforce, as workers who experienced hunger as children are not as well prepared mentally, physically, emotionally or socially as their better-fed counterparts[77]. In 2009 18.1 percent of 11th grade Oregon teens ate less in the previous year than they felt they should, because there wasn't enough money to buy food, an indicator of food insecurity[82].

School meals help children obtain calories and nutrients to learn and move more successfully into the workplace. During the 2006-08 school years, 22 percent of economically disadvantaged children did not graduate from Oregon public schools (see Table 4.8 for details). Black children and children of Hispanic origin have lower completion rates than other specific cultural and racial groups and are barely over the 68.1 percent target rate for Oregon (see Table 4.8). Children who are still mastering English are not meeting the graduation target.

Table 4.8

Oregon completion rates for student populations (2006-08)

Graduation Target: 68.1%

Graduation	Graduation	2006-2007				2007-2008				Combined Graduation
		#Enroll	#Grad	#DO	%Grad	#Enroll	#Grad	#DO	%Grad	
All Students	MET	190098	33434	7625	81.4	186284	34948	6678	84.0	82.7
Economically Disadvantaged	MET	65522	7979	2826	73.8	74164	11021	2509	81.5	77.9
Limited English Proficient	NOT MET	14389	1681	638	72.5	14882	1487	977	60.3	66.3
Students with Disabilities	MET	25931	2322	1170	66.5	22957	2435	790	75.5	70.7
Asian/Pacific Islander	MET	8253	1686	248	87.2	8400	1811	217	89.3	88.2
Black (not of Hispanic origin)	MET	5884	806	378	68.1	5713	830	381	68.5	68.3
Hispanic origin	MET	24567	3242	1791	64.4	25971	3849	1611	70.5	67.5
American Indian/Alaskan Native	MET	4425	681	269	71.7	4217	725	235	75.5	73.6
White (not of Hispanic origin)	MET	141351	26216	4717	84.8	135996	26845	3959	87.1	85.9
Multi-Racial/Multi-Ethnic	MET	2241	370	98	79.1	2859	475	124	79.3	79.2

The Combined Graduation is calculated as the weighted average of enrollment times the graduation rate for each year. The graduation rate equals graduates divided by graduates plus dropouts. Enrollment includes grades 9 - 12 from the Fall Membership collection for each applicable year.

Hunger is also associated with overweight and obesity. Food insecurity is related to obesity for families living below the poverty level[83-86]. Many low-income individuals adapt to a cycle of food shortages followed by increased consumption of calorie dense, low-nutrient foods, resulting in increased body mass[87]. Families eat the foods that are most accessible and affordable, and these are often those high in calories and low in nutrient value. This has been shown to have an effect on low-income adolescents especially. For example, between 2001 and 2007, obesity increased among lower-income adolescents but showed no statistically significant differences among higher-income adolescents after adjustment for age, gender, and race/ethnicity[84]. Babey and colleagues conclude that efforts to slow the obesity trend among youth are helping all except for the low-income adolescents[84]. Schools can help address the obesity challenge through changing the food environment, which is the focus of the next pathway.

Diet is a contributing factor to children maintaining a healthy weight. A recent 2010 study found that obesity is now considered the leading cause of reduced Quality-adjusted Life Years, along with smoking, in the United States[88]. The 2009 Oregon Healthy Teens survey indicates that 13.2 percent of 11th grade teens were overweight and 10.4 percent were obese; 15.4 percent of 8th graders were overweight and 11.2 percent were obese[82]. This means about 1 in 4 Oregon adolescents are overweight or obese. Obesity is related to cardiovascular disease, hypertension, diabetes and joint degeneration[89-95]. Being overweight or obese as a youth can make it more difficult to lose weight when transitioning to adulthood.

Obesity is a major Oregon health problem: between 1990 and 2005 obesity among Oregon adults increased by 118 percent. Oregon's adult overweight and obesity levels are at record highs, resulting from poor diet and physical inactivity, among other factors. In 2009, 58.2 percent of adults in Oregon were overweight or obese[96]. As of 2005, Oregon American Indian and Latino adults were disproportionately obese when compared to other ethnic and racial groups[97]. The costs of obesity are high. Between 1998 and 2000, Oregon spent $781 million on health care costs attributable to obesity[98].

4.2.3 Assessment of Diet and Nutrition Health Outcomes

Meal Nutrition Changes

Robinson-O'Brien and colleagues' (2010) cross-sectional study found that school meals provide, on average, over 50 percent of children's nutritional intake and are an important contribution to a child's daily fruit and vegetable intake[99]. According to literature on food procurement for Farm to School programs, many schools begin by serving local items in school salad bars[100-103]. Other schools also use scratch kitchens and incorporate local food items into the entire meal[26, 104-106]. Based on a review of these studies, we expect that HB 2800 will have a moderate impact on the nutrition of children through changes in the diversity of food and the fresh quality of items offered in the main meals and through salad bars. We predict the policy will have a smaller impact on schools that only expand their food offerings to include more fruits and vegetables in the current salad bar, or begin using salad bars, instead of incorporating Oregon products in all meal items. Oregon school districts already offer meals that aim to meet USDA guidelines, and many include fresh salad bars. In a 2007 state-wide survey, 74.3 percent of 181 nutrition service directors reported having salad bars; it

is unknown if the other 168 Oregon nutrition service directors have them[45]. Two studies indicated nutritional gains for children participating in Farm to School and school garden programs; gains included exceeding nutrient standards in protein, calcium and vitamin C, as well as falling below the standard for total fat content[104, 107]. Student preference for and consumption of fruits and vegetables is addressed in the Farm to School and School Garden Education Section 4.3.

Joshi and colleagues' review of studies on Farm to School procurement indicate that school nutrition service staff increased their knowledge of local foods and skills in menu planning, use of equipment, food preparation and cooking, and waste management practices[11]. School district demand for Oregon foods is addressed in the Employment Section 4.1.

School Meal Participation

Children are more likely to eat food if it matches their taste preferences[99, 108-112]. Shepherd (2006) and colleagues found that young people place high value on choice and autonomy in relation to food. Increasing the provision and range of healthy, affordable snacks and meals in schools and social spaces will enable them to exercise their choice of healthier, tasty options[109].

The policy is likely to have a small to moderate impact on school meal participation for all full, reduced and free priced payment levels. In one review, seven studies that tracked participation in response to use of local foods in school meals reported increases in student participation in meal programs from 1.3 percent up to 16.0 percent for all meals, free, reduced and fully paid[11]. The average increase based on data from six of the seven studies is 9.3 percent[11]. The studies indicate that there is an initial jump in participation levels at program initiation followed by a decline, with participation maintained at a level higher than before program onset[11].

Kids will eat it – if you name it right

When the food service company, Organic Fresh Fingers, first served their Mushroom Stroganoff, kids claimed not to like it. Knowing that kids respond to positive messages, just like adults, Evann Remington, the founder, changed the name to Sensational Stroganoff and found kids couldn't get enough of it. "They loved it! We ran out of it all from a name change."

The variables most associated with student satisfaction are as follows: variety, flavor and attractiveness of food; quality of ingredients; staff friendliness; and culturally appropriate choices[111]. Goldberg and colleagues found that school meal modifications such as increasing fruit, vegetable and whole grain offering and serving low-fat dairy products were more likely to be accepted and sustained if strategically implemented following the collection of input from school administrators, cafeteria staff, parents and students[113].

Promotional materials usually contain content aimed to influence children and their caregivers' knowledge and attitudes towards the featured foods by including fun facts and nutrition facts about the items, as well as a story about the growers or processors who produced the items served (see **Figure 4.11** showing example Harvest of the Month activity on brussel sprouts).

Figure 4.11 Promotional materials such as those offered by Oregon Harvest for Schools helps students identify local foods and food nutrients.

Several studies indicate that the stigma associated with eating free or reduced meals and peer group behavior contributes to lack of participation in school meals, especially among high school students[114, 115]. Based on this review, if schools provide healthy food options that are suitable to students' preferences, including cultural appropriateness, it will result in a low to moderate increase in school meal participation. School meals are connected to fruit and vegetable consumption, which we will explore at greater length in the Farm to School and School Garden Education Section 4.3.

Household Food Insecurity

It is likely that if HB 2800 encourages school meal participation, it will have a small to moderate impact on household food insecurity and hunger, which affects children. For hungry children especially, this contributes to being healthier, more focused students[80]. A CBS poll on the recession indicates that more parents are having children eat school meals as a result of cost cutting at home[116]. School meal programs address child food insecurity and hunger by providing a primary meal source for children who might not otherwise have one. Five studies of moderate strength indicate that school meal programs 1) offer a disproportionately larger amount of caloric and nutrient intake for food insecure children than for food secure children[99, 117, 118] and 2) supplement household food budgets[119, 120]. On average, children from highly food secure households obtained 16 percent of their daily calories from school meals, while children from food insecure and marginally secure households obtained 26 and 24 percent, respectively. Hungry children have greater odds of being hospitalized, and the average pediatric hospitalization costs approximately $12,000[117]. Child hunger leads to greater absenteeism, missed work days for parents, attending work while sick, and turnover in the work environment, all of which are costly for employers[77].

In one study examining numbers from 1996 to 2001, Oregon's two-parent households with children were far more likely to lack adequate food (19 percent FI and 7.3 percent with hunger) than were similar families in other states[30]. Researchers exploring this issue found that food insecure households are dealing with income volatility and stressed budgets from unexpected expenses, loss of food stamps, competing bills, loss of a job and gaining a household member in previous months[121-124].

Farm to School Programs lead to meal variety and child recognition of Oregon foods

"I received a 'Thank you' for serving fresh blueberries from Happy Harvest Farms from a student down at La Pine Elementary because he had never had a fresh blueberry before!

Another time, we served yellow and orange watermelons and the kids wouldn't try it until we gave them samples. Once they found out that it was actually watermelon they loved it. Now, when they see me they ask when will the orange and yellow watermelon be coming."

~ Katrina Weist,
Bend Nutrition Services Manager

Child Learning Outcomes and Educational Attainment

Well-nourished and food secure children learn better than undernourished and food insecure children. HB 2800 will likely have a moderate to strong impact on children's learning and academic achievement outcomes through increasing enrollment in school meal programs. There is a strong body of evidence to support the association between children's nutritional status and learning and academic achievement outcomes, especially around school breakfast. Twelve publications of moderate to moderate-high quality link nutrition intake and academic performance[125-137]. Four studies indicate that increased nutrition is associated with improved academic performance and various cognitive functions[126-129]. For example, Florence et al. (2008) found students with lower overall diet quality were significantly less likely to perform well on a literacy assessment when socioeconomic and other factors were controlled[127].

Six publications exhibited an association specifically between consumption of breakfast and positive health and education outcomes including improved nutrition, cognition and academic scores[125, 131, 132, 136, 138], improved attendance[132, 133] and education attainment[137]. Although breakfast consumption has been repeatedly shown to improve short-term cognitive function, such as memory, it has not been significantly associated with longer learning outcomes other than educational attainment[135]. Breakfast is a key component of maintaining a healthy diet and has a much more profound effect on under-nourished and food insecure children. This policy has the potential to impact children's consumption of a healthy breakfast by providing fresh fruits through the School Breakfast Program, thus improving children's chances of academic success.

Child Overweight and Obesity

If this policy encourages schools to displace some of the fatty and calorie dense school lunch offerings with nutrient dense foods including fruits and vegetables, it may have a small to moderate impact on obesity and overweight levels of youth in Oregon. Twelve articles, including literature reviews and individual studies of moderate strength, examine the association between fruit and vegetable consumption and overweight and obesity and show both positive, negative and mixed results[69, 73, 139-148]. While few short-term randomized controlled interventions have resulted in significant changes in childhood obesity, it appears that a sustained healthy diet rich in fruits and vegetables and low in fat reduces the likelihood of a child becoming overweight or obese by adulthood. Data on whether participants in the school lunch program are more or less likely to be overweight or obese is mixed and varies by ethnicity, sex, family income level and food security level[142, 143, 145].

Figure 4.12 More fruits and veggies reduce the risk of childhood obesity

4.3 Farm to School and School Garden K-12 Education

The Oregon public school system supports Farm to School programs. As discussed in the Employment pathway, 90 of 198 public school districts are purchasing at least one Oregon-sourced food product other than milk[44].

This pathway examines the impact of the Food, Garden, and Agriculture Education grants on health. This pathway overlaps with Diet and Nutrition, because food, garden and agriculture based activities can shape dietary preferences. In Figure 4.13, the pathway shows the grant program leading to an increase in educational activities, student learning, student gardening, food-based activities, positive learning behaviors and dietary preference changes. Dietary preference changes and physical activity changes can also reduce the risk of youth overweight and obesity.

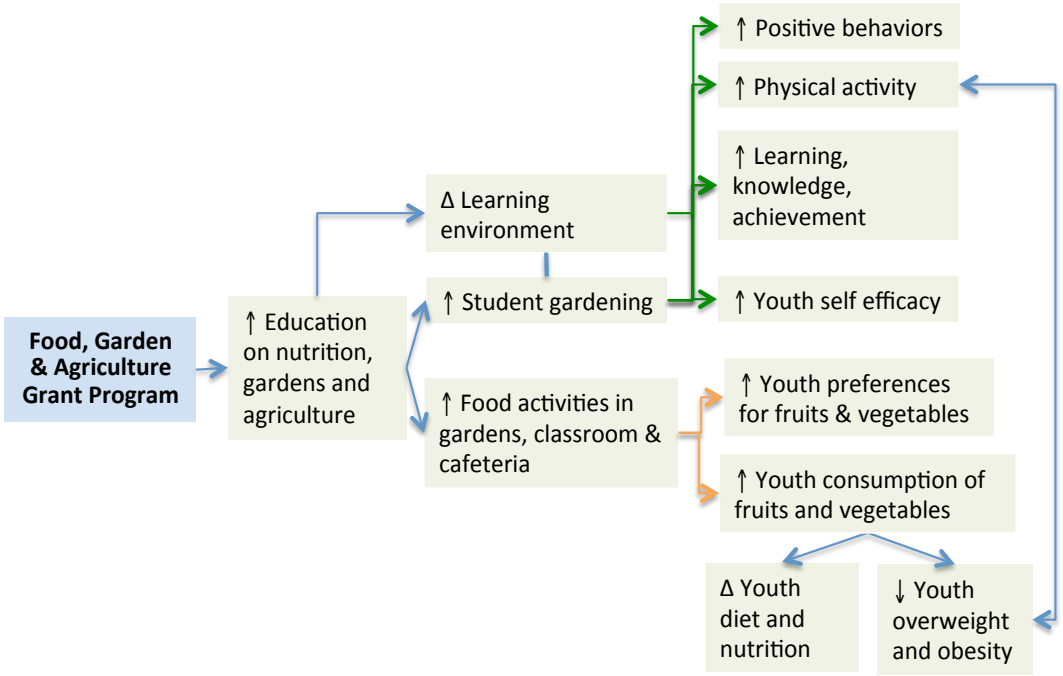


Figure 4.13 Farm to School and school garden education health determinant pathway

Farm to School and school garden programs involve one or more of three core elements that affect students' food experience: food procurement and offerings, food promotion and educational curriculum through instruction in the classroom and gardens. Food offerings may include items tasted in the garden, served in school meals or at a tasting table, prepared in scratch kitchens, salad bars, boxes of food that go home and classroom snacks. Food promotion includes food tasting, menu displays, recipe development, table tents, posters, food labels and colorful signs. Education curriculum includes science, agriculture, horticulture, nutrition, cooking, math and others. Gardens include garden plots, raised beds, greenhouses, containers and native landscapes.

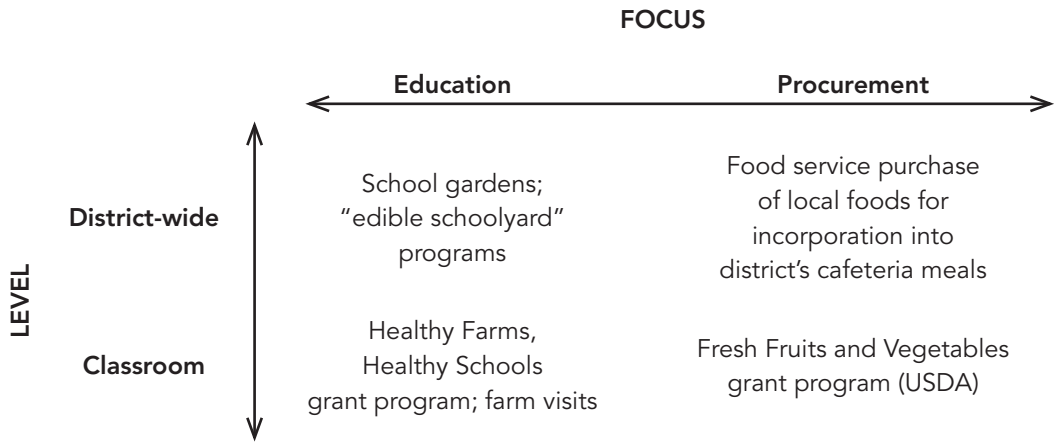


Figure 4.14 Farm to School and school garden programs by level and focus[279]

Currently, schools may buy Oregon food without engaging in food, garden and agriculture based activities, or vice versa. Figure 4.14 shows the potential for schools to engage in classroom or district-wide education and procurement activities. Figure 4.15 shows the potential for integrating food, garden and agriculture education with food procurement in cafeterias[289].

We examined the literature to understand which Farm to School elements the 2011 Farm to School and School Garden bill would likely influence. We examined Farm to School programs that focus on cafeteria or classroom food offerings, programs that incorporate gardens and programs that include nutrition or agriculture education. Limited literature has looked specifically at food promotion separate from other Farm to School activities. We examine the integration of food procurement with other school activities, such as classroom and garden time, in this pathway.

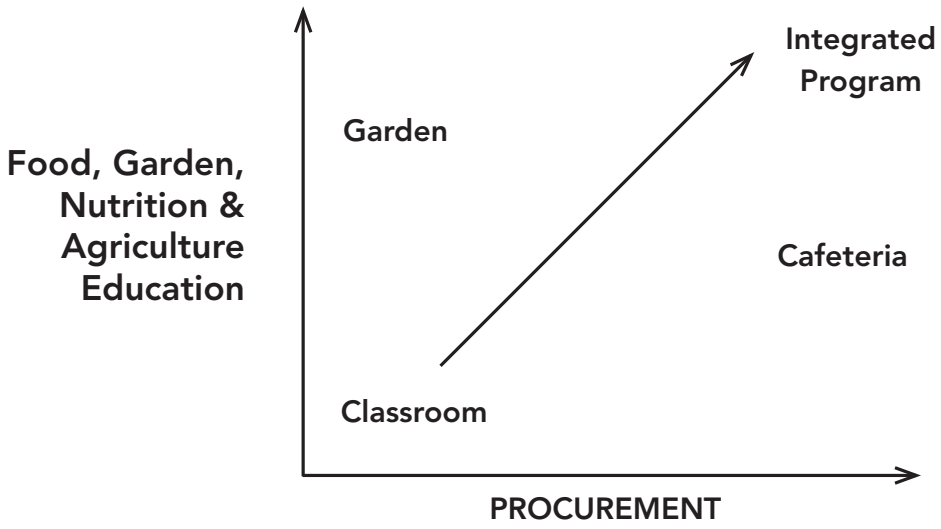


Figure 4.15 Farm to School and school garden integrated programs

School gardens are outdoor classrooms that provide hands-on opportunities for students to experience growing, cultivating and harvesting their own food. In 2004, the Child Nutrition Reauthorization act required schools participating in the NSLP and SBP programs to have wellness policies that set nutrition education and physical activity goals. Farm to School and school garden programs can help schools address this requirement through providing nutrition education and an additional physical activity opportunity through gardening.

4.3.1 Current Farm to School and School Garden K-12 Education Program Conditions

As mentioned in the introduction, several prominent statewide plans identify Farm to School and school gardens as viable school based environmental strategies to address hunger, food insecurity, childhood obesity and to promote environmental literacy. Despite this support, current Oregon education standards do not require students to learn about food systems or production.

Table 4.9
Oregon 8th and 11th grader fruit and vegetable consumption and physical activity[97, 149]

	< 5 Daily Servings of Fruits and Vegetables		< 5 days a week of 60 minutes of exercise	
	8th grade	11th grade	8th grade	11th grade
2005	76.6%	82.3%	42.1%	50.6%
2009	78.7%	82.5%	83.6%	86%

As mentioned in the Employment section, as of 2010, nearly half of the school districts report buying Oregon products[44] (see Figure 4.3). Most schools in Oregon use Food Based Menu Planning or an "offer vs. serve" approach to serving meals. In this method, children are offered five different items and are required to take at least three in order for that meal to be reimbursed by the federal government. The fact that nearly half of Oregon school districts are currently buying local food represents an opportunity to learn about program types. We do not know what level of Farm to School programming exists in each site or the degree to which cafeteria and classrooms are integrated. HB 2800's Food, Garden and Agriculture Education grants are intended to help children learn about food and nutrition. As discussed in the Diet and Nutrition pathway, diet and physical activity are related to healthy weight. Children in Oregon do not currently eat enough fruits and vegetables, crucial components of a healthy diet[97, 149]. Fruit and vegetable consumption is part of this pathway, because the grant program will support schools in promoting fruits and vegetables, which may contribute to shaping children's dietary preferences.

