

Mount Saint Vincent University
Department of Applied Human Nutrition

**Cultivating Food Security in Nova Scotia Public Schools:
A Case Study of an Elementary School Garden Project**

By:
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Abstract

Background: Community food security (CFS) exists when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for all. A small but growing body of peer reviewed research suggests that school gardens provide an array of nutrition, health, social, and ecological benefits. School gardens have been promoted as a strategy for building CFS, but to date no research is available exploring school gardens' role in CFS.

Purpose: This thesis explored the role of school gardens in building CFS. More specifically, it surveyed, from the perspective of the school community and affiliated public health practitioners: 1) any health, social and ecological effects of the school food garden at River Valley Elementary School, and 2) what factors contributed to producing these effects.

Methods: A qualitative, exploratory, single case study design was followed, using an elementary school food garden as the case. Data collection consisted of focus group and individual interviews, document review and participant observation in classroom and extracurricular garden activities. Bronfenbrenner's Ecological System's Theory and Garret and Feenstra's Model for Sustainable Food Systems were used as frameworks to inform data analysis.

Results and Conclusions: While the school garden at River Valley Elementary School did have some direct effects on human and environmental health, it was the indirect effects that were most important for their potential contributions to longer term CFS. The

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school food garden at River Valley Elementary has the potential to influence long term CFS through developing in children knowledge, skills and values that encourage participation in sustainable food systems. A societal culture supportive of healthy, sustainable food at schools, backed by relevant government and school policies, were key ecological systems factors reinforcing and supporting this garden's effects on human and environmental health, and economic vitality. If all schools are to have access to building and maintaining a sustainable a school garden, these findings suggest that adequate funding for a paid school garden coordinator and the support of a team of committed volunteers is essential. Furthermore, the social, health and ecological effects of school food garden at River Valley and their relationship to each other was complex. More research is needed to extricate if and how the observed immediate effects contribute to the indirect, CFS building potential of school gardens suggested in this thesis, and further explicate what factors at the micro-, meso-, exo-, macro-, and chronosystem levels contribute to this.

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Dedication

In the spirit of the garden club members,

I would like to dedicate this thesis

“to the whole world.”

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Definition of Key Terms

Agency: in the context of food security describes the “need for active participation of people affected by food insecurity in addressing the problem” (Canadian Home Economics Association, p.5) (1).

Biofuels: are fuels made from biological materials (e.g.: corn, sugar cane, soy, etc.). Biofuels include ethanol, biodiesel, and methanol (2).

Biophilia: is a hypothesis which refers to the human need and desire to affiliate with other living organisms (3).

Community Gardens: are in their most simple definition, any piece of land gardened by a group of people. According to the American Community Gardening Association, community gardens can be urban, suburban, or rural; grow flowers, vegetables or [build] community; one community plot, or many individual plots; located at a school, hospital, or in a neighbourhood; or a series of plots dedicated to urban agriculture where the produce is grown for a market (4).

Companion Planting: refers to an organic gardening technique of inter-planting crops which mutually complement each other in their light, moisture and soil needs, and often also deter bugs from their companion plants (5).

Ecoliteracy: is a term coming from *Ecological Literacy*; it is to understand (or to be literate in) the principles of organization that ecosystems have developed to sustain the web of life (ecology) (6).

Farm to School: is a term used to describe programs that partner schools directly with farmers for food procurement and educational purposes.

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Food Miles: is a term that describes the distance that a food has traveled from where it is produced to where it is consumed.

Food Security: exists when an individual or a community has access to sufficient nutritious, safe, personally acceptable and culturally appropriate foods that are produced, procured and distributed in ways that are environmentally sound, sustainable, and socially just (7, 8). This definition encompasses aspects of community, household, and individual food security.

Community Food Security: “exists when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for all” (Slater, 2007, p. 2) (9, 10).

Individual and Household Food Security: exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (11).

Permaculture: is a term that combines *permanent* and *agriculture* or *culture*.

Permaculture is an approach to designing human settlements, in particular the development of perennial agricultural systems that mimic the structure and interrelationship found in natural ecologies (12, 13).

School Community: the students and their families, teachers, support staff, custodians, administration, school volunteers, and others who have roles and responsibilities that come in direct contact with the school. As a volunteer and local resident I include myself in the school community of the case school described in this study.

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School Gardens: are similarly broad in scope as community gardens, but usually on school property. School gardens can be small demonstration gardens, or large gardens supplying food to the cafeteria. School gardens are usually planted, tended and harvested by students. School gardens are not necessarily all used to grow food, but this research focuses on *school food gardens*, so the terms are used interchangeably.

Schoolyard Greening/Gardening: is a general term used to describe initiatives at school to create natural (green) play spaces, including planting trees, trading tarmac for grass, and growing flower and vegetable gardens (14).

Slow Food Nova Scotia: is a network that honours local food and social eating environments, promotes fair and sustainable production methods, preserves culinary history and diversity in food cultures, and reconnects producers to consumers so that they can educate each other (15).

Sustainable Food Systems: is used in this thesis to refer to food systems where ecological, economic, social and health considerations share equal importance. Food systems include but are not limited to the production, manufacturing, distribution, marketing, consumption, and disposal of food as well as the policies that govern food systems (9, 16).

Chapter 1: Introduction

1.1 Summary of the Research Problem

School gardens and green schoolyards (see Definition of Key terms, Schoolyard Greening) provide an array of potential health (17-25), socio-cultural (21-24, 26-28) and ecological benefits (22-24, 29-32). Research suggests that schoolyard gardens positively influence student learning (22), nutrition knowledge (18, 25), willingness to taste, eat and enjoy fruits and vegetables (17, 18, 25), and physical activity levels (20, 32).

The ability of school gardens to provide opportunities for community capacity building, create a sense of belonging at school, influence school food culture, and foster school pride is supported by inferential and anecdotal evidence (22-24, 33), but is not yet supported by rigorous inquiry. Similarly, school gardens have been, and are currently used to foster environmental awareness and ecological values among school children (21, 22, 24, 29, 34-36), but the body of peer reviewed literature is limited with evidence that is mainly observational.