As of 2009 in Oregon, the majority of 11th graders do not eat the recommended daily allowance of five or more servings of fruits and vegetables a day (see Table 4.9). More than half of 11th graders (58%) and nearly half of 8th graders (45.1%) eat three or fewer serving of fruits and vegetables a day[149]. Children are also not getting enough exercise. The Centers for Disease Control recommends one hour of physical activity five days a week for youth; the majority of Oregon 8th and 11th graders do not meet this recommendation (see Table 4.9)[97, 149, 150].

Extensive public and private support for school gardens exists in Oregon. While not fully coordinated, many agencies and organizations work in alignment towards helping schools and districts meet goals for including food and garden-based education. Public support includes Oregon Department of Education and Oregon Extension Service (4H, Master Gardner and the Supplemental Nutrition Assistance Program (SNAP)). Extensive non-profit and private entities also support garden programs on local, regional and statewide levels. As of 2007, 75 public school districts report an active school garden, resulting in at least 160 gardens in the state[151, 152] (see **Figure 4.15**).

Schools with gardens are not evenly distributed across the state. The majority of school gardens exist in populous regions, with 72 percent found in urban and suburban areas. The distribution of gardens in school districts serving large populations of specific ethnic and racial is spotty with some counties having more gardens (e.g. Multnomah (44 gardens) and Clackamas (10)) and other counties having fewer (e.g. Washington (6), Marion (6), Polk (<2), Benton (6), Malheur (3), Morrow (<2), Umatilla (<2), and Coos (<2)).

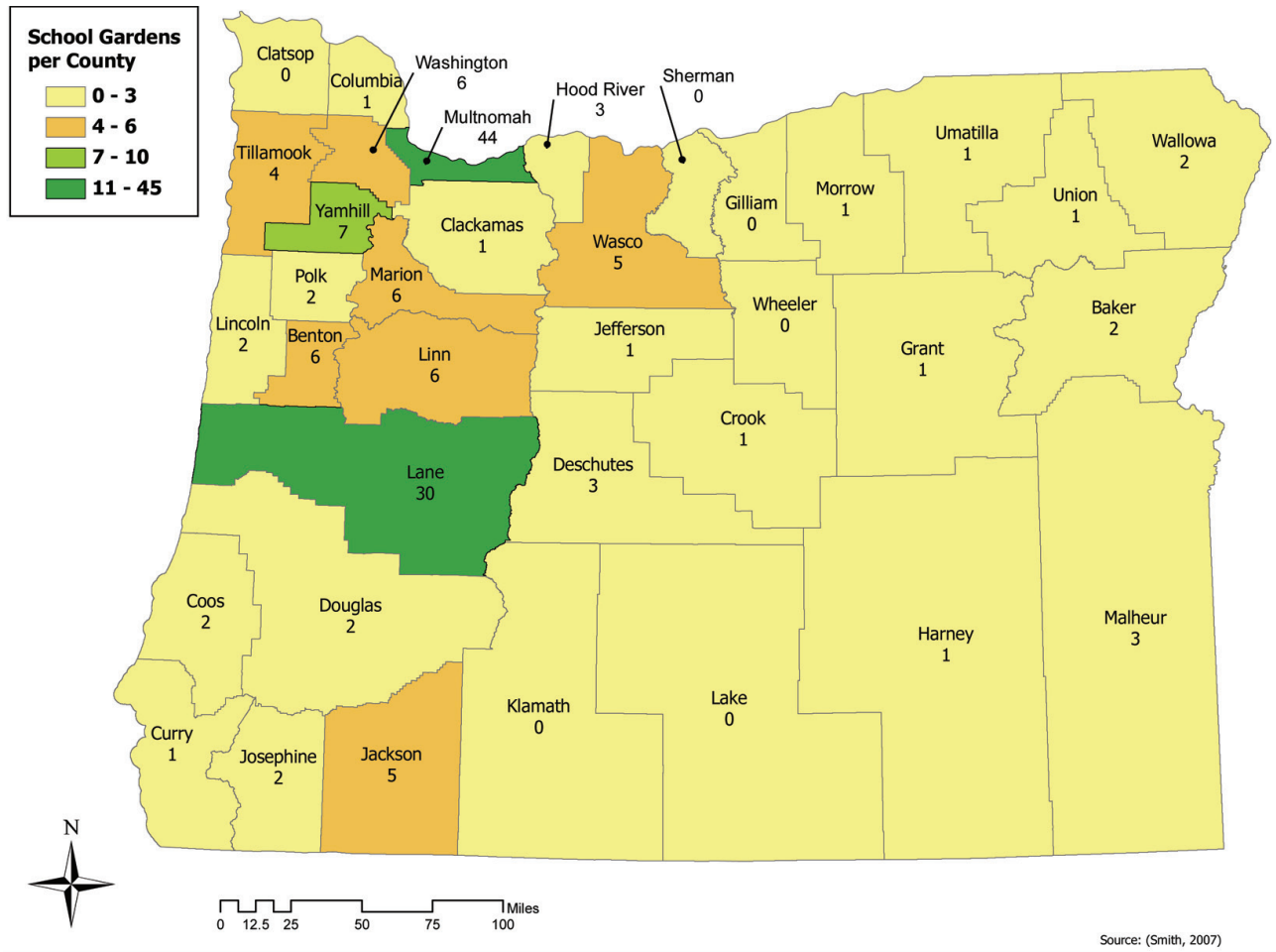


Figure 4.15 School gardens in Oregon by county, 2007[151, 152]

The two most common uses of school gardens are "hands on learning" and "academic education"[151, 152]. Schools are integrating garden activities into lesson plans for a wide variety of subject areas, most commonly science, followed by horticulture, agriculture, arts, nutrition, math, food systems, character development, cooking, health education, youth development, social sciences, physical education and community food security[151, 152]. In this pathway we examine school garden programming's impact on academic achievement, including math and science. Oregon students could be performing better in science and math. In the 2009-2010 school year, one-third of Oregon 8th graders and more than one-third of Oregon 10th graders were not meeting Math and Science standards [153] (see Table 4.10).

Table 4.10
Percent of students not meeting standard (2008-10)[153]

	Math		Sceince	
Year	8th grade	10th grade	8th grade	10th grade
07-08	31%	48%	31%	43%
09-10	28%	44%	29%	40%

Figure 4.16 Planting together (Image courtesy of Megan Kemple of Willamette Farm and Food Coalition)

4.3.2 Assessment of Farm to School and School Garden K-12 Education Outcomes

Gardening Education, Agriculture Programming and Learning Environment Changes

HB 28000 will have a strong positive impact on food and garden-based education. The policy is written to support grant funding for 150 gardens every two years. This policy will likely increase the amount of food, nutrition and agriculture programming in K-12 education for schools with gardens and help establish gardens in schools without them. A survey of California schools indicates schools use gardens for agriculture programming, among other topics[154]. Although the policy does not provide funding for curriculum, results from a 2007 inventory of Oregon public school gardens indicate that schools currently using gardens include a variety of educational content. We feel it is likely that schools receiving garden grants would continue this same trend. Oregon also has several initiatives, such as Oregon Harvest for Schools, that work to promote Farm to School efforts.

The literature indicates that garden-based education programs may affect a school's curricular, physical and social learning environments (Personal Communication, Michelle Markestyn Ratcliffe, 2007). We address the social learning environment in the Social Capital pathway. Garden programs may affect the curricular learning environment by increasing or enhancing opportunities for hands-on, place

and project-based education. The progressive activities of planning, planting, tending, harvesting and consuming produce collectively engage youth and adults in on-going, real-world processes[155-158]. Gardens may also affect the learning environment by providing a context for integrating curriculum from all classes and grade levels[154, 159]. These integrated learning experiences reinforce content and abstract ideas that students read about. Garden-based learning activities may also engage students' multiple intelligences[160-162].

School garden programs may also affect the physical learning environment. Naturalized school grounds generally improve physical living conditions, particularly in urban areas, as they mitigate the "cold" city climate, making the school surroundings setting more attractive and hospitable. Varied types of vegetation may also increase the number of different types of developmentally appropriate learning and play opportunities[163, 164]. In addition, the physical attributes of school gardens naturally reinforce learning by providing multiple exposures to and visual reminders of lessons[165].

Gardens also provide youth and adults with places of refuge, safer after school environments and a physical location where they can connect with nature and nurture living things[166, 167]. Creating 150 new gardens would expose about 15,000 children every two years to added science, nutrition and agriculture education. We determined this number by assuming each garden would reach at least 100 children based on 2007 school garden survey results.

Figure 4.17 Tasting tables (Image courtesy of Megan Kemple of Willamette Farm and Food Coalition)

Child Dietary Preferences and Diet and Nutrition Impacts

Farm to School and school garden grants will contribute to changes in school meal programs and food promotional materials in school cafeterias that affect dietary preferences. Meyer (1998) and colleagues found that the variables most correlated with student satisfaction of school meal programs included the following: variety, flavor and attractiveness of food; food options that met students' cultural preferences; and a courteous nutrition service staff[111].

Children's changing preferences, and the potential involvement of parents in Farm to School and school garden activities could shift dietary habits in the home. Observers note that farm trips, if included in Farm to School programs, provide parents and caregivers with an opportunity to share enjoyable experiences with their children that center around healthy food[1, 11]. Considering that many of the other places parents are likely to go with their children - movies, amusement parks, beaches - tend to include a lot of high calorie, low nutrient foods, farm trips offer a way to demonstrate how healthy food can be a part of happy memories.

One review found a dose-response relationship between the number of actions schools used to promote healthy eating and children's consumption of fruits and vegetables. Children at schools with the most actions had 1.9 times the odds of agreeing to eat fruit for lunch and 1.54 times the the odds of agreeing to eat fruits and vegetables on a daily basis **(see page 41).**

They also become important learning experiences for caregivers who may never have heard of spaghetti squash or seen how potatoes grow under the ground[168]. One study reported that after a year of participation in the Farm to School program, 97 percent of parents self-reported via a survey that they believe buying locally grown foods is "important" or "somewhat important."[11]

Fruit and Vegetable Consumption

The education grants in HB 2800 will have a small to moderate impact on children's dietary preferences and consumption of fruits and vegetables. Six literature reviews and one meta-analysis of more than fifty individual studies indicate a strong association between multi-component programs with elements changing the school food environment (such as gardening), an increase in fruit and vegetable offerings (e.g. salad bars, fruit baskets, snacks), taste testing, menu development, cooking and nutrition curriculum (in the garden, classroom, at home) and an increase in student preferences for, and consumption of, fruits and vegetables[11, 20, 169-174].

"I took a class of fifth graders to a local farm and asked kids if they wanted to try some broccoli. They followed me to the broccoli patch and I offered them tastes. The students kept coming back to me for more!

Over the course of about 20 minutes, this class of 28 students consumed about 20 large heads of broccoli. When they loaded the hay wagon and the farmer said 'its time to pick strawberries,' one of the girls raised her hand and said 'Farmer, Herrick, is there any more broccoli?' "

~ Megan Kemple, Willamette Farm and Food Coalition

Studies show gains in fruit and/or vegetable consumption between .30 servings and 1.5 servings a day[11, 20, 170, 172, 175]. A two-year randomized control trial in 26 schools found that increasing the variety of fruits and vegetables offered through the school lunch programs, adding one additional daily fresh fruit or vegetable option to the menu and improving the visual display of fruit and vegetables statistically significantly increased consumption by children in the experimental group when potatoes were excluded from the analysis[176]. Verbal encouragement by staff in the experimental group was shown to significantly increase fruit intake[176].

Within the reviews, some studies had mixed results[170], for example where girls ate more fruit and vegetables and boys did not[20], children consumed more fruits but not vegetables[171], and a handful of studies resulted in no changes[11, 20, 169, 171]. Six individual studies not included in the reviews showed positive and mixed results consistent with those in the reviews[110, 174, 177-180]. Two studies report children were more likely to increase consumption of fruits than vegetables[178, 179]. One meta-analysis found a dose-response relationship between the number of actions schools used to promote healthy eating and children's consumption of fruits and vegetables[174]. Children at schools with the most actions had 1.9 times the odds of agreeing to eat fruit for lunch, 1.54 times the odds of agreeing to eat fruits and vegetables on a daily basis and 0.52 the odds of agreeing that they eat sugary snacks for lunch compared to the schools with fewer actions in place[174]. Fruits and vegetables (FV) offered through school meal programs are particularly beneficial among low-income, ethnically diverse school populations and children with the overall lowest fruit and vegetable intake. Children with low fruit and vegetable intake (<5 FV daily servings) consumed a higher proportion of their daily intake at school than those with a higher fruit and vegetable intake[99].

Child Learning, Knowledge Outcomes and Educational Attainment

Garden-based learning experiences may affect children's content- and skills-based knowledge, academic and cognitive skills. Evaluations of hands-on experiences in gardens or of using the environment as a context for learning have found that they increased students' knowledge of specific content areas, including math and science[169, 181], agriculture[182], botany and horticulture[183, 184], ecological principles[182], nutrition[169, 185, 186] and food systems issues[182, 185]. Experiences in a school garden program may affect participants' academic achievement. Research on garden-based learning and schools that use the environment as the integrating context for education have found that these pedagogies may increase students' achievement test scores and GPAs and lead to a decrease in discipline problems and absenteeism[155, 162, 181, 182, 187, 188].

Quotes from students participating in Portland's Growing Gardens program:

"I wish every class were in the garden and we could pick our lunch from the garden every day."

"I didn't know you could eat plants!"

"I think kale flowers taste better than ice cream."

In one review of garden literature, nine of twelve quantitative studies found a positive difference in test measures between gardening and non-gardening students on various learning outcomes, including science and nutrition[169]. Of the positive studies, some had mixed results at the group level, or effect issues. Based on our review of the literature, this policy will have a small to moderate impact on the learning outcomes on Oregon children participating in school gardens.

Research demonstrates that garden-based learning, in addition to facilitating knowledge acquisition, may enhance academic skills and cognitive development, including processing and inquiry skills, such as the ability to observe, communicate, compare, relate, order and infer[189]. Learning in the outdoor classroom has also been associated with increased student motivation[167], willingness to stay on task and adaptability to various learning styles[162]. Garden-based education may also affect students' attitudes towards school, science and learning[169, 190-192]. Nationally, scholars, practitioners and funders are turning their research attention to the influence of Farm to School and school garden programs on academic attainment, and in particular on mediators of students academic achievement including motivation and engagement (MMR communication 2011). We cannot assess the potential magnitude of impact the food, garden and agriculture activities will have on educational attainment, as this is a new avenue of research.

Children's Classroom Behaviors, Self-efficacy and Motivation

Self-efficacy is a person's belief that he or she has the capability to complete tasks and exercise influence over events that affect his or her life[193]. Increasing self-efficacy is a key to encouraging positive behaviors of all kinds[193]. It is likely the policy will affect children's sense of control and self-efficacy, although we cannot assess the magnitude of this impact, because evidence is limited on this topic. Within two systematic reviews, we found four of twenty-three studies examining quantitative measures of self-efficacy[169, 173]. Two studies did not reveal any changes in life skills when compared to the control group[194, 195], two studies found positive effects on self efficacy and working in groups[196, 197]. In a third review, three studies assessing lifestyle changes beyond diet resulting from Farm to School programs found parents to report positive changes in social skills and self-esteem, responsible behaviors, saving money and an improved work ethic among children, and students reported increases in physical activity[11]. Garden-based learning experiences have also been shown to increase children's knowledge and development of life skills, including those needed to perform healthy and environmentally responsible behaviors, including skills related to healthy eating, composting and recycling[165, 182, 198].

Some youth job training programs in the United States use gardens to teach the horticultural and marketing skills needed to develop and sustain gardens and develop marketable products[166]. It is plausible that increased exposure to gardening, field trips to farms, class visits from farmers and increased agriculture education can contribute to motivating youth to become a producer or seek food systems related careers. We did not find any studies that examine the relationship between agriculture education for children and occupation choice later in life.

Figure 4.18 Harvesting peas (Image courtesy of Jared Pruch, School Garden Project)

Physical Activity

Belief that one can find and create environments that support physical activity has been shown to have a strong relationship with levels of physical activity[199]. Few studies directly examine the relationship between physical activity and gardening programs. One simple pre/post study of 338 youth from a California garden program showed that participants increased their physical activity from 4.9 to 5.2 times a week[200]. As of 2007, 63 percent of school garden survey respondents in Oregon indicate that in each month students spend up to five hours of time in the garden[151]. The policy will likely increase physical activity levels of school garden participants, although the activity will likely be sporadic and of short duration. Although this physical activity may be in small doses, it could have a strong impact on children who do not otherwise engage in physical activity during the week.

4.4 Environmental Health

The quality of the environment, such as climate temperatures, clean air, clean water and soil, affect peoples' health. Researchers predict climate change will cause increases in heat stress, vector borne diseases (carried out by insects and animals) and respiratory and allergic disease, among other outcomes[201-203]. This pathway examines the potential effect of HB 2800 on demand for food produced using sustainable production methods, as well as on greenhouse gas emissions.

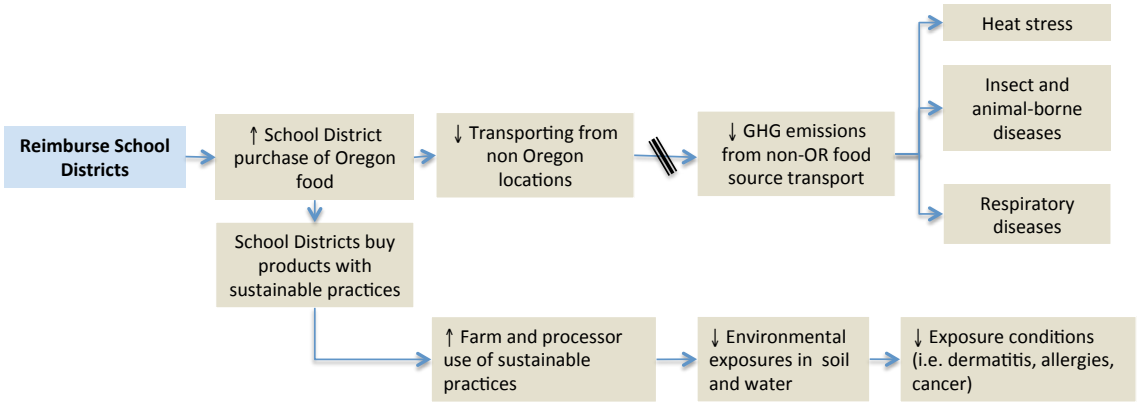


Figure 4.19 Health determinant for Environmental Health pathway

We examined the potential impact of reimbursement funds and education grant activities on environmental health outcomes. Although HB 2800 does not address food production or processing practices, we heard from committee members that some food districts are interested in purchasing Oregon-based food that was grown and processed with fewer chemical inputs, used alternative solar or wind power or were grown with other practices they considered sustainable (see Figure 4.19 for elements of the pathway).

In the scoping phase, the committees also wanted to know if school district purchases could affect farmers' or food processors' choices to use alternative or "sustainable" practices. Definitions of the term "sustainable" abound, and a compendium of sustainable agriculture or processing practices does not yet exist. Congress addressed sustainable agriculture in the 1990 Farm Bill [Food, Agriculture, Conservation, and Trade Act of 1990 (FACTA)]. Under that law, the term "sustainable agriculture" is defined as "an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fiber needs
- enhance environmental quality and the natural resource base upon which the agricultural economy depends
- make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- sustain the economic viability of farm operations
- enhance the quality of life for farmers and society as a whole."[204]

The National Sustainable Agriculture Information Service details five key types of practices that put sustainability into action. These include practices that:

1. protect economic sustainability by diversifying and adding value
2. build soil quality and fertility
3. protect water quality
4. manage pests ecologically with integrated pest management plans and reduced chemical use and
5. maximize farm biodiversity[205]

Few sectors of the economy have as far-reaching impacts on environmental systems and human health as the food industry. The main environmental impacts of industrial agriculture come from the conversion of natural ecosystems to agriculture, from agricultural nutrients and pesticides that pollute habitats, soil and groundwater[206]. The reimbursement funds would give a school nutrition service manager the option, for example, to spend a little extra in order to buy Food Alliance certified flour. Food Alliance is one example of a third-party certification that producers and processors can undergo in order to add value to their product through marketing and to validate social and environmental efforts to be sustainable.

The reimbursement funds would also affect how far food would travel. We initially hypothesized that buying more Oregon food would increase the amount of local transportation and reduce greenhouse gas emissions, because there would be less transportation from long distances. Transportation of food products leads to green house gas emissions, which is connected to climate change. Researchers predict climate change will cause increases in: heat stress; vector-borne diseases (carried by insects and animals); malnutrition and other health problems related to drought; respiratory and allergic disease; and developmental effects such as preterm birth; and perinatal mortality[201-203]. Committee members also discussed how schools would address food safety concerns if they began serving food grown in school gardens in the cafeteria. Although this last outcome is not listed in the pathway, we touch on it briefly here.

Figure 4.20 Farming practices have far-reaching impacts on our environment (Image courtesy of Flickr user Salt George)

4.4.1 Current Environmental Health Conditions Related to HB 2800

Oregon has begun to experience signs of climate change, including glacial melt on Mt. Hood, and experts report this will lead to increased water access pressures, such as reduced summer water supply, reduced availability of water for irrigation, increased cost of water, increased wildfires, increased intense storms and changing conditions for agricultural crops[207].

Ownership of farmland in Oregon is different than in the rest of the nation, as most farms are family-owned. In 2007, 85.1 percent of farms were owned by an individual or family, 5.8 percent were family-held corporations, 7.5 percent were partnerships, while less than 1 percent were non-family corporations[43]. This ownership provides greater capacity for farmers to try production innovations. Oregon is unique in that producers are increasingly trying new methods that may reduce greenhouse gas emissions; here we give two examples. In 2007, farmers participating in active conservation practices such as wetland reserves programs accounted for 612,894 acres of Oregon farmland, 3.7 percent of the total farm land acreage in Oregon[43]. In 2009, Oregon was ranked fifth in the nation for producing on-farm renewable energy, because between 200 and 499 farm operations are developing renewable energy including wind, solar and methane digestion[208].

4.4.2 Assessment of HB 2800's Impact on Environmental Health

Demand for Food Grown With Alternative Methods

It is uncertain if the policy itself will affect the demand for alternative agriculture methods. However, we do think the policy will give schools that want to purchase these products the ability to do so.

Public concern about conventional agricultural practices' potential effect on children's diets has risen in recent years due to emerging research. Commonly used organophosphorus (OP) pesticides such as malathion are known to cause neurologic effects in animals and humans at acute levels[209]. Three studies indicate the general public is exposed to pesticides through a conventional diet, drinking water and pesticides in the air[210-212]. One study found that 23 elementary school-age children who were exposed to organic diets for five days exhibited reduced urinary metabolites for OP pesticides[213]. The metabolite levels were at nondetectable levels immediately after the introduction of organic diets and remained nondetectable until the conventional diets were reintroduced[213].

Figure 4.21 An Oregon apple orchard

Pesticides are also a concern for producers, farm workers and their families. Studies indicate that farm workers and their families are exposed to pesticides from pesticide contamination of clothing and home surfaces[214-217]. One study found that malathion was absorbed by farm workers but was metabolized and cleared from the body quickly[215]. Much of pesticide exposure may be due to farm workers not employing protective practices, such as hand washing and changing clothes after working in the field[211, 218]. Researchers have linked pesticide exposure to elevated rates of a variety of cancer types, including non-Hodgkin lymphoma, leukemia, brain, prostate and other cancers in farm workers[219-226]. One recent study also found an association between Attention Deficit Hyperactivity

Figure 4.22 Fresh, local salad bar options at Portland Public Schools (Image courtesy Ecotrust)

Disorder and OP exposure[227]. While studies show strong associations between pesticide exposure and negative health outcomes, there is uncertainty around this issue, because randomized control trials (exposing people to pesticides) would be unethical. It is possible that other factors, such as lifestyle exposures besides pesticides, are to blame for cancer and other outcomes[228, 229].

There is established consumer demand for food grown using alternative agriculture methods in Oregon. Between 2006 and 2008, the total land in organic production increased 86.7 percent from 69,988 to 130,644 acres, responding to this demand[230]. As of 2007, the Food Alliance had certified 128 producers in Oregon, comprising about 2.5 million acres[231]. This is not a relationship that has been well researched. With consumer preference in place and additional resources to buy more products exercising those preferences, it is plausible that producers will respond to a higher demand for food that has been raised with sustainable farming practices.

Climate Change from Agriculture Practices

Agriculture is a known contributor to greenhouse gas emissions through the production of methane, nitrous oxide and carbon dioxide[232-237]. However, agricultural land can also be used as a "sink" for carbon dioxide to prevent its release into the air[236, 238]. Producers who are efficient with fertilizer use, restore degraded lands, cultivate soil health with organic amendments such as compost, set aside wetlands, use less intensive cropping systems relying on less fertilizers and pesticides, rotate crops with legumes and use erosion control mechanisms among other practices, can reduce greenhouse gases[206, 234, 238, 239].

Climate Change from Food Transport

A debate has emerged recently regarding the potential for consumers to purchase local food and reduce "food miles" as a way to reduce greenhouse gas emissions. Food miles describes the distance food travels from farm to consumer. Food transport is generally associated with significant greenhouse gas emissions and impacts[240-242]. Buying food produced locally may have philosophical, economic and/or social benefits[243]. In our review of the literature, we found that food miles is a contested concept, and that buying locally rather than from global markets does not significantly reduce greenhouse gas emissions based on distribution and production systems[243-246].

Food miles has been used in carbon accounting, or in estimating potential greenhouse gas reductions based on production or distribution systems[247]. For example, in a 2001 study, Pirog and colleagues calculate energy used to distribute food from three different distances in Iowa: a local system of about 38 miles distance using light-duty trucks, cars and transport; an Iowa-based regional system of 82 miles distance using midsize trucks and large semitrailer trucks for transport; and a conventional system of distances longer than 82 miles using large semi-trailer trucks for transport[248]. They concluded that if Iowa were to grow 10 percent more produce for citizen consumption, an Iowa-based regional or local transport system would result in a reduction in CO2 emissions of 6.7 to 7.9 million pounds, depending on the system and truck type[248].

Greenhouse gases associated with transportation of food products are not substantial as compared with emissions associated with the life-cycle of food production. For example, researchers determined that production of food contributes 83 percent of the average US household's greenhouse emission footprint for food consumption, while delivery of food from producer to retail contributes only 4 percent[245]. In addition, businesses achieve greater economies of scale with fewer vehicles transporting large quantities (e.g., fully-loaded semi trailers) as opposed to smaller vehicles hauling small quantities by local farmers[243]. The caveat is that this depends on the type of food item, the season and where it is being transported, as described in the Iowa example.

Figure 4.23 Transporting tomatoes
(Image courtesy of Flickr user stevendamron)

The challenge in calculating food miles is that the energy used in production is only balanced against the energy used in distribution, and the simplistic accounting leaves out other greenhouse gas emissions in the food delivery system. Researchers contest case studies that employ food miles calculations, arguing they are over simplified. For example, one case study indicated tomatoes grown in heated greenhouses in the United Kingdom technically require more energy inputs than those imported to the UK from Spain; another case study showed that importing organic food into the UK than growing non-organic food in the UK resulted in less greenhouse gas emissions, however this was only true if the food was imported by sea or for very short distances by road[246, 247]. These examples do not account for other greenhouse gas emissions arising in the life cycle of food production and distribution, such as petroleum products used for pesticide and fertilizer inputs.

Based on our review of the food miles debate and the difficulty in comparing food mile calculations from other states different in size, agricultural production and proximity to other food producing states, we do not think HB 2800 will have a significant effect on green house gas emissions and climate change-related health outcomes. However, this conclusion is limited by the food miles science.

4.5 Social Capital

Here we examine the potential for Farm to School and school garden programs to foster relationships between school district buyers and farmers or processors and among school garden participants. **Figure 4.24** shows how elements of HB 2800 can lead to these relationship and health outcomes. Here we use Pierre Bourdieu's definition of social capital as "the sum of resources, actual or virtual, that accrue to an individual or group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition (pg. 119)"[249].

Social capital is a concept that is investigated at the individual and the community, organization or national levels. Social capital is similar to a bank of resources that exists within relationships between individuals or organizations. A simple example of social capital is when acquaintances or neighbors support one another through favors such as borrowing a lawn mower, referring someone to a doctor or taking care of a pet. Each of the individuals in these examples is able to access a resource or opportunity through relationships. A social network is a web of these relationships, made up of "ties" that link people. These ties vary in their depth and strength, or level of relating. Families and close friendships involve deeper ties, while acquaintances have weaker ties.

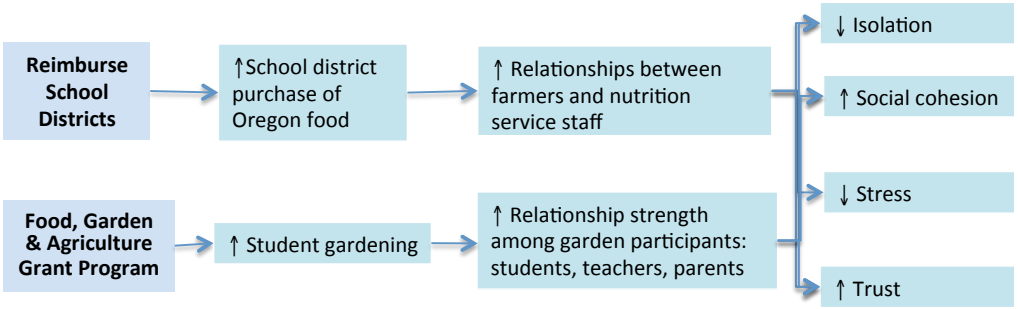


Figure 4.24 Social Capital health determinant pathway

Social capital may influence the health behaviors of neighborhood residents by:

1. Promoting more rapid diffusion of health information,
2. Increasing the likelihood that healthy norms of behavior are adopted (e.g., physical activity), and
3. Exerting social control over unhealthy behavior[250].

4.5.1 Current Social Capital Conditions Related to HB 2800 in Oregon

Researchers studying social capital examine how people connect to one another and develop relationships. People build relationships through participating in government, going to church or being a member of a sports club, for example. These activities help people know one another and build trust. Oregon encourages citizens to participate in government through laws and regulations, including an Initiative and Referendum Process, a Public Meetings Law, and Oregon's Land Use Law, which requires every local government to adopt and implement a citizen involvement program[251, 252]. Research indicates that areas within Oregon have higher than national average levels of civic engagement in government[253].

In 2000, central Oregon participated in the Social Capital Community Benchmark Survey, a project at the John F. Kennedy School of Government at Harvard University to measure the amount and distribution of social capital across 40 American communities. The researchers think of social capital as "community connectedness." Table 4.11 below shows Central Oregon's Community Quotients for different dimensions of social capital, such as trust and engagement. Community Quotients show how a community performs relative to what researchers predicted based on community factors such age, education, ethnicity and being rural or urban. A CQ above 100 indicates that a community shows more of this community connectedness than its demographics would predict; while, a CQ below 100 indicates that a community shows less of this type of social capital than its demographics would suggest[254].

Table 4.11
Social capital community quotients for central Oregon (2000)

Social Trust	Inter-racial Trust	Civic Leadership	Associational Involvement	Informal Socializing	Diversity of Friendships	Giving and Volunteering	Faith-based Engagement	Social Capital Equality
90	98	104	107	89	102	76	74	104

Roughly 68% of all communities fall in the 85-115 range, and almost 95% of all communities would fall in the 70-130 range [254].

4.5.2 Assessment of Social Capital Health Outcomes

Farm to School and school garden programs help foster relationships between school district buyers and farmers or processors. These relationships can build social capital, a component of social support that leads to stress reduction and trust[255]. Relationships are also strengthened among students, parents and teachers through participation in school gardens[169].

Student Relationships

It is likely the policy will improve relationships among students who participate in gardening programs. In one review, seven qualitative studies indicate school gardens have a strong community-building component, promoting teamwork, student bonding and school engagement with parents and neighbors[169]. Researchers observe that gardens affect a school's social learning environment in ways that may alter the school culture and identity[256, 257]. Here we review several of the ways gardens could affect relationships.

Starting and maintaining a school garden requires collaboration between youth and adults and among peers, both within the school and in the broader community. As a result, gardens increase the involvement of caring adults in education, health, youth,

Figure 4.25 Tending the rowcrops
(Image courtesy of Jared Pruch of School Garden Project of Lane County.)

Figure 4.26 Squash harvest (Image courtesy of Jared Pruch of School Garden Project of Lane County)

environmental and/or community issues and activities, much the way athletics do, but in a more nurturing, less competitive environment[159]. Engaging parents in school garden programs fosters family relationships[258]. School gardens and school-based community garden programs also provide opportunities for multi-cultural exchange and intergenerational mentoring[259]. This increases children's exposure to diverse role models, often from different walks of life[167] and allows for peer and adult modeling of desired behaviors[260]. Participation in schoolyard naturalization projects has also been described as a valuable opportunity for youth to participate in democracy[198] and community[261].

It is unclear from the literature how the policy will affect relationships between school district personnel and food producers and what impact this has on health. Researchers have not examined how this relates to social isolation, social networks or perceived community trust. More research is needed in order to better understand the ways in which school gardens and Farm to School programs help to promote parent involvement in schools and impact the relationship between children and parents. These indicators should be monitored when Farm to School and school garden programs are put into place.

Food Producer, Food Processor, and Nutrition Services Relationships

When schools purchase directly from local producers or processors they have the opportunity to engage in what is termed "direct marketing," where they have some interaction with consumers. Researchers are beginning to study social capital in other direct marketing venues such as farmers markets. Studies indicate that these buying relationships encourage economic development, support community pride, increase fruit and vegetable consumption and support farmer and processor development of professional, social and economic skills[262, 263]. Researchers have not studied the impact of Farm to School on social capital outcomes to the same extent.

Multiple studies indicate that "supporting local farmers" is a primary benefit of Farm to School programs[1, 11, 108, 264, 265]. Similar to farmers market research, studies report Farm to School purchasing fosters new relationships, aids the local economy, improves public relations and improves food quality[1, 11, 108, 264-267]. Distributors and wholesalers can also develop direct relationships with schools and with farmers when they increase their local purchasing in order to fill school orders. While most Farm to School advocates place a high value on direct relationships between schools and producers or processors, at least one study indicates distributors may play a key role in encouraging local food procurement[268].

Case studies of existing Farm to School programs have shown that food distributors' economic decisions are tied to their social relationships with farmers[31]. The commitment of food distributors to local school food procurement impacts the abillity of school districts to institutionalize Farm to School programs[268].

Social Cohesion and Trust

Social cohesion is the amount of trust members of a community feel toward their neighbors[269]. Trust is a person's expectation that other persons and institutions in social relationships "can be relied upon to act in ways that are competent, predictable, and caring"[270]. Slovic (1999) notes that trust is asymmetrical; it is easy to lose and hard to gain[271]. Kasperson and colleagues (1999) argue that social trust cannot be completely or permanently attained, in fact should not be; it must be continuously maintained and reinforced through engaged networks and norms of reciprocity[270].

Farm to School and school garden programs, to the extent that they contribute to increased interactions among producers and school nutrition service personnel or garden participants, may increase levels of trust. Researchers found that relationships with farmers – established, for example when farmers drop off their product and through farmer visits to the cafeteria – were found to have an influence on students' preference for locally grown food and on school staff support for the Farm to School program[264, 265, 268]. Personal interaction with school nutrition service professionals played an important role in generating the social benefits that farmers said motivated them to participate in Farm to School programs[264].

While motivation and support for a program is not immediately a guarantee that program contributors will trust each other, it is an indication that individuals care and are willing to engage in regular interactions – moving toward predictable behavior that builds trust over time. School gardens that involve community members may help develop collective efficacy[167]. Collective efficacy, defined by Sampson (1997) as social cohesion among neighbors combined with their willingness to intervene on behalf of the common good, has been linked to reducing violence in low-income neighborhoods.

Figure 4.27 Planting in pairs (Image courtesy of Megan Kemple of Willamette Farm and Food Coalition)

Social Isolation and Stress

For social support to be health promoting, it must provide both a sense of belonging and intimacy and must help people to be more competent and self-efficacious. Health promotion rests on the shoulders not only of individuals but also of their families and communities. Social relationships, or the lack thereof, constitute a major risk factor for health, rivaling the effects of well-established health risk factors such as cigarette smoking, blood pressure, blood lipids, obesity and physical activity[272]. Social connection has a variety of health impacts, including reduced stress, increased lifespan, access to emotional and physical resources and improving self-reported health status[255]. Social isolation, or having limited social networks, has been shown to impact future health outcomes[273-275]. For example, one study found indicators of social isolation (such as being single or widowed) associated with coronary artery calcification (a potential marker of early atherosclerosis), independent of age and coronary risk factors[276]. Socially isolated individuals living in cohesive communities do not appear to have the same ill health consequences as those living in less cohesive communities[250].

Figure 4.28 Watering veggies (Image courtesy of Jared Pruch of School Garden Project of Lane County)

The literature detailed earlier in this subsection explains how school gardens might help address social isolation if students are not otherwise engaged in social activities. Supportive and positive relationships with peers, non-related adults in the community and a strong sense of school belonging were significantly and positively related to life satisfaction, a critical aspect of happiness in early adolescence[277]. Although literature studying this topic is limited, we think existing literature regarding relationship building and behavior changes in garden participants indicates garden education programming resulting from HB 2800 education grants could have a small to moderate impact on social isolation and stress for garden participants.

4.6 Conclusions and Key Policy Recommendations

Here we summarize the overall impact of HB 2800 on health outcomes in the five main health determinant pathways and describe three policy recommendations to improve those health outcomes. We list expected impacts in the summary Table 4.11; there is a column with the impact of our policy recommendations and a column of those impacts if HB 2800 were passed without our policy recommendations. HB 2800 will likely have positive small, moderate or strong impacts in every pathway and on most health outcomes we examined.

The reimbursement monies will allow schools to buy more Oregon food. Based on an economic analysis, we found that reimbursement investments from HB 2800 will create jobs for producers and the people they hire and will add money into the general economy through successive rounds of spending. Our first policy recommendation is to encourage as much economic return on investment as possible by **amending HB 2800 to specify that schools can only be reimbursed for foods "produced" or "processed" in Oregon**.

Currently, HB 2800 allows state dollars to be used for any foods that are produced, packaged, packed or processed in Oregon. This means schools could be reimbursed for foods that have only a small portion of their production chain located in Oregon. For example, apples that are grown in New Zealand but sorted into bags in Oregon would be included. Economic analysis indicates production and processing of Oregon products require more labor than packing and packaging items from other locations.

The new USDA study on the food dollar reveals that the economic impact of food production is nearly three times that of packaging, while processing yields economic activity nearly four times that of packaging. Packaging accounts for 4 percent of the cost of food; the value of a product when it leaves a farm/ranch, is 11.6 percent, and food processing is 18.6 percent. The amount of economic activity for producing and

Table 4.11

Summary of Health Outcomes and Impacts: Highlights of HB 2800 ($23 Million)

Health Outcome or Health Determinant	Impact w/ HIA rec's	Impact w/o HIA rec's	Distribution	Quality of Evidence
Employment Impacts				
Health & life expectancy	▲▲▲▲	same	Farm sector and related jobs	****
Job creation	▲▲▲	▲▲	~270 new jobs	****
Oregon product demand	▲▲▲▲	same	100—197 School Districts[4]	****
Workers' ability to pay bills	▲▲▲	same	~270 new jobs	****
Economic activity	▲▲▲▲	▲▲▲	3.16 economic multiplier	****
Impacts on Child Diet and Nutrition				
Meal program participation	▲▲▲	▲▲	561,698 public school children[1]	**
Child learning & academic attainment	▲▲▲	same	561,698 public school children[1]	****
Household food security	▲▲	same	210,446 households[2]	***
School meal nutrition	▲▲+	same	561,698 public school children[1]	*
Child overweight & obesity	▲▲+	same	1 in 4 children	**
Farm to School and School Garden Education Impacts				
Gardening education	▲▲▲▲	same	~15,000 new children[3]	****
Child fruit & vegetable consumption	▲▲▲+	same	561,698 school children[1]	****
Agriculture & nutrition education	▲▲+	same	~15,000 new children[3]	***
Child nutrition knowledge	▲▲+	same	~15,000 new children[3]	***
Nutrition staff knowledge	▲▲	same	100—197 School Districts	**
Child achievement	▲▲	same	~15,000 new children[3]	*
Child self-efficacy	▲▲	same	~15,000 new children[3]	*
Child physical activity	▲▲	same	~15,000 new children[3]	*
Impacts on Environmental Health				
Oregon fruit & vegetable crops maintained	▲▲	same	$756,000 —$15,120,000 in school purchases[6]	***
Demand for food grown with sustainable practices	▲	same	Oregon food sectors	*
Greenhouse gas emissions from food transport	None	same	3,844,195 Oregonians[5]	**
Impacts on Social Capital				
Student relationships	▲▲	same	~15,000 new children[3]	*
Producer, processor & school staff connections	▲▲▲	same	~100 School Districts	***
Parent school participation	▲▲	same	~15,000 new children[3]	*

LEGEND

- ▲▲▲▲ Strong impact on many
- ▲▲▲ Strong impact for few or small impact on many
- ▲▲ Moderate impact on medium number or strong impact on few
- ▲ Small impact on few
- None No effect

- **** 10+ strong studies
- *** 5 -10 strong studies or data analysis
- ** 5 or more studies of weak and moderate quality; or studies have mixed results
- * <5 studies and claim consistent with public health principles

1 Enrolled children in Oregon public school system, Oregon Dept. of Education, 2009-10.
2 Household Food Security in the United States, 2009, United States Department of Agriculture, Economic Research Service, 2010.
3 Low estimate based on 2007 ODE survey of reported participation in school gardens; would be over two year grant time period.
4 Low estimate from 2010 Oregon Department Education number of School Districts that purchase local.
5 Certified estimate of Oregon population from US Census data, Population Research Center, 2010.
6 Conservative estimates from: (280,000 school lunches served in 2009-10 x $.30 for fruits and vegetables) x 9 to 180 school days.
+ Indicates schools will have to take action beyond the reimbursement program in the policy.

processing food is much larger than from packaging alone. Packers and packagers would still benefit from reimbursement funds of HB 2800 as they would be able to sell more produced and processed Oregon items to schools. This policy change will increase statewide economic activity and jobs as a result of HB 2800.