Increasing the availability and affordability of healthy food, including fruits and vegetables for all Nova Scotians at school, work, and in the community, as well as increasing food and nutrition knowledge among teachers, parents and caregivers are two objectives of the 2005 provincial healthy eating strategy Healthy Eating Nova Scotia (HENS) (37). HENS is a strategic planning document which guides Nova Scotian policy makers in a global effort to reduce chronic disease through improved nutrition. School gardens show promising healthy eating results (19, 25) and capacity, or skill building potential (22).

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Consumer alienation from food sources and loss of food production and preparation skills over the past 60 years, as a result of an increasingly centralized or industrialized food system, has negatively influenced human and environmental health (38). School gardens may play a role in reconnecting school staff, parents and students with food and providing opportunities to develop food knowledge and skills around production and preparation. In doing so, they may play a role in reversing the current trends towards more positive human and environmental health outcomes.

However, critiques of small scale, community and food based nutrition programs (such as school breakfast programs) provide evidence that these types of programs run the risk of disempowering parents (39) by institutionalizing child feeding responsibilities and undermining the larger need for centralized poverty reduction strategies (40). While school gardens hold potential to empower families through food system education, skill building around food production and parental involvement with their child's learning, as a single community food security (CFS) strategy they do not overcome the need for centralized strategies (i.e., that includes national policy supporting the development of individual, household and CFS), that address CFS in the long term.

One of the challenges to a centralized CFS strategy is that CFS is a relatively broad, new concept that encompasses a diverse network of ideas and actors (e.g., rural and urban consumers, producers, health professionals, policy makers, etc.). The concept currently lacks a clear and agreed upon definition, set of measurable indicators and conceptual framework (41, 42). However, in recognition of the importance of CFS, Dietitians of Canada (DC) released a position on CFS (9) which helps bound and define CFS for research and practice. For the purpose of this thesis research Hamm and Bellow's

definition of CFS (and adapted by DC) is understood to “*exist when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for all*” (Slater, 2007, p. 2) (9, 10).

School gardens are recognized as one aspect of building food secure communities in Canada (9). While school gardens provide an array of benefits and opportunities, challenges to sustaining garden projects at schools abound (21, 34), and a significant amount of research is necessary to establish the place of popular programs (43) like school gardens in promoting health (21, 22, 24) and CFS (41). Though school gardens have theoretical potential to contribute to CFS, to date no research is available that explores in depth how school gardens themselves can play a role in building food security in the school community, or the costs associated with these potential benefits.

“That is [to say], the outcomes for which there is anecdotal or limited empirical support make conceptual sense; there are solid rationales for how school garden programs may exert such effects. It is uncertain, however, whether current school garden models are powerful enough to actually promote these effects.” (Ozer, 2006, p. 14) (22).

This sentiment mirrors that of Anderson and colleagues who recommend that in order to develop a usable CFS theory, assumptions about CFS policies and programs (such as the benefits of growing food in schoolyards) need to be evaluated (41). It is also reflected by Williams et al., who challenge health promoters to critically assess seemingly ‘wonderful’ programs (43) – a valid step before making health policy recommendations.

This study seeks to help fill in the knowledge gaps around the role of school gardens in building CFS, drawing on the experiences and observations of the school community

members at a rural Nova Scotian elementary school garden project. The school that is the subject of this case study, “River Valley Elementary School¹”, (referred to hereafter as River Valley) is a small school with approximately 200 students situated in an agricultural region of Nova Scotia. The garden at this school includes six planter boxes and one large bed – enough garden space to grow food for some special harvest events, but not to supply the cafeteria with food regularly.

1.2 *Research Questions*

Given the potential of school gardens in building CFS, the calls for further evaluation of CFS strategies and the need to better understand the dimensions of CFS for different communities, this research explored the value of school gardens in advancing CFS using a case study approach. More specifically, this research explored, from the perspective of the school community and public health practitioners: 1) any health, social and ecological effects of this school food garden, and 2) what factors contributed to producing these effects.

1.3 *Boundaries of the Inquiry*

The purpose of this study was to explore, from the perspective of the River Valley school community, actual and potential CFS related effects of the school food garden and what factors contribute to these effects. Effects were explored in the context of how this school food garden contributes to CFS at the school level, and the role of the school in advancing CFS in the larger community.

¹ This pseudonym was used to represent actual school name to protect the identity of the school and members of the school community.

As with qualitative, single case studies this study does not seek to generate universal conclusions applicable to all school gardens. However, it is my hope that the findings and interpretations will be described in sufficient detail to allow the reader to discern transferability. I anticipate that findings will be most applicable to the rural, Nova Scotian setting and useful in the broader study of CFS and school gardens. However, as this study was funded as health policy research, interpretations were made on a theoretical level pertaining to a broader audience that will be discussed in *Chapter 6*.

This thesis will not identify or address the full range of barriers to school gardens and needed resources unless pertinent to the findings or discussion of this research. These have been summarized elsewhere (42). Finally, as a case study, this study does not seek to provide authoritative conclusions about school gardens' full health, environmental, economic or social effects, which would require a much larger and longer-term course of research. These effects are considered only in their context – exploring CFS within the setting of rural elementary school.

Chapter 2: Review of the Literature

This literature review will describe schools as a setting for health promotion; give the reader a background on food security; provide an overview of the peer reviewed research and grey literature supporting the potential health, social, ecological, and economic benefits associated with school gardens; consider gardens in the rural-specific context in which the elementary school that is the focus of this case study is situated; and summarize challenges to school gardening. Finally, the literature review aims to summarize the potential of as well as challenges to school gardens as a strategy for building school level CFS.