Schools' use of new local products, in combination with promotion and education pieces described earlier in this report, will result in healthy meals that are more appealing to children. More appealing food will help increase the number of students who purchase meals and increase the participation rates of children who are eligible for free or reduced meals. We found that when children, especially low-income children from food insecure families, get proper nutrition through school meals, they learn better, have an improved chance for educational attainment and have better health outcomes.

We recommend amending HB 2800 to specify that while grants are open to all schools, Agriculture and Garden education grants will be preferentially given to schools serving: 1) a low-income student population, defined where 40 percent are eligible for free or reduced meals, or, 2) a racially diverse student population, defined as 20 percent or more non-white, or 3) rural or urban areas with limited food access, defined as 12 percent or more of residents are low-income and live more than 10 miles from a grocery store. We developed this policy amendment to ensure Oregon's most needy youth, including those in food insecure households, members of ethnic and racial groups bearing a disproportionate burden of obesity, and those living in areas of the state with limited garden programs are prioritized for receiving educational grants in HB 2800.

HB 2800 addresses a major funding barrier for schools by providing funds to purchase local foods. We think parallel barriers identified at the national level, such as lack of equipment and staff training, need to be further explored in Oregon. We developed operations recommendations to help address food purchasing challenges around seasonality, food processing, food storage and food volume (see Chapter 5).

Barriers related to kitchen equipment and staffing, discussed in Appendix 3, may be addressed through local, state and national legislative efforts such as school infrastructure upgrades, bond measures and USDA program support. There are a variety of school case studies that indicate schools are able to incorporate local foods with only minor staffing and kitchen changes[1].

A 2009 study by the Institute of Medicine found that U.S. school children's diets may not meet the federal government's 2005 Dietary Guidelines for Americans, because nutrient-based menu planning is overly complex, and the nutrient based guidelines do not always match the Dietary Guidelines for good health[278]. The United States Department of Agriculture is currently reviewing proposed rule changes to school meal guidelines that would result in aligning school meal requirements more closely with Dietary Guidelines both for the food served and in meal options when selected by students. This will result in increasing the number of fruits and vegetables, whole grains and lean meat served. It would additionally set calorie maximums and address the over-consumption of sodium in school meals by establishing standards for the gradual reduction of sodium over time. Farm to School and school garden programs would support this federal change through providing more sources of local, quality fruits, vegetables, grains and lean meat.

Figure 4.29
Key policy recommendations to amend HB 2800

RECOMMENDATION 1: Amend HB 2800 to specify that schools can only be reimbursed for foods "produced" or "processed" in Oregon so as to increase economic activity in our state.

RECOMMENDATION 2: Amend HB 2800 to specify that while grants are open to all school districts, Food, Agriculture and Garden education grants will be preferentially given to school districts serving: 1) a low-income student population, defined where 40 percent are eligible for free or reduced meals, or, 2) schools with a racially diverse student population, defined as 20 percent or more non-white, or 3) schools in rural or urban areas with limited food access, defined as 12 percent or more of residents are low-income and live more than 10 miles from a grocery store.

RECOMMENDATION 3: Specify funding criteria for Food, Agriculture and Garden education grants to ensure grants support schools developing multiple-component programs that increase child health benefits. We recommend garden grants be awarded to those programs that work to have one item in each of the following categories: Procurement, Education, Promotion and Community Involvement.

For a complete list of Recommendations see Chapter 5

We reviewed the results of studies on integrated food and education programs, including Farm to School and school garden programs, which aim to change school food environments. Studies show that offering new food items and providing garden, food, and agriculture-based activities contribute to children's food preferences, diet changes, learning outcomes, and knowledge of what they eat including how it is grown and how it affects their bodies. We found research that indicates children's repeated exposures to growing, tending and harvesting food increases their preference for and consumption of fruits and vegetables. The research indicates the most successful programs are those that have multiple integrated components.

We recommend that HB 2800 specify funding criteria for Food, Agriculture and Garden education grants to ensure grants support schools developing multiple-component programs that increase child health benefits. We recommend garden grants be awarded to those programs that work to have one item in each of the following categories: Procurement, Education, Promotion and Community Involvement.

We present an example menu of sample actions items in each category in the summary list of recommendations in Chapter 5. If HB 2800 helps schools create Farm to School and school garden programs that include educational curriculum, cafeteria food offerings, food and nutritional promotion materials and garden programs, we expect the integrated elements to help students learn about the connections between food, nutrition, health and agriculture. These elements will also ensure the policy has a moderate to high impact on children's consumption of fruit and vegetables. Limited literature has looked specifically at food promotion, however we recommend Farm to School programs incorporate this into their program based on literature review findings related to multi-component programs. This recommendation supports integrated programs where schools buying local food help students, caregivers and community members learn about Oregon foods, agriculture and nutrition.

Based on our review, we think Farm to School and school garden programs will help build relationships between school nutrition services and producers as well as among garden participants. We developed operations recommendations to help encourage new relationships between producer and food nutrition services, see Chapter 5. Finally, based on a review of the debate on food miles, we do not think HB 2800 will significantly affect climate change related health outcomes through transport of local food. There is potential to reduce greenhouse gas emissions through changing land management practices such as reduction in farm tillage. See Operations Recommendations 2 and 8 in Chapter 5 for more information on how producers can improve these outcomes.

4.7 Potential Impacts of Amended HB 2800

On March 9, 2011, Upstream Public Health presented invited testimony to the House Committee on Agriculture and Natural Resources. As of this writing, the Farm to School and School Garden legislation was amended on April 13 to a $2 million competitive grant program. In the revised version, $1.75 million from the Economic Development fund would provide 15 cents reimbursements for each school lunch (87.5% of the funds) to a select group of school districts for using Oregon products in the National School Lunch Program. The revised bill would also provide 12.5 percent of total funding, or $250,000 in grant funds for food, agriculture or garden-based educational activities to the same selected school districts. The Oregon Departments of Agriculture and Education will use up to 2 percent of the total funds for administrative costs for managing the program. The reduced funds would be sufficient to fund school districts covering approximately 11% of the student population of Oregon.

The amended Bill was passed out of the House Agriculture and Natural Resources Committee on April 8, 2011 and referred to the Joint Ways and Means Committee. Two out of three recommendations from the HIA for changes to policy content were fully incorporated into the amended Bill, and the third recommendation was partially incorporated into the amended Bill.

Key changes include:

1. Update the definition of Oregon foods from foods "produced, processed, packed or packaged" in Oregon to just foods that are "produced or processed" in Oregon;
1. Prioritized school districts that have integrated components that include education, procurement and promotional components;
1. Prioritize school districts that have high rates of low-income students. Recommendations that were not incorporated include to prioritize school districts that have high rates of non-white students and to prioritize rural schools or schools that have poor food access. Upstream will continue to track the progress of the legislation and the impact this HIA has on the content of the Bill.

Given the short legislative timeline and limited resources, it was outside the scope of this project to assess the bill after it was amended in committee, or at any stage of amendments after the Agriculture and Natural Resources Committee. However, a few insights can be provided on the $2 million amended bill given the analysis that was conducted on the bill with the full $22.6 million in funding. Here we explain what a scaled down version of HB 2800 look like.

Key insights include:

1. The economic benefits and associated heath benefits in the short term are linearly related to the amount of funds that are allocated to food procurement.

For every dollar used to purchase Oregon foods there is a clear economic stimulus effect that includes direct employment used to produce or process the foods delivered to schools, as well as indirect economic activity related to agricultural inputs necessary to produce or process the food, and induced economic activity related to how the other economic activity reverberates through the Oregon economy. Together, these effects would create an estimated 24 jobs in Oregon in the short term if the amended bill is passed. However, in the longer term, it is likely that there may be a tipping point in local purchases whereby a higher level of local purchases around the state may inspire additional local purchases, as schools and school districts build professional relationships with local food producers and processors. In our analysis of the original bill, we are estimating that the economic stimulus over time would be approximately three times the short term economic effect. However, it is unclear if a more limited investment in Farm to School that reached 11% of students would inspire the same level of increased economic activity over time. Therefore, the only conclusion that can be made is that it is likely that this investment will provide increasing economic activity and job creation over time. This effect is likely between two times and four times the short term economic impact. Any health benefits related to employment, which includes broad benefits in lifespan and reduced chronic disease rates will be related to the overall impact on employment.

2. The nutritional benefits and educational improvements may be higher in the amended bill for the schools served but will reach a fraction of Oregon students.

Because the amended bill would create a competitive grants program, the school districts that receive state funds will likely include elements that better improve the nutritional content of foods, compared to the original bill that covers all Oregon schools. However, the student population covered will include approximately 11% of Oregon public school students, which will diminish the public health impact. Competitive grants will be evaluated based on the extent to which they will likely improve health, the extent to which they create jobs and the extent to which they include multi-component interventions. All three of these evaluation criteria will lead to improved health outcomes for the student populations within the selected school districts

3. The education, social capital and environmental health impacts will likely be comparable relative to the reduced fiscal impact.

For the reduced student population served (approximately 11% of Oregon students), the school districts will implement Farm to School and school garden educational components (such as school teaching gardens) as well as promotional materials, such as Oregon Harvest for Schools. This will lead to benefits similar to the benefits described in the Assessment section of this report but for a more limited population. Benefits would likely include improvements in learning and increased social capital between schools and local food producers. In addition, to the extent that schools and school districts influence the agricultural practices of farmers, there may be additional environmental benefits within the state.

5. Legislative and Operations Recommendations

This section describes our legislative and operations recommendations to improve the potential health impacts resulting from HB 2800. Please note that the legislative recommendations are a repeat of the discussion in the conclusions because this is intended to serve as a stand alone section of the report.

LEGISLATIVE RECOMMENDATIONS

RECOMMENDATION 1: ***Amend HB 2800 to specify that schools can only be reimbursed for foods "produced" or "processed" in Oregon so as to increase economic activity in our state.***

Currently, HB 2800 allows state dollars to be used for any foods that are produced, packaged, packed or processed in Oregon. This means schools could be reimbursed for foods that have only a small portion of their production chain located in Oregon. For example, apples that are grown in New Zealand but sorted into bags in Oregon would be included. Economic analysis indicates production and processing of Oregon products require more labor than packing and packaging items from other locations.

Figure 5.1 A field 'thrasher'

The new USDA study on the food dollar reveals that the economic impact of food production is nearly three times that of packaging, while processing yields economic activity nearly four times that of packaging. Packaging accounts for 4 percent of the cost of food; value leaving the farm/ranch is 11.6 percent, and food processing is 18.6 percent. The amount of economic activity for producing and processing food is much larger than from packaging alone. Packers and packagers would still benefit from reimbursement funds as they would be able to sell more produced and processed Oregon items to schools. This policy change will increase statewide economic activity and jobs as a result of HB 2800.

RECOMMENDATION 2: ***Amend HB 2800 to specify that while grants are open to all school districts, Agriculture and Garden education grants will be preferentially given to schools serving:***

1. ***a low-income student population, defined where 40 percent are eligible for free or reduced meals, or***
2. ***schools with a racially diverse student population, defined as 20 percent or more non-white, or***
3. ***schools in rural or urban areas with limited food access, defined as 12 percent or more of residents are low-income and live more than 10 miles from a grocery store.***

Research indicates Farm to School and school garden programs benefit vulnerable populations, such as food insecure or very low food secure families; certain ethnic and racial specific populations that carry a disproportionate burden of chronic diseases such as obesity and diabetes; and areas of the state that have less support to create gardens. This recommendation ensures these three vulnerable groups, along with schools that have more resources, will receive support. This legislative recommendation will improve meal program participation and household food security by ensuring these groups receive Farm to School and school garden benefits.

RECOMMENDATION 3: ***Specify funding criteria for Food, Agriculture and Garden education grants to ensure grants support schools developing multiple-component programs that increase child health benefits. We recommend garden grants be awarded to those programs that work to have one item in each of the following categories: Procurement, Education, Promotion, and Community Involvement.***

The third legislative recommendation is related to building strong school programs. Research indicates schools with the most linkages between food offerings and educational curriculum achieve the biggest changes in children's preferences of fruits and vegetables for positive health benefits. While many programs in their start-up phase will not have enough support to launch every element of a multi-component program, we recommend grants be awarded to schools who have a plan for adding elements in three to five years.

Research also indicates that involving parents and community members in gardens helps schools keep them going. We created an example list of sample menu items in the categories of procurement, promotion, education and community involvement.

Example Menu of Categories with Sample Action Items

PROCUREMENT

- School purchases food from Oregon producers and processors for use in breakfast, lunches or after-school meal programs.
- School provides Oregon-made snack options that meet federal nutrition requirements in vending machines, a la carte cafeteria items and student stores.
- Schools offer Oregon foods within a salad bar.

EDUCATION

- School uses model, integrated curriculum that includes agriculture, food, nutrition and gardening such as Agriculture in the Classroom.
- If not using integrated curriculum, school includes healthy eating concepts in at least two of the following classroom areas: gardening, science, health, math and language.
- Education includes field trips to local farms or school visits by farmers, processors or chefs to help children understand how food is grown and made.
- Garden program includes activities that integrate cultural, ethnic and biological diversity such as planting indigenous and culturally appropriate foods.
- Garden exposure includes 20 hours for each child per school year and provides at least two opportunities for planting, tending and goal setting during the school year, based on research indicating this is the minimum needed to foster attitude and behavior changes.

PROMOTION

- Garden and/or cafeteria conduct food tastings.
- Cafeteria actively promotes local food sources with activities and materials such as those offered in Oregon Harvest for Schools.
- Garden posts signs linking garden grown food with cafeteria food offerings.

COMMUNITY SUPPORT

- Garden program has leadership team that includes at least one teacher, one community member and one school youth member.
- Garden has administrative support.
- Garden has staff support including facilities and school nutrition services.
- Garden program has vehicle for youth input in its structure and activities in addition to representation on leadership team.
- School promotes community involvement in garden through garden work parties, planning cultural harvest celebrations or other means beyond the leadership team.
- School has a plan to maintain garden during summer months.
- School wellness policy includes language on healthy eating connected to the cafeteria, classrooms and garden.
- School participates in community healthy eating initiative.
- School Wellness Committee advocates for school nutrition through its efforts.

OPERATIONS RECOMMENDATIONS:

RECOMMENDATION 1: *Schools, school districts and purchasing cooperatives work with producers, distributors and processors to plan menu options, review growing seasons and product types, and explore aggregation mechanisms or other purchasing models to help secure regular purchasing volumes.*

This recommendation addresses school and producer linkage barriers. Farm to School procurement benefits from relationships between buyers, sellers and other handlers such as distributors and wholesalers. There is no one-size-fits-all approach to food distribution in Oregon. However, much can be achieved from planning ahead. We heard from producers that they desire to know ahead of time when the product is needed, the product type, and the needed volume, in order to plan their growing season and market strategies. We heard from schools, school districts and other institutional buyers about their desire for flexibility in menu planning, their need to meet price points, their desire for consistent volumes and quality of food and the challenge of wanting food items out of season.

RECOMMENDATION 2: *Schools, school districts and purchasing cooperatives utilize their purchasing power to support producers who are developing innovative alternative agricultural practices and utilizing labor practices that support worker health.*

Our second Operations recommendation is centered on supporting sustainable practices. With passage of the legislation, schools would have more flexibility to buy more local products, to seek out fresh items, promote alternative land use practices and encourage safe, fair labor practices. The Food Alliance certification process for producers and handlers provides guidelines for sustainable practices. Key opportunities include: 1) to provide a preference for foods grown or processed in a way that reduces environmental impact and negative health outcomes (see Recommendation 8) and 2) to encourage safe and fair labor practices, and 3) support microenterprises and small-scale, local producers. Schools should look for producers that have a good track record of using established OSHA safety protocols in growing and processing food.

RECOMMENDATION 3: *The Oregon Department of Education should work with school districts and the Oregon Department of Agriculture should work with small-scale producers to secure grants to fund mobile processing equipment, school or farmer-site processing, and storage units in areas with limited distribution systems.*

This recommendation addresses a concern raised by both producers and school food nutrition services regarding the challenge of using fresh, minimally produced products (such as spinach or carrots) that require washing, chopping and packing. Many schools no longer have the equipment capacity or the labor time to accomplish this. Oregon has very few processors who can handle smaller volumes of these items, and many farmers in rural areas are not equipped to handle this

type of request. This recommendation will help schools or producers develop the capacity to lightly process and store food items, either at the smaller micro-scale or through collective cooperatives to create one central processing area.

RECOMMENDATION 4: ***The Oregon Department of Education should offer training and resources to school districts to enhance and increase the use of salad bars, and encourage all schools to have salad bars that offer fresh items and products that meet proposed nutrition standards based on the Institute of Medicine 2010 report. The Oregon Department of Education should also encourage local procurement for salad bars.***

The fourth recommendation regards use of Oregon food items in school meals. Much of Farm to School research is centered on salad bars, and they have been shown to increase the amounts of fruits and vegetables consumed by children. Although at least half of Oregon schools already offer salad bars, there are opportunities to expand the number of salad bars and increase student participation. Training and resources related to placement of the salad bar, quality, variety, cultural specificity, and seasonality of items offered, and signage and promotion of local items would enhance student participation and increase fruit and vegetable consumption. This same training can be applied to Oregon food items served in hot meals as well.

This recommendation ensures state dollars are used to improve the nutritional content of meals. This may include offering lower sodium foods, lower fat foods and fresh or minimally processed fruits and vegetables. Schools could identify and promote the Aggregated Nutrient Density Index (ANDI) scores for different salad bar items. ANDI scores were developed by Eat Right America and incorporate a food item's nutrient to calorie ratio; foods with higher ANDI scores are nutrient dense and calorie light. The list of scores are available on their website. Salad bars also provide the opportunity to easily incorporate local products into cafeteria offerings, to highlight local foods and to utilize more fresh and minimally processed foods.

RECOMMENDATION 5: ***Existing programs, such as Oregon Master Gardeners, Future Farmers of America, Oregon 4-H and programs at public state universities (e.g. Oregon State University, Eastern Oregon University, University of Oregon, Portland State University) should collaborate with other garden support organizations across the state to efficiently utilize existing resources in supporting Farm to School and school garden efforts.***

This recommendation helps develop a coordinated network of school gardens, building on existing program efforts and promoting resource and knowledge sharing among school gardens. The National Farm to School Network has an existing list of resources on its website; the Oregon Department of Education could help expand this by creating a database of organizations that offer garden support throughout the state.

RECOMMENDATION 6: ***The Oregon State Department of Agriculture and the Oregon Department of Education should collaborate with the Oregon Agriculture Extension Service to help producers and processors develop marketing materials that communicate a product's "produced or processed in Oregon status" and their eligibility for reimbursement, such as a school label, and help school district buyers develop and use language in their Request for Proposals that specify an Oregon product preference.***

This sixth recommendation helps buyers find vendors and products that qualify for reimbursement. The Oregon Department of Education has promotional materials schools can use in the cafeteria from Oregon Harvest for Schools. However, producers and suppliers will need a simple way to market or identify their product, such as a school labeling system. A central statewide list of vendors and products eligible for reimbursement, similar to Ecotrust's Food Hub, will help other institutions find these items. See Appendix 4 for this and other resources.

RECOMMENDATION 7: ***After passage of the legislation, ensure that economic and nutritional impacts are tracked and evaluated. Since the Oregon Department of Education will set up a tracking system for reimbursements for qualifying items, we recommend ODE work with other partners to collect as much economic and nutritional information as possible for research partners and help schools set up electronic purchasing, where feasible.***

The seventh recommendation is related to the Oregon Department of Education's administration and tracking of the reimbursement program. The Oregon Farm to School and School Garden legislation is an innovative approach to promoting more local food production and improved quality of school meals. The lessons learned from this approach should be carefully tracked, analyzed and disseminated to local and national partners in order to shape food procurement initiatives. Research and non-profit entities may need to collect addition data to be able analyze the following impacts:

1. Resulting economic activity in different agriculture sectors,
2. Changes in nutritional content of school meals, and
3. The attributes of those districts that are able to better incorporate Oregon food into cafeteria offerings.