2.1 *Schools as a Setting for Health Promotion*

There is a strong argument supporting school based health promotion, and with food security recognized as a social determinant of health (44, 45), perhaps also school based food security promotion/education. At schools, health promoters have a captive audience. Students spend a large portion of their waking hours at school, and “*the breadth of activities that students engage in during this time, including learning, playing, eating and socializing provides a diverse array of controlled environments in which children can learn, practice and be reinforced in making healthy decisions*” (Boutlier, p.89) (46). According to Bandura, ideally, health promotion integrates the school, home, community and society at large (47), utilizing inter-setting reinforcement to strengthen health messages between the classroom, lunchroom, playground and beyond.

The Health Promoting Schools Program is a provincial project operating in the regional school board to which the case study school belongs. This program currently

focuses on facilitating physical activity opportunities for all students, and ensuring a nutritious school food culture to contribute to chronic disease prevention (48) using a similar approach to the Multiple Component Approach to School Health Promotion. This approach described by Boutlier et al., involves the school environment (physical activity opportunities, health and nutrition services, health education, role modeling, and school culture), as well as parental and community components (46). This model integrates health into the school environment and views health and learning as mutually beneficial. That is to say, healthy children learn better, and educated individuals are healthier.

The concept of student participation is discussed in the health promoting schools literature (49). Jensen et al. discuss genuine student participation as learning opportunities where students are part of constructing knowledge that is relevant to their context, and the learning environment is flexible to accommodate divergent learning outcomes. That is not to say that the outcomes are unclear, but that teachers are trained to guide and foster *emergent* learning, which in the case of school gardens refers to the active construction of knowledge that occurs through interaction with the garden itself (through activities), with other people in the garden, and from reflection on experiences in the garden (49). Garden environments, and the experiential nature of youth garden programs, have shown promise as settings for emergent learning opportunities (26). It is reasonable to believe then, that school gardens as settings for emergent learning opportunities in health is worth investigation.

2.2 *Food Security: Concepts and Promising Strategies*

Food security is a prerequisite for disease prevention and health (50), and is a recognized social determinant of health (9, 44). McIntyre describes it as more than just a

determinant of health, but also a determinant of dignity, progress, justice and sustainable development (51). There are several levels at which food security can be considered, including global, national, community, household or individual (40), and cultural (52), and at least as many definitions of food security, which differ according to organization and region. Food security can be defined as a condition when an individual or a community has access to sufficient, nutritious, safe, personally acceptable and culturally appropriate foods that are produced, procured and distributed in ways that are environmentally sound, sustainable, and socially just (8). Accordingly, there is a need for ecological and economic integrity as well as social equity in policy and programs that address food insecurity, a position supported by Dietitians of Canada in their position on CFS. Community food security exists when all community residents obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for all (9, 10). This definition, and the social movement that works towards CFS, puts sustainable food systems at the centre of food security and emphasizes self-reliance and equity in food access. *Individual and household* food insecurity refers to income related food insecurity, which is linked (as is food insecurity in general) most strongly with inadequate financial resources (7, 40). Therefore efforts to alleviate household food insecurity are focussed on more centralized strategies such as federal social safety nets (53, 54), underlying poverty (40), and multisectoral policies that support overall food security such as transportation policies (7). To date, household food security is the only measure of food security in national population surveys (55).

While the small-scale and community based nature of school garden programs makes them inappropriate as central strategies to address income related food insecurity (40, 54), available evidence suggests that they play an important role as a *setting* for building CFS. School gardens have a food systems focus in that they are used primarily as tools for health and environmental education. In addition, some school gardens may have the potential to contribute to individual or household related food security (financial access) if they have the ability to provide free, fresh food to children at school (56, 57). While recognizing this potential, for the purposes of this research I will focus on the concept of CFS when considering school gardens as a strategy for building food security because of its central focus on sustainable food systems.

The CFS definition is perhaps more challenging to use because though it is conceptually rich, it is methodologically weak (41). To date no accepted standard measure or set of indicators exist to assess CFS, though the DC position statement on CFS proposes a number of potential indicators, two of which are *the number of (community) gardens/gardeners, and the number of school garden or hydroponics projects/students involved*. This research will help determine how school gardens play a role in CFS.

Another weakness of the CFS definition is that there is no agreed upon definition of 'community' (41). In this research, 'community' will be defined as the people within the school community boundaries, including students and their families, staff, administration, school volunteers, and others who have roles and responsibilities directly in contact with the school. Nor is there an agreed upon central theory or framework to underpin CFS (41). The framework applied in this research will consider qualitative measures of CFS in

relation to Garret and Feenstra's model of a sustainable community food system (16), which captures the underlying role of ecological health, economic vitality, social equity and human health (9). In framing interview questions and observations around this model of sustainable community food system, this research will contribute to the understanding of CFS at the school level. This will also inform what is known about the role that school gardens play in advancing CFS within a larger community.

While there is no agreed upon measure of CFS, community food system assessments, a tool for CFS planning (16, 58, 59) have been used by communities such as the city of Vancouver (59) to identify existing resources, programs and policies pertaining to food CFS strategies discussed below in this section (60). Community food system assessments also help identify gaps in CFS strategies and areas for action within a community (59). Though community food system assessments provide a promising tool for CFS planning, they have not provided validated measures for measuring CFS. We do not know the degree to which our current food systems support ecological and community economic vitality, social equity and human health, each important to sustainable community food systems (16).

Strategies to build CFS have been categorized into one of three broad types of strategies on a continuum: 1) initial food systems changes, which include short term initiatives such as educational efforts around CFS; 2) mid term, food systems in transition strategies, which involve building networks for change, such as community gardens; and 3) long term food system changes which influence policy to work towards a sustainable, equitable food system (9, 60, 61). School gardens can fit within the continuum of CFS strategies at any of the three stages (42). School gardens can be small, demonstration and

education gardens (short term), though they are often part of a larger community network that builds capacity (mid term) to understand and participate in CFS (9, 62). They could also be one piece of a larger school or board level sustainable food procurement policy as is the case in some school boards in the United States (63). While Canadian examples of the inclusion of school gardens within school or board level policies could not be found in the published, peer reviewed literature, Evergreen² (64) has recommended their inclusion within the framework of provincial and school board wellness policies. This was one of three strategic directions on the future of school food gardens, identified by Evergreen and documented in *Growing Healthy Food on Canada's School Grounds* (64). To date, Evergreen has not been able to sustain efforts in integrating gardens into wellness policies due to a lack of financial resources (65).