This information will also help the Oregon Department of Education expand Farm to School initiatives in the future.

RECOMMENDATION 8: ***The Oregon State Department of Agriculture and the Oregon Department of Education should convene a committee by December 2012 to support school choices of sustainable practices in agriculture through identifying best practices for producers, processors and suppliers.***

The eighth recommendation would help develop a menu of sustainable production and processing practices. The Sustainable Agriculture Research and Education program under the USDA describes sustainable agriculture practices as those that:

1. Ensure profit over the long term
2. Provide stewardship of our nation's land, air and water, and
3. Ensure a quality of life for farmers, ranchers and their communities.

This committee would be composed of members from the Oregon Department of Agriculture (ODA), Oregon Department of Environmental Quality (DEQ), Oregon Department of Education (ODE), non-profit stakeholders, community leaders and relevant experts from the Oregon State University Extension Service. The ODA will biennially assess and report on adoption of best sustainability practices within the Farm to School program. ODA may request assistance from the OSU Extension Service Program for conducting assessments and reports. We suggest the committee draw on existing resources from the USDA, SARE, The National Institute of Food and Agriculture, the Food Alliance, and the Green Guide for Health Care (Nutrition service Operations section), and other leaders on this topic.

RECOMMENDATION 9: ***The Oregon Health Authority should collaborate with other institutions, such as the OSU Extension Service Program, Oregon's land grant universities, and Oregon Health Science and University, to encourage and conduct research on health outcomes related to Farm to School and school garden programs.***

The ninth recommendation encourages existing research institutions to collaborate on examining the potential health outcomes of the Farm to School and school garden legislation so that learning will be shared broadly and for efficient use of limited resources.

RECOMMENDATION 10: ***The Oregon Department of Education should work with the Oregon Department of Agriculture and Governor Kitzhaber's Energy Efficiency Team on grants to prioritize cafeteria infrastructure improvements.***

The tenth recommendation involves updating kitchen facility infrastructure through Governor Kitzhaber's proposed job creation program. Research and stakeholder feedback described school hurdles in implementing Farm to School and school garden programs, including: integrating or implementing nutrition education, improving kitchen facilities, implementing food handling rules for use of garden food in cafeterias, training staff and purchasing equipment or storage units.

6. Monitoring and Evaluation

Upstream Public Health plans to hire an external evaluator to conduct 12 key stakeholder interviews to provide feedback on the HIA process. Key stakeholders will include members of the advisory committee, HIA experts, policymakers, and reporters. Questions will be asked related to the research methodology, the community engagement process, the communications and dissemination strategy and the impact on policy.

Upstream will also monitor the impact of this HIA on the Oregon Farm to School legislation, as well as the impact on other state and national food policy debates. Monitoring will include the tracking of websites, news stories, magazine articles and the legislative process. We will look at the number of news articles that mention the HIA or results from the HIA, the number of studies that cite the HIA, amendments to HB 2800 that come from recommendations of the HIA, and other state or national policies that incorporate recommendations.

Figure 6.1 Portland Public School lunch (Image courtesy of Ecotrust)

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Appendix 1: Community Engagement Process

Community Based Research

The research team wanted to involve a diversity of perspectives and expertise from community organizations impacted by the farm to school and school garden policy in shaping and strengthening the HIA. This appendix describes methods and results for the HIA where we used community input. The sub-sections are as follows.

A. Committee Member Selection
B. Oregon Farm to School Network Survey – Scoping Stage
C. Interviews – Scoping and Recommendations Stages
D. Recommendations Development
E. Communications – Reporting Stage

A. Committee Member Selection
The Research Coordinator conducted a stakeholder analysis to develop a list of populations, stakeholders and organizations that might be affected by, or have an interest in, HB 2800. Stakeholder analysis is an analytical method planners and project managers use to better understand conflict among potential collaborators and power differences among stakeholders[12-14]. From this general list, the Research Coordinator conducted informational interviews with partners to identify interested individuals from relevant organizations or occupations. We convened two groups to give continual input on the project throughout the HIA process: a Technical Advisory Committee and a Practitioner Advisory Committee. The final committee members are listed in the Acknowledgements section.

There is overlap in expertise within the two committees. The research coordinator developed the Technical Advisory Committee membership based on four criteria related to research and data. Individuals needed to have experience 1) conducting health impact assessments, 2) examining health outcomes pertaining to the policy, 3) work on programs affected by the policy (i.e. Farm to School or School Gardens), or 4) work with relevant data sources. The research coordinator developed the Practitioner Advisory Committee membership based on four criteria related to populations affected by the policy and by logistics of implementing the policy. Individuals needed to have experience 1) being a member of an affected population, 2) advocating for an affected population, 3) working on programs affected by the policy (i.e. Farm to School or School Gardens), and 4) reside in various locations around the state. The research coordinator also worked to find representatives from different regions of the state. See table 1 for an example stakeholder matrix used to develop a list of members for the PAC.

Table 1. Example Matrix for Stakeholder Analysis for PAC.

		Area of Expertise or Stakeholder Group	Name	Organization	County	Interests, Positions Values
1	Food Production	Small farmer w/school direct mkt experience			Umatilla?	
2		Med scale farmer w/school direct mkt exp			Tillamook?	
3		Processor w/school direct			Multiple	
4		Distributor or Manufacturer w/school direct exp			Deschutes?	
5		Large or mid-scale farmer			Multiple	
6	Schools, Youth	Garden education teacher			Lane	
7		School food service staff			Hood River?	
8		School cook			Coos or Tillmk?	
9		Youth F/R meals participant			Multnomah	
10		School administrator			Malheur or Baker?	
11	Advocates	Child Health advocate			statewide	
12		Agriculture and Processor advocate			statewide	
13		Family care			statewide	
14		Farm worker advocate			statewide	
15		Ag Education			statewide	
16		Ethnic youth most affected by meal programs			statewide	
17		Environmental Health			statewide	
18		Low income advocate			statewide	

B. Oregon Farm to School Network Survey – Scoping Stage

The purpose of the internet survey was to confirm a) most impacted populations and b) central research topics defined by committee members in the scoping stage. Two questions used Likert scale responses (four and five point scales). We asked open ended follow-up to each question. We had members of the PAC and CAC edit and test the survey before launch. We launched the survey on Thursday, October 21st and gave participants a two-week deadline of November 5th. We extended the deadline to November 10th to increase participation. We sent two reminder emails: one on October 29 and another on November 5th.

We sent the survey to members of the Oregon Farm to School Network. This group includes individuals, not for profits, governments and businesses who support, or seek to understand more about, Farm to School efforts in Oregon. The group subscribes to an account through an internet platform called Basecamp through its host, Ecotrust, a member of the Network. Subscribers receive email postings through this platform. There are 141 individuals with emails on this list belonging to at least 80 organizations. Thirty individuals answered at least one of the four questions on our survey, a response rate of 21%. We did not track organization type for respondents.

Survey Responses

The first question asked participants to identify populations who would be most impacted by the policy. "Below is a list of groups whose health we think will be affected by the 2011 Farm to School and School Garden Policy. Please indicate how strongly you think each group will be affected by checking the box below the scale." Participants could select numbers between 1 ("Policy will NOT impact this group") and 5 ("Policy will STRONGLY impact this group). Table 2 indicates which populations respondents thought would be most impacted. At least three-quarters of respondents felt that public school children (100%), teachers (77%), school cafeteria staff (83%), school food service administrators (87%) and Farm to School program administrators (87%). The majority of respondents felt that all groups would experience some impact from HB2800, even if it was only small (see table 2). These responses confirmed the vulnerable populations we examined in the Assessment.

Four respondents added four different groups that would be impacted by HB2800: community members, AmeriCorps members and other interns working on Farm to School and school garden efforts, non profit and government organizations who work with or administer Farm to School and school garden programs, and Head Start or other child care facilities who may build on Farm to School and school garden efforts.

Table 2. Percentage of responses who thought a group would be somewhat or strongly impacted

Impacted Groups:	**2+3 (Small)%**	**4+5 (Moderate, Strong)%**	**Impacted Groups:**	**2+3 (Small)%**	**4+5 (Moderate, Strong)%**
Public school children	0	**100**	Farmers	33	63
Parents	36	63	Processing workers	63	33
Teachers	23	**77**	Processors	46	47
School cafeteria staff	17	**83**	Distribution workers	58	34
School food service administrators	13	**87**	Distributors	43	53
Farm to School program administrators	13	**87**	Manufacturing workers	62	24
Farm workers	60	33	Manufacturers	60	30

All values reported to nearest whole number.

Table 3. Chance that policy will result in outcome (SC = Some Chance, VLC = Very Large Chance)

Potential Policy Outcomes	SC %	VL C%	Potential Policy Outcomes	SC %	VL C%
The policy will create food sector jobs.	62	31	Schools will increase education about how food is grown.	28	**69**
Food sector workers will have more stable income.	69	24	Schools will increase education about food nutrition.	41	55
Food sector workers will be more able to pay their health bills.	45	14	Schools will increase education about how food affects health.	45	48
Food sector workers will be more likely to buy food for themselves and their families.	50	18	Schools will give kids more food options to try, such as Oregon squash.	34	**66**
Food sector worker children will be more able to finish their education.	50	18	Students' knowledge of food's linkage to health will increase.	52	45
Parents will buy more Oregon fruits and vegetables at their children's requests.	62	35	Students' knowledge of how food is grown will increase.	34	**66**
Parents will buy more from farmers' markets or other direct farmer source at their children's requests.	66	24	Students' knowledge of fruits and vegetables will increase.	34	**66**
Schools will serve food items with lower fat content.	45	45	Students' preference of fruits and vegetables will increase.	55	45
Schools will serve more servings of fruits and vegetables in meals.	31	**66**	Schools will build relationships with farmers.	45	45
Children's school diets will improve.	26	**70**	School gardens will help teachers and students work together.	64	36
Children will be less likely to be overweight.	59	24	Some schools will prefer to buy food produced with "alternative" agriculture methods.	46	32
Children will be more likely to focus in class.	59	31	Some farmers will use different agriculture methods based on school requests.	48	21
Children will be more likely to learn in class.	55	28	The amount of food transported from outside Oregon will be reduced.	52	28
Schools will create more gardens.	31	**69**	The amount food-transport-related green house gas emissions will be reduced.	34	35
Children will get more physical activity in gardens.	45	45			

All values reported to nearest whole number.

The second question asked participants to indicate how much chance a potential outcome would occur as a result of the policy. "Below is a list of significant potential impacts resulting from the policy. Please indicate how much chance you think the policy will result in each outcome." Participants could select numbers between 1 ("No Chance") and 4 ("Very Large Chance"). Table 3 indicates participant responses combining some chance and a very large chance. Again, at least two-

thirds of respondents felt there would be at least some to very large chance of all impacts from the policy. At least two-thirds of respondents thought there was a very large chance that seven outcomes would happen: 1) Schools will serve more servings of fruits and vegetables in meals; 2) Children's diets will improve; 3) Schools will create more gardens; 4) Schools will increase education about how food is grown; 5) Schools will give kids more food options to try, such as Oregon squash; 6) Students' knowledge of how food is grown will increase; and 7) Students' knowledge of fruits and vegetables will increase. These responses confirmed the health outcomes we examined in the Assessment.

C. Interviews – Scoping and Recommendations Stages

The research coordinator conducted informal interviews with individuals who acted as "resources" for the HIA. We completed interviews conducted during the scoping stage for input on vulnerable populations and health outcomes. We asked the co-sponsors of the bill, Representative Kotek and Representative Clem how we could best provide information from our HIA to frame the policy dialogue. We also asked the co-sponsors what topics they thought would be of highest interested from their constituents and other legislative members. We completed one interview during the Recommendations stage for input on policy recommendations specific to Latino communities. Additionally, several resources supported the HIA through answering technical questions about data or research methods, editing the report, or providing feedback on sub-sections of the report. Individuals who provided this expertise are listed in the Acknowledgements section.

Table 4. Interviewed individuals in the F2SSG HIA

Organization, Name	Scoping	Recommendations
Representative Kotek	x	
Representative Clem	x	
Northwest Food Processing Association – Craig Smith	x	
NORPAC – Chuck Palmquist	x	
Oregon Farm Bureau – Katie Fast	x	
Asian Pacific American Network of Oregon – Joseph Santos-Lyons	x	
Latino Network – Cynthia Gomez		x

During the Scoping stage we presented our general scope diagram and an overview of research topics and asked the following.

1. Are we missing any populations or key research areas?
2. Do you have any feedback on the policy?
3. Do you have any concerns or question about the HIA?

During the Recommendations stage we presented the draft Recommendations following the two Community Forums and asked the following.

1. Are we missing crucial content in our existing recommendations?
2. Is there a recommendation topic we are missing?
3. What are your concerns about the HIA, the policy or our recommendations?

D. Recommendations Development

First Draft – Advisory Committees

Policy recommendations in HIAs are used to maximize positive health outcomes and minimize negative health impacts. The Research Team developed an initial set of policy and operations recommendations based on what we were learning in the Assessment stage. We sent this initial list out to members of the Practitioner and Technical Advisory Committees and convened multiple meetings in January of 2011 to discuss and revise the recommendations following an overview of initial Assessment findings. Committee members expanded initial versions of recommendations through tracked changes of electronic documents. We added these changes before taking the new list to Community Forums for continued revisions. We began with three policy recommendations and five operations recommendations. We ended with an expanded version of three policy recommendations and ten operations recommendations.

In the initial Committee meetings we provided a list of potential criteria we would use to rank and select recommendations based on HIA Best Practices (see figure 1). The Research Team emphasized that the first three, 1) improving health, 2) administrative feasibility and 3) political feasibility were crucial. We asked the PAC and TAC members to guide us on the other two criteria. As a result of discussions, the Committee members selected a fourth and fifth criteria. These were that recommendations would be measureable, or have outcomes that could be tracked over time. The last criterion was that recommendations would be cost effective, or fiscally wise.

Figure 1. Example Instructions for Committee Members to Develop and Revise Recommendations

We will:

1. Select five top criteria
2. Revise recommendations
3. Draft additional recommendations as needed
4. Score the recommendations based on criteria

Potential Criteria for Selecting Policy Recommendations (Pick top 5)

- Improve health if implemented and does not introduce negative impacts (i.e. maximize potential impact on FV consumption by having gardens integrated with cafeteria food promotion and nutrition education)
- Administratively feasible (i.e. preference on how federal dollars are spent – can't change federal law)
- Politically feasible (i.e. preference for organic food is not politically supported)
- Responsive to predicted impacts
- Specific and actionable
- Experience-based and effective
- Enforceable
- Can be monitored
- Technically feasible
- Economically efficient

Only three committee members ranked and applied the five criteria to the existing set of recommendations. Some committee members did not feel they knew enough about HB 2800 or the political and budgetary landscape to apply all criteria. The group did use the discussion on the set of criteria to help consider and weigh each recommendation. This was apparent when committee members attending Community Forums referred to the criteria to help other citizens understand how to think about the draft recommendations.

Table 5. Example Criteria and First Draft Recommendations

Recommendations Criteria and Scoring Please score each draft policy suggestion (and any you add) by the five criteria in the columns. Indicate in each criteria column a "Y" for yes, a "N" for no, or a "?" if uncertain.	Improve Health	Admin Feasible	Political Feasible	Measurable	Cost Effective
POLICY Recommendations (requires approval and/or action from Oregon Legislators):					
1. Modify the eligible items included to increase the economic stimulus impact in Oregon.					
2. Specify the funding criteria for School Garden and Agricultural Education grants to ensure the grants go to schools serving low-income children.					
3. Specify funding criteria for School Garden and Agriculture Education grants so funding goes to programs utilizing multiple components to affect child dietary preferences and consumption patterns.					
OPERATIONS Recommendations (requires approval and/or action from relevant agents):					
1. Schools should utilize their purchasing power to promote healthier, more sustainable agricultural practices, and more just labor practices.					
2. The Oregon Department of Education should encourage the use of salad bars for new Farm to School programs.					
3. The change in school purchasing practice should be closely tracked after passage of the legislation.					
4. Encourage innovations in school curriculum to complement changes in the cafeteria and school gardens.					
5. Encourage research on health outcomes related to Farm to School and School Garden programs.					

Second Draft – Community Forums

We held two community forums during the Recommendations phase to obtain feedback on our findings and preliminary policy recommendations. We presented our preliminary findings from the assessment and provided copies of the recommendations. We asked volunteers to facilitate group discussions about the recommendations and led the group through three steps. First, participants added revisions to existing recommendations. Second, participants added recommendations if they thought something were missing. Finally, participants prioritized their top three recommendations based on the criteria and their own expertise. Participants were given three gold stars and everyone in each group placed their three stars on their favored recommendations. Groups had approximately one hour and thirty minutes to discuss recommendations. This was enough time to review the policy recommendations and three or four of the operations recommendations.

Figure 2. Community Forum Recommendation Development Exercise.

Farm to School and School Garden HIA (HB 2800)
Draft Policy Recommendations Development Exercise

We developed these policy and operations recommendations based on the findings from the HIA and will be selecting those that meet five criteria for the final report. We want recommendations that help to 1) improve health, 2) are administratively feasible, 3) are politically feasible, 4) have measurable effects, and 5) are cost effective. The definitions for each of these are below.

> "Improve health" means that the recommendation directly affects one or more health outcomes included in the health determinant pathways of this HIA.
>
> "Administratively feasible" means that the legislature, or an identified institution, could implement the recommendation based on current capacity.
>
> "Politically feasible" means there is current political support for this recommendation.
>
> "Measurable" means an organization could measure changes brought about by the recommendation.
>
> "Cost effective" means the recommendation would use funds efficiently.

1. Please review the current draft recommendations, is critical content missing? If so, please describe below. In your group, please read through the list of draft recommendations and discuss the content. Please think big picture and avoid word-smithing. If you have specific changes you want us to capture, please note them in the space below.

2. Overall are there critical recommendations missing in the draft? If so, please describe the general recommendation(s) we missed. In your description please indicate 1) whether the recommendation is to amend the policy or to affect policy implementation, 2) what health outcome it impacts, 3) what groups of individuals are affected, 4) and why you think this recommendation will be effective in improving health

We compiled the results and amended, or added, recommendations that were in alignment with our original criteria. Many individuals felt the third policy recommendation regarding integrated Farm to School and school garden programs needed to emphasize that start-ups and slow beginning programs would still have the potential for funding. We revised the language to emphasize this. Individuals were also concerned about giving preference to schools serving low-income, rural or ethnically diverse students. There was a strong feeling that the grants be open to all schools. We revised the language to highlight that grants are open to all schools and that only a proportion of the grants would be preferentially awarded to high-need schools. We retained this emphasis because our research indicated that these populations bear a disproportionate burden of food insecurity and obesity and this recommendation helps address that disparity.

Figure 3. Community Forum Discussion Leader Instructions

Discussion Leader General Instructions

Thank you for facilitating the group exercise today! Here are some general instructions to help your group move along. You should have five to six folks at your table, please try a whole table discussion if folks feel comfortable with that. If it's easier to work in pairs or trios, you could try that approach too.

1. Introductions – Before beginning the first half of the exercise, have folks go around and introduce their name and organization. Introduce yourself and explain that you're there to help guide the discussion and exercise. You will also record their thoughts on an exercise sheet to turn in (*I've printed 3 copies per group so folks can read them on their own and make notes if they want).*
2. Side one of the page (~30 min) Explain that we want their general feedback to make sure we haven't missed something crucial in our recommendations to improve the health outcomes of HB 2800. Have folks review the existing policy and operations recommendations and see if there's something in the current text we are missing. Does one of the recommendations we have now need to be expanded or cut down? Capture the groups' changes on one document to turn in.
3. Side two of the page (~20 min): Do we need an additional recommendation? Again, please capture the groups' suggestions on one page. *If you have suggestions of your own, please note these.*

If they want more time, they can email Tia their comments and/or new recommendations by Feb. 12.

4. **Prioritize** (~10 min)**-** Now that they have had a chance to look over the recommendations, explain that we would like them to apply some criteria so we can prioritize which recommendations are "most important." Explain that we developed our recommendations based on the 5 criteria listed at the top of the page (there are definitions). Now it's their turn to prioritize what we have based on their own expertise and experience. *You can vote too!*
5. Give each person 3 gold stars. Have them place one star next to their top three recommendations on one of the lists of recommendations documents.

Please turn in one exercise sheet from each group.
Please turn in one copy of the list of recommendations with gold stars.
Please remind folks to fill out the blue evaluation sheet.

Thank you for helping us today and have a great weekend!

There were some suggestions we did not add because of the criteria. For example, one suggestion was for schools to prioritize food grown within 100 miles of their community. This would be nearly impossible to track. Another example was to reduce the recommended gardening time suggested in the sample list of gardening activities for the third policy recommendation to less than ten hours per student per school year. The rationale was that giving up 20 hours of instruction time to all students would be logistically challenging for teachers to accomplish without assistance from third party gardening organizations. We kept this recommendation because research indicates this is the minimum number of hours to support behavior change and because the grants will help schools hire third-party gardening program for support.

Prioritization Results

The highest ranking recommendations from both Community Forums were all three policy recommendations and three operations recommendations. Results are skewed toward Eugene participants because half of Umatilla participants left prior to the prioritization exercise, see table 6. The version of the recommendations Community Forum participants reviewed is in Figure 4. Prioritized recommendations have stars by their number.

Table 6. Votes for Recommendations from Community Forums

	P1	P2	P3	O1	O2	O3	O4	O5	O6	O7	O8	O9
Umatilla	9	4	6	1	10	5	3	1	0	5	0	3
Eugene	17	11	16	4	6	6	5	3	4	7	6	2
Totals	**26**	**15**	**22**	5	**16**	**11**	8	4	4	**12**	6	5

Figure 4. Draft Reviewed in Community Forums (*** = Prioritized Recommendations)

Health Impact Assessment: Farm to School and School Garden HB 2800
2/3/11 DRAFT

DRAFT POLICY RECOMMENDATIONS:
Preliminary recommendations to improve the health outcomes within the legislation [DRAFT 4]:

*****Recommendation #1: Modify the eligible items included to increase the economic stimulus impact in Oregon.**
Currently, the legislation would allow state dollars to be used on any foods that are produced, packaged, packed or processed in Oregon. This potentially allows foods that have only a small portion of their production chain located in Oregon. For example, apples that are grown in China but sorted into bags in Oregon would be included. The legislation could specify that foods must, at minimum, be produced or processed in Oregon in addition to packing and packaging. This would significantly increase the economic activity that is generated in Oregon, and promote Oregon agricultural activities at all levels of the production chain. As it is difficult to determine what does and does not meet these criteria, an additional recommendation on Farm to School Operations is included in the next section.

*****Recommendation #2: Specify the funding criteria for School Garden and Agricultural**

Education grants to ensure the grants go to schools serving children from low or moderate income families.

Garden grants should be preferentially allocated to schools with the children in 1) highest financial stress, measured by household food insecurity and free/reduced meal eligibility and 2) schools serving more than one ethnic and cultural specific population. Gardens grants should be prioritized to schools with at least 40% of population receiving free or reduced priced meals at school. This will ensure that garden education can benefit vulnerable populations such as food insecure or very low food secure families. Garden grants should also go toward schools serving more than one ethnic and cultural specific population as some of these groups tend to carry a disproportionate burden of diet and nutrition related health outcomes such as chronic diseases. Schools will be required to complete on-going evaluation of the programs in order to receive the grants.

*****Recommendation #3: Specify funding criteria for School Garden and Agriculture Education grants to ensure grants support schools developing multiple-component programs to affect child dietary preferences and food consumption patterns.**

We recommend garden grants be preferentially awarded to those programs that strive to have one item in each of the following categories: Education, Promotion, Procurement and Community Involvement. Example elements appear in a menu list below.

Part A: Based on evidence in the literature, grants should be preferentially allocated to schools that have the most linkages between food offerings and educational curriculum. This includes linking garden education, classroom curriculum, nutrition content, cafeteria offerings, and community involvement. This will maximize program health benefits.

Part B: Grants should be preferentially allocated to schools that include promotion of farm products. In order to further impact both the Oregon economy and children's diet, grants should be awarded to schools that include promotion elements linking cafeteria food offerings to farmers and nutrition. This includes educational and promotional activities within the cafeteria for seasonal/local items, such as a "Harvest of the Month" program.

Part C: Because many programs in their start-up phase will not have enough support to launch every element of a multi-component program, we recommend they have a plan for adding missing elements or can show how the grant will help them achieve this objective in a five year time span.

Category 1 PROCUREMENT:

- ☐ School purchases food from Oregon producers and processors for use in breakfast, lunches or after-school meal programs.
- ☐ School provides Oregon-made snack options that meet Oregon a la carte nutrition requirements in vending or other snack access sites.

Category 2 EDUCATION:

- ☐ School uses model integrated curriculum that includes agriculture, food, nutrition and gardening such as Agriculture in the Classroom,
- ☐ If not using integrated curriculum, school includes healthy eating concepts in at least two of the following classroom topics: gardening, science, health, math, and language.
- ☐ Garden exposure includes ~20 hours for each child per school year, and provides at least four opportunities for planting, tending and goal setting during the school year.

Category 3 PROMOTION:

- ☐ Garden and/or cafeteria conducts food taste tests,

- ☐ Cafeteria actively promotes local food sources with activities and materials such as those offered in Oregon Harvest for Schools,
- ☐ Cafeteria includes nutrition promotion with activities and materials such as those offered in Oregon Harvest for Schools
- ☐ Garden posts signs linking garden grown food with cafeteria food offerings.

Category 4 COMMUNITY SUPPORT:

- ☐ Garden program has leadership team that includes at least one teacher, one community member and one school youth member,
- ☐ Garden has administrative support,
- ☐ Garden program has vehicle for youth input in its structure and activities other than representation on leadership team,
- ☐ School promotes community involvement in garden through garden work parties, harvest celebrations or other means beyond the leadership team,
- ☐ School wellness policy includes language on healthy eating connected to the cafeteria and garden,
- ☐ School participates in community healthy eating initiative,
- ☐ School Wellness Committee advocates for school nutrition through its efforts.

DRAFT OPERATIONS RECOMMENDATIONS

Preliminary recommendations to improve health outcomes in legislation implementation [DRAFT4]:

Recommendation # 1. The Oregon State Department of Agriculture and the Oregon Department of Education collaborate with the Oregon Agriculture Extension Service to 1) help producers and processors develop promotional materials and messages that communicate product locality, and 2) help buyers develop and use language in their Request for Proposals or Requests for Information that specify a local product preference.
This recommendation will encourage product marketing tests in labeling, in distribution, and in other retail avenues to help vendors communicate their unique Oregon-produced, packed or processed status. These materials will help school-related buyers and vendors identify appropriate products for the Farm to School reimbursement program. This will help all buyers who are choosing to buy Oregon items, including schools, school districts, purchasing cooperatives, hospitals, prisons and other institutions.

*****Recommendation #2. Schools, school districts and purchasing cooperatives work with producers, distributors and processors to plan menu options, review growing seasons and product types, and explore aggregation mechanisms to help secure regular purchasing volumes.**
This recommendation seeks to address school and producer linkage barriers. Farm to School procurement benefits from relationships between buyers, sellers and other handlers such as distributors and wholesalers. There is no one-size-fits-all approach to food distribution in Oregon. However, much can be achieved from planning ahead. We heard from producers a desire to know ahead of time the needed volume, product type and when the product would be needed in order to plan their growing season and market strategies. We heard from schools, school districts and other institutional buyers a desire for flexibility in menu planning, a need for meeting price points, a desire for consistent volumes and quality of food, and a challenge of wanting food items out of season.

*****Recommendation # 3. The Oregon Department of Education should work with schools and school districts and the Oregon Department of Agriculture should work with small-scale producers to identify and acquire grants to fund efficient, low-cost mobile processing equipment in rural areas with limited distribution systems.**
This recommendation relates to the concern voiced by both producers and school food nutrition services regarding a desire to use fresh, minimally produced products (such as spinach or carrots) that require washing, chopping and packing. Many schools no longer have the equipment capacity or the labor time to accomplish this, Oregon has very few processors who can handle smaller volumes of these items, and many farmers in rural areas are not equipped to handle this type of request.

Recommendation #4: The Oregon Department of Education should 1) offer training and resources to school districts to enhance and increase the use of salad bars; 2) encourage all schools to have salad bars that offer fresh items and products that meet proposed nutrition standards based on the Institute of Medicine 2010 report; and 3) encourage local procurement for salad bars.
Salad bars have been shown to increase the amounts of fruits and vegetables consumed by children. Although at least half of Oregon schools already offer salad bars, there are still important opportunities to expand the number of salad bars and improve the quality and variety of offerings. Training and resources related to placement of the salad bar, quality, variety and seasonality of items offered, signage and promotion of local items, would enhance student participation and increase fruit and vegetable consumption. The recommendation ensures state dollars are used to improve the nutritional content of meals. This may include seeking out lower sodium foods, lower fat offerings, fresh, or minimally processed fruits and vegetables. Schools could identify and promote the Aggregated Nutrient Density Index (ANDI) scores for different salad bar items. Salad bars also provide the opportunity to easily incorporate local products into cafeteria offerings, to highlight local foods, and to utilize more fresh and minimally processed foods.

Recommendation #5: The Oregon Department of Education should closely track school purchasing practices through the reimbursement program after passage of the legislation.
The Oregon Farm to School and School Garden legislation is an innovative approach for promoting more local food production and improved quality of school meals. The lessons learned from this approach should be carefully tracked, analyzed and disseminated to local and national partners in order to shape food procurement initiatives. Some key components that should be tracked or analyzed include: (1) The amount of economic activity that is generated in Oregon due to the legislation, (2) How the increased state funds impact the nutritional quality of school meals, 3) What food sectors are most affected, and (4) What components/attributes of schools allow them to better integrate local foods into cafeteria offerings. *Look at legislation – which of these are already being done with the 2% admin funds?*

Recommendation #6 The Oregon State Department of Agriculture and the Oregon Department of Education will convene a committee by December 2012 to support school choices of alternative practices in agriculture through identifying best practices for producers, processors and suppliers.
The Sustainable Agriculture Research and Education program of the National Institute of Food and Agriculture under the USDA describe sustainable agriculture practices as those that, 1) ensure profit over the long term, 2) provide stewardship of our nation's land, air and water, and 3) ensure a quality

of life for farmers, ranchers and their communities. This committee would be comprised of members from the Oregon Department of Agriculture (ODA), Oregon Department of Environmental Quality (DEQ), Oregon Department of Education (ODE) and relevant experts from the Oregon State University Extension Service. The ODA will annually assess and report on adoption of best sustainability practices within the farm-to-school program. ODA may request assistance from the OSU Extension Service Program for conducting annual assessments and reports. We suggest the committee draw on existing resources from the USDA, SARE, The National Institute of Food and Agriculture, the Food Alliance, and the Green Guide for Health Care (Food Service Operations section), and other leaders on this topic.
See the following References:
http://www.csrees.usda.gov/sustainableagriculture.cfm
http://www.sare.org/publications/whatis.htm
http://extension.oregonstate.edu/blogs/sustainable_agriculture/report/

*****Recommendation #7: Schools, school districts and purchasing cooperatives utilize their purchasing power to support producers who are developing innovative alternative agricultural practices and utilizing labor practices that support worker health.**
With passage of the legislation, schools would have more flexibility to buy more local products, to seek out fresh items, promote alternative land use practices and encourage safe, fair labor practices. Key opportunities include: (1) To provide a preference for foods grown or processed in a way that reduces their impacts on the environment and negative health outcomes (see recommendation #6 above). (2) Encourage safe and fair labor practices. Schools should look for producers that have a good track record of using established OSHA safety protocols in growing, processing and manufacturing, have a good track record reducing food-borne diseases, and provide benefits to workers or wage increases beyond the state minimum wage. The Food Alliance certification process for producers and handlers provides guidelines on safe and fair labor practices.

Recommendation #8: The Oregon Health Authority and the Oregon Health Policy Board collaborate with other institutions such as the Oregon Agriculture Extension Program, Oregon's land grant universities, and Oregon Health State University to encourage and conduct research on health outcomes related to farm to school and school garden programs.
New research is needed to better understand how farm to school and school garden programs affect the following outcomes 1) social relationships between students, students and teachers, and famers and staff, 2) How skills and knowledge of school nutrition staff change in order to utilize new products, (3) How garden education projects impact student learning, physical activity, and self-efficacy, 4) How exposure to agriculture education, field trips and farmers encourages childhood interest in agriculture as an occupation, and 5) How food offerings influence food preferences, overweight levels, and student learning.

Recommendation #9: We recommend existing programs such as Oregon Master Gardeners and Oregon 4-H collaborate with other garden support organizations across the state to efficiently utilize existing resources in supporting farm to school and school garden efforts.

Do we delete this or keep it? This is covered in the grant program, and this will be defined at the federal level from the Nutrition Reauthorization act – do we feel okay about dropping this, or do we need to keep it in?**:**
~~**Recommendation #10: Oregon Department of Education and Encourage innovations in**~~

Appendix 2:
Scoping and Assessment Methods

Appendix 2. Scope and Assessment Methods

A. Scope Development Process

Following multiple meetings, the Research Team and advisory committees identified seven initial pathways between HB 2800 and potential health outcomes. The Research Team prioritized and condensed these health determinant pathways based on three criteria:

1) The degree to which the policy was certain to act on the health determinant,
2) The degree to which the policy was certain to impact populations affected by this determinant, and
3) The degree to which the policy would impact vulnerable populations affected by the determinant.

Following this prioritization process, the group developed two tiers of determinants. Tier one included Diet and Nutrition, Employment, Farm to School and School Garden K-12 Education, and Environmental Health. Tier Two included Social Capital because we thought it was more indirect, uncertain, or difficult to judge its magnitude on different populations. The Farm to School and School Garden K-12 Education determinant encompasses other determinants such as physical activity, nutrition education and garden education that were originally separate pathways. The two tiers of pathways helped the HIA Team focus and prioritize time and resources when conducting the assessment. The committees and Research Team also included a few research questions about how the policy would affect adults' dietary practices based on anecdotal evidence indicating that children's preferences can cause dietary changes in the home, that teacher dietary behavior can influence children's preferences, and that parent or caregivers' behaviors may be influenced by participating in Farm to School and school garden activities (such as school garden work days).

The Research Team and advisory committees generated a series of research questions for each health determinant pathway. The Research Team developed a list of general research topics in each health determinant pathway connected to those research questions in the draft scope. Members of the two committees voiced their opinion on the top three or four research topics in each pathway that met the following criteria: 1) availability of data sources to address the health outcomes; 2) accessibility of literature; 3) feasibility to answer the question without primary data collection; and 4) degree to which the topic adds value to the analysis, in relation to health outcomes and vulnerable populations. The Research Team used this feedback from the committee prioritization to focus the scope.

B. Research Questions

Below are the list of priority and context research questions for quick reference. The working scope from the original excel document with vulnerable populations, data methods and other considerations can be emailed on request to Tia Henderson (tia@upstreampublichealth.org).

Table 1. Employment Pathway Research Questions

Health Determinant: Employment	
Priority Questions	**Context Questions**
Will this policy (through employment) affect mental health outcomes?	How will this policy increase food availability in urban and rural areas?
Will this policy (through employment) affect chronic disease outcomes?	How will food insecurity and hunger be impacted as a result?
Will this policy (through employment) affect life expectancy?	Will this policy change educational attainment outcomes for children of previously unemployed or underemployed workers?

Will demand for Oregon products increase as a result of this policy? Will policy scenarios change the number of jobs needed to supply the demand for Oregon food products in school cafeterias? Will this policy create more food sector jobs? Will this policy require more school cafeteria jobs? Will it stabilize (help maintain) existing jobs?	Will this policy help reduce chronic conditions in low income families?
Will policy scenarios stabilize food sector jobs by extending their time span?	If health status is improved for employed workers, what will the cost savings be to the state as a result of the policy? – *too difficult to measure*
How will the policy impact employment opportunities for these populations?	
What policy scenarios will affect food sector workers' ability to pay bills (affect purchases) for material needs including food and medications?	
Does job creation decrease prevalence of hunger/food insecurity?	
How much economic activity would this policy generate in the processing sector (based on different scenarios)? How much would this extra processing capacity lead to more food bank donations?	
Will passage of this policy affect those currently employed by the EDF? Will other jobs be impacted by changes in allocation of EDF funds?	

Table 2. Diet and Nutrition Pathway Research Questions

Health Determinant: Diet & Nutrition	
Priority Questions	**Context Questions**
Will this policy increase the # of schools and school districts purchasing local?	Do children who eat free/reduced price school meals feel stigmatized? How does this stigma impact stress levels among students?
Will the policy increase youth enrollment in school meal programs around the state? In particular districts (may not be able to evaluate to this detail)?	What is the current level of skills/knowledge needed for school staff? What are they types of skills needed among food service personnel for using local Oregon products and their use? Will this increase their knowledge and skills? (edited 10/28/10 after meeting – added to Prediction list)
Will this policy affect the number of school children who pay for school meals?	What type of food is offered to students through the existing school meal program?
Will this policy impact the percent of ethnic minorities enrolled in the federal meal program in OR?	What is the linkage between school meal caloric content and obesity? OR generally, what is the linkage between school meals and obesity?
Will this policy affect levels of food insecurity among school children?	What is the link between nutrition and # of missed school days from chronic or acute illness (i.e. colds) based on hunger/food insecurity?
How will this policy impact the number of servings of fruits and vegetables that are consumed by students in OR public schools?	What is the linkage between school meal caloric content and obesity?
Will this policy affect the nutrition of public school breakfast and lunch (i.e. help them meet, or surpass USDA requirements)?	What is the link between nutrition and sleep in school age children?
How could this policy impact levels of overweight and obesity for OR youth? Through dietary changes?	What is the link between level of education and health status?
Linkage between school meal nutrition and learning/educational attainment. Linkage between nutrition and cognitive development. Linkage between nutrition and behavior.	

Table 3. Farm to School and School Garden K-12 Education Pathway Research Questions

Health Determinant: F2SSG K-12 Education Programs	
Priority Questions	**Context Questions**
Will this policy lead to more gardening education?	What type of support programs have been found to produce changes/results in dietary behavior, learning outcomes, etc.?
Will this policy increase the amount of agriculture programming in K-12 education?	Is there a linkage between level of parent involvement in schools and garden or diet or ag education? Do schools with more parental involvement perform better?
Does garden education affect children's dietary choices including eating fruits and vegetables?	What are the trends for PA in schools in oregon?
Will this policy lead to more nutrition, food and diet program activities that help schools meet, or surpass the standards?	Is there a linkage between gardening programs and gardening at home, in choosing fresh produce at home, in cooking at home? Among low income families?
Will this policy change youth's knowledge of the links between nutrition, food and health? Knowledge then can lead to preferences	Is there a link between nutrition education or garden education and children preferences influencing parents to buy healthy food options at home (at retail, farmers' markets, orther locations? Do students currently ask their families to spend SNAP, WIC and $ on Oregon products (i.e. does it affect low income as well)?
Will this policy affect children's learning outcomes?	Is there a linkage between agriculture or gardening education and an increase interest in occupations? Will this policy increase interest in farming as an occupation among youth?
What is the linkage between gardening or cooking education and children's sense of self control and self efficacy?	What is the current level of youth overweight and obesity in Oregon? How is level of obesity linked to risk for overweight from youth to adult; risk of diabetes type I type II, risk of diet related cancer, risk of CVD?
Do garden programs give children the ability to be physically active? How much? What type, duration? Will garden programs help kids be more physically active?	Will this policy affect children's overweight, obesity? Through PA?

Table 4. Environmental Health Pathway Research Questions

Health Determinant: Environmental Health	
Priority Questions	**Context Questions**
Will this policy affect demand for alternative agriculture methods?	What is the linkage between buying local and reduced green house gas emissions? What does this look like for SD's buying from Oregon?
Will this policy reduce the impact of climate change health outcomes?	What health outcomes is Oregon currently experiencing based on climate change?
	What are the current preferences of school districts for types of products and the agricultural methods used in producing them?
	Do farmers with more stable sources of income use alternative ecological measures or agricultural methods such as composting, wetland set-asides or cover crops?
	What human exposures are related to convention agriculture methods? What human exposures are related to alternative agriculture methods?
	What kind of human exposures and related illnesses currently happen in relation to farming in Oregon?

Table 5. Social Capital Pathway Research Questions

Health Determinant: Social Capital	
Priority Questions	**Context Questions**
Do school gardens help support relationship building among students, and between students and teachers? What is the impact on health?	what is the linkage between schools who buy directly from food producers, processors, and manufacturers and quality of relationships? What does this do for health?
How so school gardens promote parent involvement in schools? Do children and parent relationships improve based on school gardens?	Do Oregon farmers currently feel isolated in their communities? Will this policy help increase the social network of farmers?
Will this policy affect relationships between school district personnel and food producers?	

B. Literature Review Methods

The HIA Research Team conducted literature reviews on each of the five health determinant pathways using the following tools, strategy and criteria. The Research Team met three times to test, discuss, re-test and refine the scoring criteria. For each health determinant pathway, we evaluated the quality, quantity and consistency of research in relation to the prediction research questions. We evaluated systematic literature reviews on whether they had inclusion and exclusion criteria; we did not re-examine the literature included in each review. The literature and data in the Social Capital and Environmental Health pathways was not easy to evaluate using the scoring criteria, as the literature base involved methods of analysis unfamiliar to the research team (e.g. food miles) or was considered preliminary. For these sections we focused on general quality, quantity and consistency of findings. Table 6 presents search criteria and table 7 includes an initial list of search terms we applied to different databases.