In part because of the newness of the concept of CFS and a lack of validated indicators discussed above, published research on CFS in Nova Scotia is lacking. Published research on food security in Nova Scotia has focussed primarily on income related, household food insecurity (7, 66-70). Many of the issues of individual and household food insecurity, such as social inequality in access to food, are inextricably connected with unsustainable food systems and ecological issues pertinent to CFS; they are rooted in a capitalist economic system that commodifies food, and in turn marginalizes groups of consumers (the poor) and producers (small scale farmers and fishers) (45). As such, what is known about income related individual and household food security is useful in understanding CFS. The next three sections will provide a brief overview of what is known about food security in Canada and Nova Scotia.

² Evergreen is an independent non-governmental organization in Canada that funds school food garden and schoolyard greening initiatives. See www.evergreen.ca for more information.

2.3 *A Brief History of Food Security in the Literature*

Food systems and food supply issues have been central to the concept of food security, since it first emerged in the 1960's in the international development literature, where sufficiency was the key concern (41). The concept shifted in the 1980's to include access issues (41), which in Canada tended to be primarily an issue of inadequate household income, recognized by the emergence of food banks and school-based child feeding programs (51). In the 1990's there was another shift towards recognizing the complex, systems nature of food security, including the necessity of long term planning around natural resource protection, gender equality and rural revitalization, among others things (38, 41).

2.4 *Food Security in Canada*

The best available data on the prevalence of food security in Canada come from the Canadian Community Health Survey (CCHS) Cycle 2.2 (Nutrition). CCHS is a cross sectional survey collected biannually (71), however, detailed, peer reviewed report of food insecurity in Canada from CCHS 3.1 has not been released yet, so the following statistics come from CCHS Cycle 2.2. The CCHS Cycle 2.2 (collected in 2004/05) focussed specifically on dietary intake and related factors, including food security, and sampled 35,107 Canadians of all ages (76.5% response rate) in all provinces. Excluded from the target population were full time Canadian Forces members, those who lived in the territories, on First Nations reserves or on Crown Lands, those in institutions, the homeless or those in very remote areas. According to the CCHS 2.2, a conservative estimate of the number of Canadian households in 2004, where either adults, children, or

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both, experienced moderate or severe income related food insecurity is 1.1 million or 9.2% of households (71). In 2004, households with children were more likely to experience food insecurity (10.4%) than those without (8.6%) (71). Of these households with children, 5.2% had at least one child living in it who experienced food insecurity as opposed to being buffered by parental food insecurity. It is well documented that in food insecure households, parents may deprive themselves of food in order to ensure that their children have adequate food (71, 72). When three or more children were living in the household, both parents (13.9%) and the children (8.6%) were at a higher risk for experiencing food insecurity compared with families with less than three children.

Income related food insecurity is more prevalent in urban areas of Canada (9.6%) than rural (7.3%) (71), however rural food insecurity may be underreported. We know, based on those reporting hunger in the National Longitudinal Survey of Children and Youth (1994) (73) and food insecurity in the National Population Health Survey (1998/99) (74), that only one quarter to one third of those who report household food insecurity use food banks, and qualitative research suggests that this statistic might be lower in rural areas (75). Moreover, more than half of food banks in Canada are located in rural areas, and these food banks are facing food shortages (76). The Canadian Association of Food Banks (CAFS) highlights social and economic vulnerabilities of living in rural areas, such as lack of access to social supports and transportation, as well as limited employment opportunities, as key factors contributing to the existence of hunger (or income related food insecurity) in rural Canada (76).

2.5 *Food Security in Nova Scotia*

In Nova Scotia, a body of research on income related food insecurity is building, (7, 67-70, 77-79). In 2004 in Nova Scotia, income related food insecurity affected 14.6% of households – the only province where the prevalence was significantly higher than the national average of 9.2% (71)

Other research shows that those at risk of individual and household food insecurity include seniors reliant on public pensions and living alone (79), low income Nova Scotians (69, 70), especially low income lone mothers (80, 81) who often compromise their own nutrition to feed their children (72). Within Nova Scotia, the District Health Authority (DHA) Three (Annapolis Valley) reported the highest level of food insecurity (12.7%), significantly higher than Nova Scotia as a whole (map detailing DHA Three location and borders available from online reference) (82). Moreover, food costing data in Nova Scotia from 2002, 2004/05, 2007 and 2008 showed that the cost of a nutritious diet is significantly higher in rural than urban areas (67, 70, 77, 83).

Food Security is a recognized priority of the Nova Scotia Healthy Eating Strategy, with two objectives: 1) to increase the proportion of Nova Scotians who have access to nutritious food; and 2) to increase the availability of nutritious, locally produced foods throughout the province (84). In addition, increasing the availability and affordability of healthy foods in schools, and nutrition knowledge and capacity of teachers and parents are named priorities in this strategic document (84). At the public school level, these objectives are mirrored in the Food and Nutrition Policy for Public Schools in Nova Scotia (85), which binds public schools in Nova Scotia to maximize the availability of

healthy foods in schools, minimizing the availability of unhealthy foods in schools. This policy also *encourages* schools to, where possible, purchase locally produced foods.

The health of school aged children, as with public health in general, demands intersectoral support (20, 86, 87). Similarly, school level food security, as with food security in general, certainly requires intersectoral support because of the broad social, economic and environmental factors implicated in challenging an individual, household or community's ability to access sufficient nutritious food (9, 87).

2.6 Overview of Peer Reviewed Research on Gardens

Research on school gardens and greening began to emerge in the late 1990's initially with a primarily environmental focus (33, 36). Since 2000, peer reviewed research has expanded considerably beyond environmental education (29, 31) to include nutrition skills, attitudes and behaviours (17, 19, 30, 34, 88, 89), physical activity (30, 32, 90), socio-cultural effects (23, 34, 90-94) and other life skills (27, 90) related to school gardens. Research on gardening with disadvantaged youth (outside of school) has also demonstrated socio-cultural (95) and nutritional (91) potential.

Despite this potential, school gardens are resource intensive; lack of time, funding, and other resources are commonly reported reasons for either not starting a garden, or discontinuing a garden program (17, 23, 34). In rural areas, the challenges to community or school gardens include transportation, as the distances between home and school often requires access to a vehicle (96). Though there is no peer reviewed research on the barriers of school gardening in Canada available, one report which examined best practices and barriers to school gardening in Canada implicates lack of government and

school board support, maintenance and volunteer challenges, teacher turnover and lack of time (64).

Recently, in a cross-sectional study of 1658 parents and their preschool children (aged 2 to 5 years) enrolled in a parent education program, home vegetable gardening was linked to greater fruit and vegetable intake among rural parents and their preschool children (97). Considered together with evidence of an association between participation in school gardens programs and subsequent initiation of gardening at home (98), as well as parental role modelling and children's nutritional habits (99, 100) the case for the importance of parental involvement in school gardens is strong. To date, no published research has examined the role of parental or family involvement on the outcomes of school gardens.

2.7 *Historical Context of School Gardens*

In Canada in the early 1900's, school gardens were valued for promoting and teaching citizenship at school (101). Similarly, in the United States, a surge of school gardening activity occurred during World War I (1917-1919), with the federal government sponsored School Garden Army (USSGA) (102). This program was part of a host of federally funded garden programs that encouraged patriotism and support for the war effort through increased food production in the community and school in a time when the US food system was in "tenuous condition" and "archaic" (Hayden-Smith, 2007, p.22) (102). The US agricultural system lacked the infrastructure to manage the food supply, faced efficiency and labour shortage challenges, and furthermore 90% of the food produced was being consumed in country, while nearly one million American troops were in need of provisions in Europe (102). The USSGA was also seen as a response to

increasing urbanization, a way to foster civic engagement, and reconnect urban and suburban American youth with the food system (102). The federal program was not continued after the war; however, many of these “soldiers of the soil” joined in community ‘Victory Gardens’ during World War II (102) a similar, community based effort for food production during a time of crisis in the US.

The resurgence of school gardens began in the 1990’s, primarily in California, where the Superintendent for Public Instruction called for “a garden in every school” presumably in recognition of the teaching opportunities they provide for sustainable waste management techniques, since legislation was passed granting start up funds to schools to set up gardens with this purpose (22). There are now over 2000 school gardens in California alone (34), and hundreds more in the rest of the US (4, 103). Tens of thousands of schools internationally (103), and at least 129 Canadian schools (14) have school gardens. Some school gardens are found at schools with larger sustainable food procurement practices such as direct farm to school purchasing programs (62), some function as community gardens (93, 96), and others are primarily focussed on academic learning (34).

2.8 *Health Effects of School Gardens*

As noted in the *Overview of Peer Reviewed Research on Gardens*, and in a recent review by Carlsson and Williams (42) school food gardens have been noted in a small body of literature for their value in teaching and promoting physical activity (30, 32, 90), and encouraging positive nutritional attitudes, skills and behaviours in students (17, 19, 25, 30, 34, 88, 89).

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Using a qualitative, single case study design researchers working at an Early Education Program with a garden and greenhouse documented key skills learned by children aged three to six. Data analyzed included teacher's field notes, children's drawings and focus group interviews with 19 teachers. They found that children were learning kinaesthetic and body awareness skills, developing fine and gross motor skills, muscle memory, balance and stability in their gardening activities (90).

In a comprehensive survey investigating the effects of elementary school food gardens on student physical activity, 89% (of 105 teachers, parents and administrators associated with 59 schools) felt that, from their perspective, food gardens provided students of all ages, interests and abilities with diverse opportunities for moderate physical activity (32). A report from the Evergreen foundation, based on these same data, speculated that long term engagement might encourage lifelong physical activity (20). In the same report, 60% of teachers, parents and administrators involved with school gardens felt the garden encouraged students who are normally less physically active to be more active (20). This research supports the notion that school gardens help to promote equitable access to healthy lifestyles for school children that they could carry throughout their lifetimes.

Gardens have the theoretical potential to address two provincial healthy eating priorities in Nova Scotia: 1) to increase the availability and affordability of healthy foods in schools; and 2) to increase the nutrition knowledge and capacity of teachers and parents (84). By growing and providing some free or very low cost produce at school, gardens could increase (and equalize) at school access to fruit and vegetables to the school, lower cafeteria costs, thereby make a small contribution to individual and

household or income related food security. However, research to date has not examined school gardens' impact on household or income related food security.³

In California, one of the most common uses of a school garden is to enhance the nutrition, science and environmental studies curricula (34). Forty seven percent and 45%, respectively, of fourth grade teachers in California surveyed via mail-out questionnaire indicated that they perceived gardens to be somewhat to very effective at enhancing physical activity and healthful eating habits (17). Teacher's perceptions are supported by research which shows that not only are children's knowledge of and preferences for some vegetables improved (18, 25, 91), but so too are vegetable intakes when children are involved in garden programs (19, 25, 30). A quasi-experimental study of garden-based nutrition education involving fourth grade students at three schools demonstrated positive effects on the nutrition knowledge and preferences for not only vegetables grown in the garden, but other vegetables to which children were not directly exposed (18). Focus group research with eight to 13 year old inner city, youth garden program participants and non-participants supports these findings, showing that youth gardening can have a positive influence on food choices (willingness to eat nutritious foods and try unfamiliar foods), nutrition knowledge and cooking skills (91).