Tools:

1. Excel spreadsheet. Use this to track articles, findings, relevant outcomes, and ranking on significance. This is content-focused and will help us when we need to weigh the evidence.
2. Zotero reference manager. Track all articles for use in bibliography. This is citation focused, and allows collaboration.
3. Research log. On paper or in excel, track search terms, databases, number of articles returned and number of articles used (and why they were included/rejected). This is so we can include the process in the methodology.

General Strategy:

- Search on databases.
- Use reference lists, related authors, and related articles.
- Search based on direct or related Farm to School and Garden programming.
- Search based on specific health determinant and health outcome(s).
- Search based on health outcome connected to specific population(s).
- Use research questions as a basis for specific searches (others will be general).

Table 6. Search Criteria

Inclusion	**Exclusion**
Research is directly related to farm to school, school gardens, or integrated programs (regardless of geographic location or school population mix).	Research is more than three degrees of separation away from farm to school and/or school garden programming.
Research uses sound experimental or observational design (i.e. rct, case/control, cohort, cross-sectional) or is a relevant case study.	Research uses faulty or questionable methods (i.e. poor response rates, bad inclusion criteria).
Research connects health outcomes findings to relevant populations (i.e. youth diet and obesity).	Research is on non-relevant population.

Research is on related F2S/SG programming such as nutrition education, Federal meal program, horticulture, physical activity in gardens, etc. (Two degrees of separation)	Literature is theoretical or an opinion piece (although you can mine these for good references and for context).
Research occurs within the past decade.	
If older than a decade, research is a seminal, heavily influential piece.	
Research shows strong link between a key health determinant and outcome in a vulnerable population, even if it is not directly tied to F2SSG or support program (i.e. studies on children eating organic vs conventional food and the chemicals in their blood/urine + a study of levels of chemicals and dose-response resulting in cancer, allergies or other outcomes). (Three degrees of separation).	

Table 7. Draft Terms for Pathways

Diet Pathway Search Terms	**Employment Pathway Search Terms**	**Access to F2SSG K-12 Education Programs Pathway**
Federal, School + meal program School lunch, breakfast program Nutrition + education, school, garden, youth, outdoor, ecological, outcomes, behavior, policy Farm to school Obesity school child, education Child diabetes school, education Diabetes learn Diet, Diet + garden + Fruits, vegetables preferences, child Stigma, stress + school meals Free reduced meals Nutrition educational attainment Diet + behavior, education attainment, school performance Diabetes school performance School intervention + diabetes, obesity, nutrition School garden + (health, nutrition, diet, fruit, vegetable) Nutrition prevention diabetes Type 2 diabetes (insert above)	Employment access Unemployment + education, attainment Income security Oregon employment Rural + employment + health Employment health Unemployment + health, food, hunger, food insecurity Farmer + health hunger or food security Employment, reemployment or unemployment + physical, mental health, life expectancy, risk chronic disease Economic hardship health Employment status affect mental, physical health,	All D & N terms and: Nutrition program school Outside education school Learning outcomes focus education Focus + environmental education Ecological education + learning outcomes Outdoor education behavior School nutrition garden, agriculture, food, promotion, schools, physical activity Physical activity school Physical activity education obesity, self efficacy, Pa+ obesity, bmi
Environmental Health Pathway	**Social Capital Pathway**	
Gas emissions local food/markets Farmers markets + mileage “ + emissions “ + transport food system + climate change pesticides + farmer worker health pesticides bodyburden children food system local food system soil erosion agriculture soil contamination farm soil erosion farm soil contamination food system sustainability local food sustainable	Relationships + health Direct markets relationships Farmers markets relationships Employment relationships Oregon + social capital, social cohesion, trust	

Weight of Evidence Criteria

We used two articles regarding strength of evidence to develop a strategy. We revised this after discussing the process and applying the original set of criteria. Below are the instructions each member of the Research Team used to review relevant articles. We did not apply this criteria to articles used to address context questions.

Table 8. Weight of Evidence Criteria for Literature Used to Evaluate Priority Research Questions

From Our Team's Previous HIA Experience	*From Research*
Quality: Effect estimates (i.e. dose response, association)	**Quality:** the aggregate of quality ratings for individual studies, predicated on the extent to which bias was minimized
Quantity	**Quantity:** number of studies, sample size or power, and magnitude of effect
Consistency	**Consistency:** for any given topic the extent to which similar findings are reported using similar, and different, study designs.

Sources:
Oxman, A.D. (2004). Grading quality of evidence and strength of recommendations. *BMJ,* 328: 1490-4.
Agency for Healthcare Research and Quality (AHRQ) (2002). Rating the Strength of Scientific Research Findings. Pub. No 02-PO22

Directions

1. Calculate initial quality score for each article **based on evidence type.**
   - Randomized controlled trial = **5**
   - Longitudinal (more than one year), quasi-experimental study = **4**
   - Short-term quasi experimental study (i.e. intervention & control) OR large-scale cross sectional study = **3**
   - Pre-post, small cross sectional study = **2**
   - Other evidence = **1**

2. Adjust each article's numeric quality score **based on limitations or strength of evidence**, as noted below.

Decrease grade if (numbers adjusted from orig. article)**:**
- Serious (-1) or very serious (-2) limitation to study quality
- Important inconsistency (-1)
- Some (-1) or major (-2) uncertainty about directness
- Imprecise or sparse data (-1)
- High probability of reporting bias (-1)

Increase grade if:
- Large population size (+1)
- Evidence of a dose response gradient (+1)
- Strong evidence of association – significant relative risk of >2 (<0.5) based on consistent evidence from two or more observational studies, with no plausible cofounders (+1)
- Very strong evidence of association – significant relative risk of >5 (<0.2) based on direct evidence with no major threats to validity (+2)
- All plausible confounders would have reduced the effect (+1)

3. Determine a final numeric article score and assign it to a "low" "medium" or "high" quality ranking based on a range. Do **not** create a collective aggregate score of all articles.

4. Determine a collective "weight of evidence" of all articles for each prediction research question based on 1) quality of articles, 2) quantity and 3) consistency of all articles. For each health outcome, report the final in terms of direction and/or magnitude of impact based on the collective weight of evidence.

Appendix 3: Oregon Farm to School Food Procurement and Operation Barriers

HB 2800 addresses funding barriers to purchasing local foods. While it is beyond the scope of this HIA to examine Farm to School operation challenges in detail, understanding the benefit to schools of additional funds also requires understanding food production elements. The price of food is tied to costs of producing, packaging, marketing, transporting and distributing the product. Smaller and mid-scale farmers have found it difficult to access traditional markets because of difficulty meeting volume requirements, costs of paying middle men such as wholesalers and lack of, or limited access to, adequate distribution systems[1-4]. If a farmer or processor can sell directly to a school, they may gain a larger share of the profit than if they pay a wholesaler or sell into the federal commodities market. Schools plan their menus on a period basis (e.g. weekly, monthly or yearly) and need a steady source of particular volumes of a product at a very low price. Larger school districts or districts that purchase together can often obtain a lower price because of the large volume they purchase. Many of Oregon's school districts are smaller and cannot always obtain this low price point due to lower volumes.

Studies across the country identify equipment needs and labor costs to process whole foods as barriers to buying local food[1, 5-7]. Izumi and colleagues note that wholesalers or distributors can gather the needed volume from multiple suppliers and can prepare food items to meet school needs[8]. It is important to note that even distributors and wholesalers who actively link farmers, processors and schools cannot always meet the low price points school districts require. Our advisory school nutrition service committee members work in schools that have adequate equipment. An ODA sponsored survey in 2008 of school nutrition service providers indicates that 78.8 percent of respondents use both scratch and heat/serve of prepared items methods, while 10 percent have either only scratch or only heat/serve facilities[9]. The survey had a 42 percent response rate (113 completed of 269)[9]. This indicates that at least one third of the state's school districts have the capacity to work with both whole and processed Oregon food items. Farm to School and school garden coordinators would benefit from a school kitchen inventory survey to find out current school capacity to handle and process whole food items beyond the 2007 ODA survey.

There are multiple factors that influence what is served in a typical school meal. Researchers and school district nutrition service managers indicate that funding, school administrative support, facilities, nutrition standards, federal and state regulations, food availability, crop growing conditions and committed farmers are common elements that shape food procurement[4, 10-13]. Figure # reveals some of the elements that contribute to school meal content. Factors that are unique to individual school districts include district wellness policies, nutrition goals and children's preferences. HB 2800 acts primarily on two factors: funding and child preferences. Here we discuss other challenges schools and producers face when working to develop market relationships.

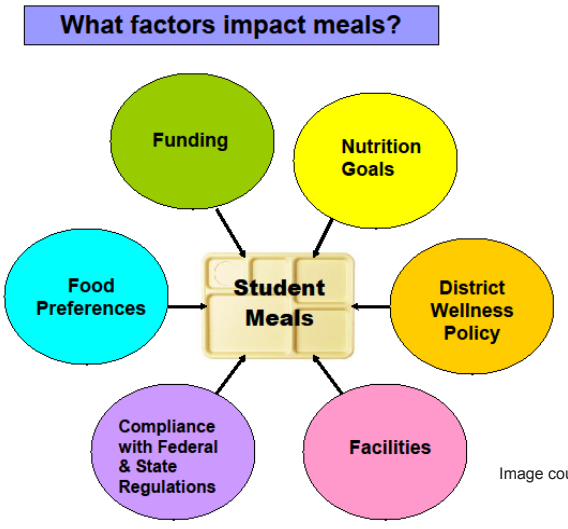

Image courtesy of Portland Public School Distric

Researchers note that schools and producers face multiple barriers in providing local food across the nation including: price of items; quality of items; availability of items (e.g. producer offerings, consistency, seasonality, volume); accessibility of items (e.g. prepared, packed, distribution system and delivery; and coordinating efforts[1-5, 9-14].

Table 1. Common Farm to School procurement challenges and suggestions.

Challenge	Suggestions
Distribution + Delivery	• Develop an online database for electronic purchasing • Develop cooperatives or aggregation mechanisms
Availability	• Plan menus at least one season in advance • Increased communication to identify appropriate crops, seasons, and volumes
Food Preparation	• Apply for USDA grants for kitchen equipment upgrades, storage facilities and mobile processing units • Share the processing between the producers (e.g. cleaning) and the school kitchens (e.g. slicing, packing and storing).

HB 2800 will help address some of the funding challenge. Improved communication between schools and producers regarding crops can help schools find the type and quality of products they need – smaller apples, for example. Delivering food from the field to the cafeteria is a major challenge, because farmers may have a volume too small to address a school demand, or a school may demand too low of a volume to make the handling costs cost effective. Traditional brokers usually charge a fee to wholesale and distribute food items to retail or other markets that are not feasible for schools and the small or mid-sized producers looking to meet school needs. Schools and producers have looked into various delivery mechanisms such as cooperatives or aggregating products. Menu planning one season ahead can help schools and producers address food availability fluctuations, while finding grants to fund kitchen processing and storage equipment can help address the food preparation challenge (see Table 1).

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14. Ecotrust, *Summary of responses to 2009 School Food Service Directors Survey*. 2009, Oregon Department of Education.

Appendix 4: Resources

Resources on Health Impact Assessments

Centers for Disease Control and Prevention - Healthy Places
http://www.cdc.gov/healthyplaces/hia.htm
The CDC provides an overview of HIA methodology and includes links to many resources.

The Health Impact Project
http://www.healthimpactproject.org/
The Health Impact Project is a collaborative of Pew Charitable Trusts and Robert Wood Johnson Foundation. The website includes news, resources, and funding opportunities.

Health Impact Assessment Blog
http://healthimpactassessment.blogspot.com/
This blog provides updates on developments in the HIA field.

UCLA Health Impact Assessment Clearinghouse
http://www.hiaguide.org/
UCLA maintains a learning resource center, and a catalog of completed HIAs conducted around the U.S.

World Health Organization - HIA resources
http://www.who.int/hia/en/
This website provides guides, resources and links to other HIA websites around the world.

National Resources on Farm to School Programs and Policies

The National Farm to School Network
http://www.farmtoschool.org/
The National Farm to School Network provides resources and links to state Farm to School programs across the U.S.

Community Food Security Coalition
http://www.foodsecurity.org/farm_to_school.html
Provides resources, publications and links to funding opportunities related to Farm to School programs.

Food Corps
http://food-corps.org/
This is a national community service program related to farm to school and school garden initiatives.

School Nutrition Association
http://www.schoolnutrition.org/
Includes publications, resources and links related to school food service programs.

USDA Farm to School
http://www.fns.usda.gov/TN/
Includes resources, links to funding opportunities and guides on procurement rules.

Oregon Resources on Agriculture and Farm to School Programs

Oregon Department of Agriculture
http://www.oregon.gov/ODA/about_ag.shtml
Provides data and resources about agriculture in Oregon.

Oregon Department of Education Farm to School and School Garden Program
http://www.ode.state.or.us/search/results/?id=379
Provides links to many Farm to School and School Garden programs across Oregon, as well as resources and data.

Ecotrust Farm to School Program
http://www.ecotrust.org/farmtoschool/
Provides information on Oregon and regional Farm to School programs and policies.

Oregon Rural Action
http://oregonrural.org/our-work/farm-to-school
Includes updates on Farm to School programs in rural areas of Oregon

Rogue Valley Farm to School
http://www.rvfarm2school.org/
Provides information and resources about Farm to School Programs in the Rogue Valley area of Oregon.

Upstream Public Health
http://www.upstreampublichealth.org/farmtoschool
Provides updates and information on Oregon Farm to School legislation.

Willamette Farm and Food Coalition
http://www.lanefood.org/farmtoschool.php
Includes updates and information about Farm to School programs in Lane County and the surrounding areas.

Appendix 5:
Economic Analysis of HB 2800

Local Foods to Schools: An Economic Analysis

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Highlights

- Each new job that is created producing local foods supports another 1.67 jobs in the Oregon economy.
- Local food production's contribution to the income portions of Oregon's economy is matched 2.16 to 1 as it generates economic activity throughout the rest of the economy.
- Labor income comprises 63% of the total income effects of a local foods initiative. Since local foods production can employ unskilled and semi-skilled workers who have unemployment rates over 18% and 14%, respectively, this high proportion of labor income to total income can be especially helpful to folks who have been hardest hit by the recession. It is also an industry well suited to provide on-the-job training to boost the skill level of employees.

Introduction

Economies grow, and are sustained by, exporting goods and services to bring in new money and by producing goods that are currently imported, called import substitution, to plug the leaks of local dollars to outside economies. Local foods production is particularly effective at import substitution or plugging those leaks and keeping local dollars recirculating in the local, in this case statewide economy.

A significant stumbling block to establishing and increasing the local food production in the Oregon and its county economies is stable market demand. The persistence or profitability of these enterprises is also dependent on the producer or processor capturing a major portion of the retail value of their product. It is very difficult to compete with larger conglomerates if the producer or processor is selling at commodity or wholesale prices.

Marketing directly to an end user like a school, which can provide a reliable market demand at a price that includes most of the value added steps in creating the end product, can stabilize the local foods businesses and encourage their growth.

[1] *****Tia Henderson, Ph.D. edited this report and provided many useful ideas that increased the report's clarity.

Upstream Public Health and the OSU Extension Service funded a study by the Oregon State University Rural Studies Program to answer the question; “What are the economic effects of a Farm to School and school garden initiative in Oregon?” The analysis is a follow-up to an abbreviated analysis that was completed for Ecotrust in 2009 on their local foods to schools pilot program in the Portland Public Schools and Kaiser School District (I’ll add citation later here). To make these estimates we used purchasing information from Sodexo, a third party food service provider (they aren’t a distributor/wholesaler) and from two school districts in Oregon and scaled those projections to a the initial HB 2800 funding level and a potential amended funding level that is being considered by the 2011 Legislature.

In this report we provide;

(1) an **overview of the agriculture and food industry** in Oregon and the how local foods to schools production fits within that industry,
(2) an **estimate of the economic contributions** that $1,750,000 and $19,580,000 of biennial spending on local foods would have over a two year period within the Oregon economy and the methods including limitations that we used to make those estimates,
(3) a **comparison of how the economic effects may be distributed** between urban and rural counties
(4) a few **options to consider** that could enhance the economic effects of a local foods to schools program

Overview of the Agriculture and the Food Industry

We recently completed an estimate of the economic contributions or linkages of the agriculture and food industry in the Oregon economy.[2] Local foods to schools initiatives cause their first round of effects within the agriculture industry as we described it in the report. Essentially the agriculture and food industry reach every sector in the Oregon economy and 19.4% of the jobs and 14.9% of the value added or income in Oregon are linked to the agriculture and food industry. It is an industry of considerable breadth and depth with significant opportunities for growth.

Local food production provides diversification and often a higher profit margin for the agriculture and food industry. To the extent the products move through their production processes in Oregon, the sector can provide income per acre in the thousands of dollars rather than the hundreds of dollars as do commodity crops. Often local foods are produced on adaptive farms that tend to be mid-sized with diversified crops. Many of the adaptive farmers are reversing a long trend in agricultural production of working more time off-farm. Adaptive farmers on the average are working higher percentages of their time on-farm as their businesses develop.[3]

This recession has affected different industries and employees at significantly different levels of intensity. While the Oregon unemployment rate overall is 10.4%, less than six percent of people with Bachelors or higher degrees are unemployed, while eighteen percent of people who did not complete high school are unemployed (cite). Agriculture and the food industry, unlike other

[2] Sorte et al. 2011. http://ruralstudies.oregonstate.edu/sites/default/files/pub/pdf/OregonAgEconomyAnUpdate.pdf

[3] Sorte et al. 2009. http://ruralstudies.oregonstate.edu/research#land-use

industries that have become progressively more specialized, has many occupational opportunities for people with all levels of skill.

Estimate of Economic Contributions Including Methods of Analysis

In the 2011 Legislative Session, the elected officials are considering an amended version of HB 2800 to create a pilot program to reimburse selected schools an additional fifteen cents per lunch to pay for locally produced, packed and/or processed food. Total funding for this pilot program is expected to be $1,750,000. The original funding proposed for HB 2800 is $19,580,000 which we discuss later in this section. We broke the pilot program funding amount down based on information from an Ecotrust privately funded pilot project during 2008 and 2009 and the expenditures made by two large food wholesalers for Oregon school districts in 2010.

Methods

The IMPLAN input-output economic model that we relied on is produced in Stillwater, Minnesota by the Minnesota Implan Group, Inc. (MIG). It was originally designed to help the Federal Emergency Management Administration and U.S. Forest Service estimate the economic effects of events and policies. MIG uses public and private databases to calculate all the goods and services that are imported to, used internally and exported from an economic area (U.S., state, county or zip code). IMPLAN expresses economic sector estimates as *output* or sales, *employment* in full and part-time jobs, and *value added* or the portion of sales that are income, which is locally produced. MIG brings all data sources together and balances the inputs and outputs of all the counties in the U.S. We used the most current 2009 data in this analysis. The term “value added” is used two describe different things. In an economic analysis, “value added” is the portion of sales that result in income. In agricultural marketing, “value added” is when a producer or processor adds other ingredients or steps to a product that results in a higher net worth item. Jam, sauces and vegetable blends are examples of value added products. MIG takes two years to bring databases together and balance the inputs and outputs of all the counties in the U.S. Our estimates are based on the most current 2009 data.

Since the output or sales amounts include a good deal of “double counting” we rely on the employment and value added estimates. A number of studies focus on the output numbers because they are the largest. We report the output numbers, yet our emphasis is on the employment and value added metrics as this is the more conservative approach. Almost every good or service is double counted when sales estimates are made.[4]

The employment and value added measures only count the effort and value, respectively, that are contributed by each industry and represent a unique contribution. The output or sales in the Oregon

[4] An example of the double counting in the output or sales numbers would be when a farmer pays for electricity to pump irrigation water to produce a tomato. The price of the electricity is recorded as an output or sale amount from the utility to the farmer. When the tomato is sold to a processor to be used in a sauce, the value of the electricity will be included in the price of the tomato and counted again. When the sauce is sold to a restaurant the value of the electricity will be counted again. When the meal is sold to a customer the value of the electricity will be counted once again. While the electricity only added unique value once, it was counted four times.

economy for 2009 were approximately $278,803,856,556. However, the Oregon value added or state product was $153,024,613,192.

We used two sources of school food purchasing data for the IMPLAN analysis. One data set is from a study completed by Ecotrust, with funding from the Kaiser Permanente Community Fund at the Northwest Health Foundation[26]. Ecotrust provided a 7 cent meal subsidy for two school districts to buy Oregon products to determine the effects that added money – similar to that in HB 2800 – would have on school district purchasing. Ecotrust worked with the Portland Public School District and the Gervais School District to track school nutrition services' purchasing for the 2008-09 school year as part of a larger Farm to School and School Garden analysis. This portion of data represents the impact of schools with additional funds to buy Oregon products. The second source of data comes with permission from Sodexo detailing twenty-six school districts' purchases for the 2008 calendar year. Ten percent of the purchases in 2008 represent meals and snacks outside of the school year NSLP and SBP. This portion of the data set represents school purchasing without additional funds to buy Oregon products.