The relationship between school food gardening and nutrition is complex and in some cases contradictory (89). In a historical control, 12 month intervention trial (control n=132, intervention n=120) using self-administered questionnaires requiring one word answers and three point Likert scale responses, Somerset and Markwell conducted a

³ This thesis does not argue that school gardens overcome the urgent need for comprehensive poverty reduction strategies (40, 54).

study of a school food garden of the impact on fruit and vegetable attitudes and identification skills. The authors concluded that school based food gardens were associated with skill development conducive of increased fruit and vegetable consumption: enhanced ability to identify and prepare fruits and vegetables, greater attention to the origins of produce (garden grown and fresh), and changes to perceived consumption of fruits and vegetables. Supporting this, in an evaluation study of the Oklahoma Cooperative Extension Service after-school education and gardening program, which included Kindergarten to eighth graders (30), a pre/post questionnaire completed by 43 children showed a significant ($p < 0.02$) increase in the proportion of children reporting that they eat vegetables every day, from 21% before the gardening program to 44% afterwards. However, contrary to the research on inner city youth described in the previous paragraph (91), the authors also reported a *decreased* interest in trying new fruits (89) among grades four to seven students in a low socioeconomic area of Brisbane, Australia. More research is needed to examine the extent to which gardening encourages children to try new, unfamiliar foods.

Finally, there are two studies supporting the presumed corollary to the previous research described – that school gardens do indeed positively influence fruit and vegetable intake in children. In one study that used a non-equivalent control group design, sixth graders ($n=99$) in three different schools completed three separate 24 hour recalls before and after the garden program intervention (19). At the control school, no intervention occurred. Students in the two treatment schools participated in a 12 week nutrition education program, and one treatment group also participated in garden based activities. In this study, the students at the intervention school which included garden

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based activities significantly increased their fruit and vegetable, vitamin C, A and fibre intakes between pre and post testing. No significant increases in fruit and vegetable, vitamin C, A and fibre intakes were seen in the control school or the intervention school without garden-based activities (19). In the second study of 115 second grade students, children in an experimental group participating in nutrition education and gardening were more likely to choose and consume vegetables at lunch time than were children who only had nutrition education, or the control group (25). The authors concluded that this suggests that the gardening component of the study was important in positively influencing vegetable consumption.

Two separate California surveys, however, indicated that many teachers (46%) (17) and principals (55%) (34) felt that the school garden was not effective to slightly effective at enhancing their school meal programs. Teachers and principals recognized the link between the garden and school meal program, but admitted that in practice this link is often lacking, thereby missing out on the chance to possibly influence “changes in dietary habits through students gaining knowledge of the origins of food” (Graham, 2005, p.1799) (17). This link between the garden, dietary habits and knowledge of food systems is evidently one that requires further attention. One program in California, which is exemplary in its attention to this link, uses school gardens as a means of teaching *ecoliteracy* (see definitions) (6), increasing children’s understanding of the biological systems that support and sustain us. Reconnection with our food systems through education, as well as skill building around growing and preparing food is important because changes to our food system over the past 60-70 years have resulted in significant

consumer alienation from the food we eat, and ‘deskilling’⁴ around growing and preparing food (38). Consumer deskilling has tremendous consequences on consumer sovereignty (power over our own food choices), diet and health, as well as sustainability and community economic development (104). Increases in the availability of convenience foods, those that have undergone processing, packaging and transformation from their raw goods state, are stripping consumers of their skills to prepare healthy meals from whole foods at lower cost (104). Food gardens have the potential to play an important part in consumer re-skilling as they put members of the school community in direct contact with whole foods, and provide offer educational opportunities around growing food, food systems and food preparation (if connected with a kitchen/cooking program).

The body of peer reviewed research linking school gardens to physical activity (17, 32, 34, 90) and nutrition (17, 19, 22, 34, 89) is small, but of high quality, providing reason for further research in this area. A weakness inherent in each of the studies is that each school and school garden program is unique in its activities, school environment, and level of integration and community involvement. Results from these studies are difficult to generalize to all school garden programs. This is particularly important when framing school garden research in Nova Scotia. None of the peer reviewed studies discussed above, relating physical activity or nutrition to school gardens, were done in Nova Scotia, and only one of the studies was conducted in Canada (32) in an urban centre. However, survey research done by Evergreen in 2006, which sought input from Canadian non-governmental organizations, municipalities, school boards, teachers and

⁴ The loss of consumer knowledge, skills, and analytical frameworks needed to make informed decisions, and increased distance (in time, space and experience) between consumers and food (104).

grounds staff, in addition to reviewing the literature for best practices in school gardens, and surveying 50 representatives from 19 schools across Canada, has been published in a preliminary report called *Growing Health Food on Canada's School Grounds* (64).

Evergreen reported that 91% of respondents felt that school food gardens foster awareness and appreciation of nutritious food, 89% felt that food gardens provide important opportunities for moderate physical activity, and 63% send produce home with volunteers, staff and students. This research report, though not peer reviewed, demonstrates a good start to investigating the value of school gardens in Canada, and the need for further research on the range and depth of school garden program offerings, level of integration with the community, and how school gardens contribute to health in schools and communities.

2.9 *Socio-cultural Effects of Community, Youth and School Gardens*

Research on community gardening and specifically community gardening with youth shows some promising socio-cultural effects including: relaxation, skill building around food, connection to nature and food security (56); cultural connections (56, 91, 95) and emergent learning opportunities (26, 93). These are summarized briefly here before a discussion of research specific to *school* gardens.

Using depth interviews with 49 community gardeners in Havana, Cuba, Moskow found that community gardening provided gardeners (adults) with an outlet for, among other things, spiritual satisfaction, aesthetic expression and relaxation – both relaxation related to decreased anxiety about meeting family food needs as well as restorative relaxation (56). In this research, Moskow discussed how gardening was important in that

it reconnected many of the Cuban gardeners to their rural past by using skills they had not used in years (and thereby avoiding a loss of food production skills). Gardening also contributed to a connection to nature, ecological enhancement, community enhancement and food sharing, as well as meeting food needs at a time of scarcity (56). In Toronto, a multiple case study of three community gardens illustrated that community gardening provides marginalized groups (mainly immigrant gardeners) with an avenue to participate in politics (part of food system transformation), access culturally appropriate foods, assert their identity and engage in citizenship (105).

Community gardening projects with youth have shown promise in helping to develop social skills, and individual and cultural awareness among inner city (91) and Native American youth (95). A program created specifically for Yaqui (Native American) youth in Tucson, Arizona, who typically lack roots in their community, feel out of place at schools, and most often drop out, had the youth plant a native species garden which the authors observed provided youth with hands on vocational skills, cultural knowledge and community connections (95). Another study of an eight week, inner city, youth, summer gardening program describes the value of youth gardening as sites which foster *emergent* learning opportunities in the intersection of science, community and work life (26).

Youth gardening programs are challenging during the school year because of school infrastructure and time constraints. Rahm concludes, however, that there is no reason why they cannot take place, provided that youth are active participants and teachers are able to envision their role as (co-learners) (26). While it is recognized that the teachers' role requires administrative support, it is not clear what specific supports are needed.

Classroom-community relationships can also be challenging for schools wanting to engage in school gardening through working with an existing community garden (not on school property). In an ecological study of one such program, teacher attitudes about the children's and community member's ability to garden were often negative and slow to change, even though it was apparent to the researchers that in some cases children knew more than the teachers about gardening (93). Establishing trusting relationships took many months, but showed significant promise in learning outcomes. Negative views of the capabilities of parents (most of whom were living on social assistance, many of them lone mothers) bringing their children to charitable feeding programs, to provide nutritious food at home was also found among the service providers (many of them teachers) in a multiple case study of nine child feeding programs in Atlantic Canada (39). Drawing from the experience that trusting relationships required time to develop, and Ozer's argument for the community capacity and collective efficacy building potential of school gardens (discussed later in this section), school gardens may provide opportunity for parents and community members of all socioeconomic backgrounds to engage with teachers over a longer period of time. This will help to establish trusting relationships and hopefully dispel negative assumptions about food related skills among community members.

The research on community and youth gardens is helpful in informing what we know about the socio-cultural effects of school gardens as the body of peer reviewed research specific to the socio-cultural effects of *school* food gardens is small. What is known relates to their usefulness for teaching children with behavioural issues (89, 94, 106), encouraging cooperative play (27, 90, 94) and developing self esteem or self

understanding (27, 28, 90). In a study using face to face interviews with teachers responsible for 12 schools with a school food garden in the Brisbane area, Australia, Somerset et al. reported perceived improvements in self esteem and confidence of children, as well as improvements in disruptive behaviours (28). Faber Taylor et al. found that playing in green spaces generally benefits children with attention deficit disorder (ADD). Using both within and between subjects comparisons, parents were surveyed regarding their child's attention functioning after activities in several play settings. The authors found a positive correlation between the level of "green" of the play space and improvement in ADD among children (106).

In the same qualitative, single case study that found children aged three to six were learning kinaesthetic and body awareness skills, researchers at a US Early Education Program with a garden and greenhouse found that school gardens also encouraged cooperative learning and play, learning to share, negotiate, resolve conflicts, and interact and collaborate with adults (90). In addition, the authors found that children developed an array of intrapersonal skills such as self confidence, pride and self efficacy as a result of their involvement in the garden and greenhouse activities.

The social dimension of peace in relation to green school grounds arose in the recent research of Dymont and Bell (2008). They document that students learning and playing on one of 45 green school grounds in Canada were perceived by adults (administrators, teachers and parents) as being more civil and cooperative than prior to the greening of the schoolyard. Reports of aggressive behaviours at school also decreased and the behaviours of students with behavioural challenges improved (94). In this study, one principal also perceived the trees, plants and bushes as contributing to a more peaceful schoolyard (94).

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Robinson and Zajicek found that regardless of age, gender and ethnicity, school gardens help children develop life skills that are transferable to success at school and beyond (27). Using an experimental, pre and post test design that assigned children to either a treatment group that participated in the garden program or a control group that did not, the authors found that the treatment group significantly ($p < 0.005$) increased their overall life skills scores, and in particular, their scores for working with groups and self understanding compared with the control group (27).

School gardens were thought of in the first quarter of the 1900's as important tools for citizenship education in public schools (Osborne, 2000, p.1) (101). It could be argued that the social skills that children are learning at schools with gardens and green playgrounds discussed above (cooperation, non-disruptive behaviour, working with groups, learning to share, negotiate, resolve conflicts, interact and collaborate), are integral to their development as functioning citizens. Currently, the elements of citizenship education that are generally agreed upon include an acceptance of social values (101). Social values may differ depending on context, but Osborne, borrowing from Spicer (107), offers several core Canadian social values that include: equality and fairness; respect for minorities; consultation and dialogue; accommodation and tolerance; compassion and generosity; respect for Canada's natural beauty; and respect for Canada's world image of peace, freedom and non violent change (101). These core social values overlap with many of the socio-cultural effects discussed previously (e.g., positive behavioural outcomes (89, 94, 106), cooperative play (27, 90, 94) and self esteem or self understanding development (27, 28, 90), indicating that school gardens still contribute to citizenship education a century later, in very different times. This is supported by a

comprehensive review of the literature on school ground naturalization, conducted by Evergreen Canada in 2000 (24), which described schoolyard greening projects that involve students in democratic decision making as providing a chance to participate as citizens (or agents) in the creation of local wisdom, social capital and community health.

As with community gardeners in Toronto (105), students who develop an interest in gardening in school may also be more apt to exercise citizenship as adults through their food choices and through community gardening. Cook, Crang and Thorpe suggest that food choices are both personal (individual tastes) and public, part of citizenship nationally and globally (108). Others suggest that through participating in community gardens in Toronto, a diverse population of immigrants have been able to participate publicly and express citizenship through stewardship of their communal land (105, 109).