Table 1 Oregon School District Nutrition Services' Purchasing Data Sources

Source	Ecotrust	Sodexo
Districts	2	26
Enrolled Students (2008-09)	46,026	167,928
Percent of Oregon Enrollment	8%	29.7%
Eligible Free and Reduced Students (2008-09)	19,975	81,719
Total Oregon purchases	$1,976,698 (with $.07 incentive)	$260,006 (without incentive)
Total agricultural sectors**	18	21

* * Agricultural sectors, such as Dairy cattle and milk production or Vegetable and melon farming represent groups of economic activity that are assigned industry classification codes and are tracked by Federal statistics agencies. Enrollment for Oregon public schools was 564,064 in the 2008-09 school year. ~10% of purchases were from meal programs other than school breakfast and lunch.

For each food purchase, Sodexo or school districts retrieved information on the vendor/brand, item description, purchase unit (e.g., flat, package, loaf, etc.), price per purchase unit, total units purchased and total amount spent. We categorized school purchases by agricultural industry sector using North American Industry Classification System codes from the U.S. Census before loading them in the IMPLAN model. The combined data represent meals served to approximately one-third of the state's public school children (see table 1). The data set also represents a mixture of school purchases with incentive to buy local, and a mixture of purchases without the added incentive.

Limitations

While this is a relatively modest level of spending, the *IM*pact *PLAN*ning (IMPLAN) economic model that we used to make these estimates is linear. This is a limitation, because it does not change how things are produced depending on the quantity produced; and a benefit because we can multiply any higher level of funding by the proportions of effects estimated herein to get a rough idea of the economic effects for the higher level.

Economic impact analyses typically estimate an annual impact based on exports and economic base or export base theory. Since all of the demand or payments for this program will be made with Oregon dollars to Oregon businesses, we have estimated the economic *effects* or *activity* that is caused by the additional expenditures and not the economic *impacts*. As mentioned above we estimated the effect of import substitution and not the impacts of export expansion.

The Oregon Legislature and this program is proposed to be funded on a biennial basis. All the estimates in this report are for two years and to determine the annual dollar estimates the reader can divide the biennial estimates by two.

Employment estimates are more difficult than the value added or output estimates because many of the jobs in the first year will continue into the second year and so will the employees. Some jobs will end and new ones will be established in the second year. The employment estimate at the biennial level can contain double counting.

At the same time, we did not have a clear estimate of how the food service production might change at the local school level and so did not include those estimates. We began our estimates and applied all the dollars to the second round of spending with the primary supply expenditures for local foods, using those expenditures as the direct effects. Additional employees are likely to be hired at the schools.

The additional labor costs at the schools while boosting employment at the schools will reduce the dollars available for spending in agriculture with suppliers. Many parts of agricultural production are more mechanize than food preparation jobs in the schools. The net effects of using some of the funding for food preparation at the schools would be to increase our employment estimates.

As discussed above, we assumed all the dollars for this program would cause new production. It is probable that at least in the beginning of the program some of the production will be diverted from other exports or local customers.

Also, the IMPLAN model is static or a snapshot in time that assumes the same production techniques at all levels output and unlimited supply. It may take some time for the supply chain of food to adjust to additional expenditures. These amounts in this proposal are quite modest and little or no distortion is anticipated at these levels of funding. In addition our estimates are based on large conventional farms and processors. To the extent that the local foods are produced on adaptive or modest size farms or processed by locally owned medium size processors our estimates are too conservative.

IMPLAN certainly does have some limitations, yet it is very useful and transparent. The majority of economic impact analyses are completed using this model and it is constantly refined to better represent local economies.

Estimates

Table 2 shows the estimated economic effects of the incentive funding to school districts so they can purchase more local foods. The funding level of $1,750,000 can be found in the upper right corner of the table. These estimates are based on the assumption that all of the $1.75 million in sales would come from *new* production so the estimates reflect a net increase to the sectors that we analyzed. If the producers, packers and/or processors just shift their sales from other customers to schools the effect could be less or zero. Upstream Public Health advisory committee members engaged in producing and processing confirmed these sales would support additional production that would require more production capacity and therefore be a net increase.

Table 2. *Economic effects of local foods to school funding at $1,750,000*

Type of Effect	*Employment Full & Part-time*	*Labor Income*	*Total Value Added*	*Output*
Direct Effect	9	$306,355	$433,900	$1,750,000
Indirect Effect	9	$364,286	$579,035	$1,164,179
Induced Effect	6	$198,988	$356,882	$598,275
Total Effect	24	$869,629	$1,369,817	$3,512,454
Multiplier	2.67	2.84	3.16	2.01

One measure of the respending that can be caused by any type of expenditure is a multiplier. The multiplier in Table 1 is calculated by dividing the total effect by the direct effect in each column. The direct value added portion ($433,900) of the purchases divided into the total of all the unique value added expenditures (total output minus “double counting”) of $1,369,817 equals a multiplier of 3.16. For each value added dollar spent, another $2.16 ($3.16-$1.00) of unique value is added or received by the sellers.

Table 3 shows the top twenty most affected sectors sorted largest to smallest by total value added effects. Remember these sectors include not only some of the primary producers; they include the most affected suppliers and some of the service industries where the employees or proprietors spend their income.

Table 3. *Top 20 affected sectors sorted by total value added effects*

Sector	*$*
Bread and bakery product manufacturing	148,102
All other food manufacturing	117,437
Wholesale trade businesses	115,395
Fruit farming	93,382
Management of companies and enterprises	67,593
Transport by truck	25,364
Vegetable and melon farming	23,294
Food services and drinking places	22,456
Monetary authorities and depository credit institutions	21,599
Offices of physicians- dentists- and other health care	20,979
Private hospitals	19,268
Legal services	19,132
Insurance carriers	18,974
Frozen food manufacturing	18,792
Electric power generation- transmission- and	16,516
Tortilla manufacturing	16,382
Nondepository credit intermediation and related institutions	15,259
Telecommunications	13,448
Poultry processing	12,339
Support activities for agriculture	12,321

As mentioned above, the IMPLAN model is linear. If the Legislature decides to fund the local foods to schools initiative as originally proposed at $19,580,000 the economic effects in Table 1 can be multiplied by the level of expected spending in HB 2800 to calculate the total effects of the higher level of expenditures. Table 4 provides those estimates.

Table 4. *Economic effects of local foods to school funding at $19,580,000*

Type of Effect	***Employment Full & Part-time***	***Labor Income***	***Total Value Added***	***Output***
Direct Effect	101	3,427,673	4,854,724	19,580,000
Indirect Effect	101	4,075,845	6,478,575	13,025,500
Induced Effect	67	2,226,388	3,993,000	6,693,843
Total Effect	269	$9,729,906	$15,326,299	$39,299,343
Multiplier	2.67	2.84	3.16	2.01

Comparison of How the Economic Effects May Be Distributed

Upstream Public Health asked us to discuss the possible distribution of economic effects between Oregon's urban and rural economies. Urban and rural are defined in many ways, yet we are able to create a model that combines the 11 metropolitan (urban) counties and a model that combines the 25 non-metropolitan (rural) counties in Oregon (insert how these are defined e.g. population and geography). We did not have an accurate way of separating the direct effects between urban and rural so we could calculate the indirect and induced effects. However using the IMPLAN model, we did estimate the percentage of jobs and value added production and processing that takes place in urban and rural Oregon. It is reasonable that the total economic effects from Table 1 or Table 3 would be distributed pretty close to those percentages. Table 5 shows how the percentage of production and processing jobs and value added dollars are distributed between rural and urban counties and how the jobs and value added dollars from all the economic sectors in Oregon are distributed. We only used food related production and processing sectors that are likely to be affected by the proposed expenditures for these estimates.

Table 5. *Distribution of jobs and value added dollars between rural and urban counties*

	Rural	*Urban*
Jobs - Full and Part-time		
Food Production	52%	48%
Food Processing	31%	69%
All Sectors	18%	82%
Net Production/Value Added ($)		
Food Production	50%	50%
Food Processing	27%	73%
All Sectors	15%	85%

The distribution of economic effects related to the production sectors of the agriculture and food industry should be quite similar between rural counties and urban counties. While the economic effects related to processing may be proportionately greater in urban counties, this effects will be distributed to rural areas (31% of jobs and 27% of dollars) proportionately more than the general economy (18% for jobs and 15% of dollars) or the population which is distributed approximately 22% to rural counties and 78% to urban counties.

Options to Consider

These economic effects can be significantly enhanced to the extent that the production, packing, processing and preparation of the local foods are labor intensive. The estimates in this report are based on the way food is currently produced and prepared in schools. If even a portion of these funds were used to increase the number of workers preparing the food at the local schools, the economic effects would be significantly increased.

Earlier in the report, we noted that unskilled and semi-skilled workers have been most severely impacted by the recent recession. If trade continues to globalize, it is likely that these workers could continue to be stressed at least until 2050. If the local foods to schools program emphasizes on-the- job training for agricultural and food industry workers it would be difficult to overstate the long run economic effects of the initiative.

Appendix 6: HB 2800

76th OREGON LEGISLATIVE ASSEMBLY--2011 Regular Session

House Bill 2800

Sponsored by Representatives CLEM, KOTEK; Representatives DEMBROW, FREDERICK, GARRETT, HOLVEY, KOMP, MATTHEWS, SCHAUFLER, J SMITH, Senator EDWARDS (Presession filed.)

SUMMARY

The following summary is not prepared by the sponsors of the measure and is not a part of the body thereof subject to consideration by the Legislative Assembly. It is an editor's brief statement of the essential features of the measure **as introduced.**

Directs Department of Education to provide reimbursements to school districts that serve Oregon food products as part of United States Department of Agriculture's National School Lunch Program or School Breakfast Program. Directs department to award grants for development of food-based, agriculture-based and garden-based educational activities.

Allocates moneys from Administrative Services Economic Development Fund to Oregon Business Development Department for purposes of reimbursements and grants.

Declares emergency, effective July 1, 2011.

A BILL FOR AN ACT

Relating to Oregon Farm-to-School and School Garden Program; creating new provisions; amending ORS 336.426; limiting expenditures; and declaring an emergency.

Be It Enacted by the People of the State of Oregon:

SECTION 1. ORS 336.426 is amended to read:

336.426. (1) The Department of Education shall establish the Oregon Farm-to-School and School Garden Program. Through the program, the department shall:

(a) Provide reimbursements to school districts that serve Oregon food products as part of the United States Department of Agriculture's National School Lunch Program or School Breakfast Program;

[*(a)*] **(b)** Assist school districts that participate in the United States Department of Agriculture's National School Lunch Program or School Breakfast Program in [*utilizing*] **using** Oregon food products and produce from school gardens;

[*(b)*] **(c)** Promote [*food-*] **food-based, agriculture-based** and garden-based educational activities in **schools and** school districts [*that participate in the United States Department of Agriculture's National School Lunch Program or School Breakfast Program*];

[*(c)*] **(d)** Provide information to school districts on how farm-to-school and school garden projects may help implement wellness policies mandated by the United States Department of Agriculture;

[*(d)*] **(e)** Assist school districts in incorporating farm-to-school and school garden projects into wellness policies mandated by the United States Department of Agriculture;

[*(e)*] **(f)** Work with the State Department of Agriculture**, agricultural organizations, state institutions of higher education and other regional organizations and community-based organizations** to develop farm-to-school related programs; and

[*(f)*] **(g)** Perform other activities necessary to facilitate the success of the Oregon Farm-to-School and School Garden Program.

(2)(a) A school district may be reimbursed for purchasing Oregon food products by applying to the Department of Education for reimbursement and showing that food for which the district seeks reimbursement:

NOTE: Matter in **boldfaced** type in an amended section is new; matter [*italic and bracketed*] is existing law to be omitted. New sections are in **boldfaced** type.

LC 203

(A) Was produced, packaged, packed or processed in Oregon; and

(B) Was used in meals that are part of the United States Department of Agriculture's National School Lunch Program or School Breakfast Program.

(b) The Department of Education shall provide reimbursement for purchases of Oregon food products that satisfy the requirements of paragraph (a) of this subsection. Reimbursements shall be in an amount that equals the lesser of:

(A) The amount paid per meal by the school district to purchase the Oregon food product; or

(B) Fifteen cents for every school lunch and seven cents for every school breakfast.

(c) A school district that receives moneys for reimbursement as provided by paragraph (b) of this subsection:

(A) Must use the moneys to purchase food produced, packaged, packed or processed in Oregon; and

(B) May not use the moneys to supplant purchases of food products with federal moneys.

(d) The Department of Education shall consult with the State Department of Agriculture to develop rules and standards related to the implementation of the reimbursements described in this subsection.

(3)(a) A school or school district may apply to the Department of Education for a grant to be used for food-based, agriculture-based and garden-based educational activities in schools and school districts.

(b) The Department of Education shall consult with the State Department of Agriculture to determine the recipients and amounts of grants awarded under this subsection.

(c) An applicant for a grant may not receive more than $20,000 in grants per biennium under this subsection.

(d) The Department of Education may not award more than 150 grants per biennium under this subsection.

[*(2)*] **(4)** The State Board of Education **shall adopt rules that establish the criteria to determine the eligibility for a grant awarded under subsection (3) of this section and** may adopt any **other** rules necessary for the administration of this section.

[*(3)(a)*] **(5)(a)** For the purpose of paying the costs of the Department of Education of administering the Oregon Farm-to-School and School Garden Program, the department may accept contributions of moneys and assistance from any source, public or private, and agree to conditions placed on the moneys not inconsistent with the duties of the department under this section.

(b) Any moneys received by the department under this subsection shall be placed in the Department of Education Account. **Moneys specifically received for reimbursements described in subsection (2) of this section and for grants described in subsection (3) of this section shall be credited for those purposes.**

(6) The Department of Education may expend for the administrative costs incurred by the department under this section no more than two percent of all moneys received by the department for the Oregon Farm-to-School and School Garden Program.

SECTION 2. The amendments to ORS 336.426 by section 1 of this 2011 Act first apply to food purchased on or after the effective date of this 2011 Act.

SECTION 3. (1) There is allocated to the Oregon Business Development Department from the Administrative Services Economic Development Fund the amount identified in subsection (2) of this section.

(2) Notwithstanding any other law limiting expenditures, the amount of $22,580,000 is established for the biennium beginning July 1, 2011, as the maximum limit for payment of expenses by the Oregon Business Development Department and the Department of Education from the Administrative Services Economic Development Fund for the following purposes:

(a) $19,580,000 for the reimbursements described in ORS 336.426 (2).

(b) $3,000,000 for grants to be used for food-based, agriculture-based and garden-based educational activities, as described in ORS 336.426 (3).

(3) The allocation of moneys from the Administrative Services Economic Development Fund under this section is subject to the requirements in section 4, Article XV of the Oregon Constitution, for deposit of specified amounts of the net proceeds from the Oregon State Lottery into the Education Stability Fund and into the Parks and Natural Resources Fund and shall be made only after satisfaction or payment of:

(a) Amounts allocated to Westside lottery bonds issued under ORS 391.140 or to the reserves or any refunding related to the Westside lottery bonds in accordance with the priority for allocation and disbursement established by ORS 391.130;

(b) All liens, pledges or other obligations relating to lottery bonds or refunding lottery bonds that are due or payable during the biennium beginning July 1, 2011; and

(c) Amounts required by any other pledges of, or liens on, net proceeds from the Oregon State Lottery.

SECTION 4. This 2011 Act being necessary for the immediate preservation of the public peace, health and safety, an emergency is declared to exist, and this 2011 Act takes effect July 1, 2011.

Appendix 7: Amendments to HB 2800

(as of April 2011)

HB 2800-6
(LC 203)
4/7/11 (HRL/ps)

PROPOSED AMENDMENTS TO

HOUSE BILL 2800

On page 1 of the printed bill, delete lines 5 through 28 and delete pages 2 and 3 and insert:

"SECTION 1. ORS 336.426 is amended to read:

"336.426. (1) The Department of Education shall establish the Oregon Farm-to-School and School Garden Program. Through the program, the department shall:

"(a) Assist school districts that participate in the United States Department of Agriculture's National School Lunch Program or School Breakfast Program in [*utilizing*] **using** Oregon food products and produce from school gardens;

"(b) Promote [*food-*] **food-based, agriculture-based** and garden-based educational activities in school districts [*that participate in the United States Department of Agriculture's National School Lunch Program or School Breakfast Program*];

"(c) Provide information to school districts on how farm-to-school and school garden projects may help implement wellness policies mandated by the United States Department of Agriculture;

"(d) Assist school districts in incorporating farm-to-school and school garden projects into wellness policies mandated by the United States Department of Agriculture;

"(e) Work with the State Department of Agriculture to develop farm-to-school related programs; and

"(f) Perform other activities necessary to facilitate the success of the Oregon Farm-to-School and School Garden Program.

"(2) The State Board of Education may adopt any rules necessary for the administration of this section.

"(3)(a) For the purpose of paying the costs of the Department of Education of administering the Oregon Farm-to-School and School Garden Program, the department may accept contributions of moneys and assistance from any source, public or private, and agree to conditions placed on the moneys not inconsistent with the duties of the department under this section.

"(b) Any moneys received by the department under this subsection shall be placed in the Department of Education Account.

"SECTION 2. (1) A school district may apply to the Department of Education for a grant to be used by the school district to:

"(a) Reimburse the school district for costs incurred by the school district to purchase Oregon food products described in subsection (3) of this section; and

"(b) Fund food-based, agriculture-based and garden-based educational activities in school districts.

"(2) For a grant received under this section:

"(a) 87.5 percent of the moneys of the grant must be used for reimbursements as described in subsection (1)(a) of this section; and

"(b) 12.5 percent of the moneys of the grant must be used for the educational activities described in subsection (1)(b) of this section.

"(3)(a) For the portion of a grant that is allocated for reimbursements, a school district shall be reimbursed for the costs incurred by the school district to purchase Oregon food products that were:

"(A) Purchased on or after the date the school district received the moneys for the grant;

"(B) Produced or processed in Oregon; and

"(C) Used in meals that are part of the United States Department

of Agriculture's National School Lunch Program.

"(b) For Oregon food products that satisfy the requirements of paragraph (a) of this subsection, reimbursements shall be in an amount that equals the lesser of:

"(A) The amount paid per meal by the school district to purchase the Oregon food product; or

"(B) Fifteen cents for every school lunch.

"(c) A school district that receives moneys for reimbursement as provided by paragraph (b) of this subsection:

"(A) Must use the moneys to purchase foods produced or processed in Oregon; and

"(B) May not use the moneys to supplant purchases of food products with federal moneys, but may use the moneys to pay for the difference in cost between food products that are of higher quality and food products that are allowed to be purchased with federal moneys.

"(4) For the portion of a grant that is allocated for educational activities, a school district shall use the moneys for costs directly associated with the educational activities, including staff time, travel costs and equipment purchased for the activities.

"(5) The Department of Education shall consult with the State Department of Agriculture to determine the recipients and amounts of grants awarded under this section. Preference shall be given to school districts that:

"(a) Propose farm-to-school projects or school garden projects that:

"(A) Are well designed;

"(B) Incorporate positive changes in food purchasing;

"(C) Promote healthy food activities;

"(D) Have clear educational objectives;

"(E) Involve parents or the community; and

"(F) Have high potential for job creation;

"(b) Represent a variety of sizes and geographic locations; and

"(c) Serve a high percentage of children who qualify for free or reduced price school meals under the United States Department of Agriculture's National School Lunch Program.

"(6) The Department of Education must award at least three grants per biennium under this section.

"(7) The Department of Education shall consult with the State Department of Agriculture to develop rules and standards related to the grants awarded under this section.

"(8) The Department of Education and the State Department of Agriculture may expend for the administrative costs incurred by the departments under this section no more than two percent of all moneys received by the departments for the grant program.

"SECTION 3. (1) There is allocated to the State Department of Agriculture from the Administrative Services Economic Development Fund the amount identified in subsection (2) of this section.

"(2) Notwithstanding any other law limiting expenditures, the amount of $2 million is established for the biennium beginning July 1, 2011, as the maximum limit for payment of expenses by the State Department of Agriculture and the Department of Education from the Administrative Services Economic Development Fund for the grant program described in section 2 of this 2011 Act.

"(3) The allocation of moneys from the Administrative Services Economic Development Fund under this section is subject to the requirements in section 4, Article XV of the Oregon Constitution, for deposit of specified amounts of the net proceeds from the Oregon State Lottery into the Education Stability Fund and into the Parks and Natural Resources Fund and shall be made only after satisfaction or payment of:

"(a) Amounts allocated to Westside lottery bonds issued under ORS

391.140 or to the reserves or any refunding related to the Westside lottery bonds in accordance with the priority for allocation and disbursement established by ORS 391.130;

"(b) All liens, pledges or other obligations relating to lottery bonds or refunding lottery bonds that are due or payable during the biennium beginning July 1, 2011; and

"(c) Amounts required by any other pledges of, or liens on, net proceeds from the Oregon State Lottery.

"SECTION 4. This 2011 Act being necessary for the immediate preservation of the public peace, health and safety, an emergency is declared to exist, and this 2011 Act takes effect July 1, 2011.".