Strengthening the small body of peer reviewed literature on school food gardens, project reports and other grey literature exist that show promising socio-cultural outcomes of school gardens. Research supported by the Public Health Agency of Canada demonstrated that green schoolyards foster cooperative play and civil (i.e., polite) behaviour through diversified and peaceful play spaces (20). Early findings from an evaluation study on the Edible Schoolyard, a school garden in California, suggests trends in improved psychosocial adjustment on a standardized student questionnaire; however, these findings have yet to be published (35).

In a review of the literature on school gardens, Ozer (2006) discusses the anecdotal evidence, gleaned from project reports, websites and interviews with garden coordinators, that favours school gardens for their positive influence on child psychosocial development, motivation to learn, achievement, engagement and cooperation with peers

(22). She also uses the community gardening literature to reason that school gardens may increase the nutrition knowledge, capacity and collective efficacy of students, teachers and parents (22). In this case, Ozer defines community capacity as the “knowledge and skills that the community can draw on to address issues of common concern” (Ozer, 2006, p.12) and collective efficacy as “a group’s shared belief in its capabilities to act together to achieve desired outcomes or goals” (Ozer, 2006, p.12). Ozer points to a study based on community gardens that emphasized their capacity building effects (98) and the opportunities for cooperation and conflict between members of the school community that garden programs by nature provide, to ground the theoretical potential of school gardens in building community capacity. Examples of the capacity building qualities of school gardens provided by Ozer include: strengthening the school community, collective efficacy and social networks; involving parents in the school; and creating stronger ties between the school and community.

In addition, Ozer discusses how school gardens may have positive social impact on the school culture, fostering pride and ownership in the school, while creating a safe place for groups of children, and can help to engage parents that are not typically involved with the school (e.g., with sports or fundraising) (22). Again, engaging parents is particularly promising because of the strength of parental role modelling in children’s eating behaviours (100), and in light of the evidence that some types of institutionalized children’s feeding programs run the danger of excluding parents from their children’s nutritional needs (39). Parental exclusion from feeding their children through institutionalization undermines autonomy, creates dependence and is disempowering especially to those who need it most (39). Engaging parents with school gardening

activities broadens the capacity building effects and encourages interactions between the school and home.

2.10 *Ecological Effects of School Gardens*

School gardens impart ecological benefits in two ways, through education (initial) and through (transitional) food systems changes. The biophilia hypothesis asserts that children's innate love of nature is biological. Biophilia refers to the fundamental, genetically based, human need and tendency to affiliate with other living organisms (3). Because children are drawn to living things, and because of the need for environmental awareness and stewardship (globally recognized in the face of ecological crises such as natural resource depletion and global warming), teachers have for decades been finding creative ways to incorporate experiential, environmental education into the classroom. School gardens are one example of this.

Some schools have designed gardens specifically for environmental education, for example the school garden at Oak Grove in Ojai, California, which employs the principles of permaculture in all school gardening projects (13). Permaculture is a design philosophy that seeks to mimic nature's patterns and relationships (13). School gardens have been shown to positively influence children's environmental ethic (29, 31) and are used to teach ecoliteracy, or to engage in systems thinking modelled on observations from nature (36).

In the Toronto District School Board, 90% of parents, teachers and principals who participated in a survey investigating the influence and potential of green school grounds indicated that student stewardship and environmental awareness increased in children

attending schools with a green school ground (21). Environmental awareness included awareness specific to food systems, as reported by one teacher: "...I have seen young children picking and collecting ripe tomatoes, gazing in wonder at 15-foot sunflowers and picking beans off the vine. In some cases, students became more familiar with other organisms, as they held worms and insects in their hands..." (Dyment, 2005, p. 37) (21). Though this study provides provocative quantitative and qualitative support for schoolyard greening, as a report it has not been subjected to peer review, and it is limited in the context of this thesis research in that the schools involved were from one of Canada's largest urban centres.

It is documented in a recent peer reviewed study that teachers perceived school gardens and greenhouses to be useful for key skill development among children aged three to six. Among a host of other key skills (discussed above under *Socio-cultural Effects and Health Effects*), children at a US Early Education Program with a garden and greenhouse developed an understanding of seasons and lifecycles, learned about plant life, pond life, insects, birds, animals and habitats, respect/reverence for the environment, and developed a sense of ownership and responsibility to become good stewards of the environment (90).

School garden projects also provide food that is more than just locally produced, it has not required any transportation at all. It therefore is far less associated with the production of greenhouse gases or other pollutants, which are inherent in transportation systems today. This is directly linked to sustainable food systems in two ways. First, this direct garden to kitchen connection (or other food consumption activity) provides a great opportunity for experiential learning about food miles (see definitions), and encouraging

a connection with food sources and ecological consciousness around food. Hamelin discusses the importance of this connection, dietetic education, and Public Nutrition in the context of New Nutrition Science⁵ (87). Indeed some evidence shows that school food gardens are associated with student's greater attention to the origins of produce. In a 12 month intervention trial assessing the impact of a school based food garden on grades four to seven student's attitudes and identification skills regarding vegetables and fruit, students in grades four to six attributed *added value* towards vegetables and fruits that were garden grown (89). Second, considering the rising price of fuel (see discussion under *Economic Effects*), it may become important in the future to localize our food systems in order to sustain them.

Though relatively limited, the body of literature supporting school gardening indicates that they show promise for both education and skill building around food systems, and on a very small scale, can directly support local food systems.

2.11 *Economic Effects of School Gardens*

Farm to school programs, as extensions of direct marketing programs (such as urban farm markets), boost farm incomes, especially for urban-edge farmers or those farming around the perimeter of municipal limits (110). Though no peer reviewed research is available that explores the economic effects of school gardens, growing food on school property also has the *potential* to pass economic benefits on to the school, families and a sustainable food system (33, 111); this potential increases with larger projects that have sufficient, dedicated volunteer and organizational support to produce a significant amount

⁵ More detailed information about The New Nutrition Science Project are explored in *Public Health Nutrition*, 8(6A): 2005.

of food. Some school garden projects for example sell produce at a local farm market or within their schools as a way of raising money to support the program or for other school-related goals such as post-secondary scholarships (33).

Schoolyard gardens typically have a garden to kitchen connection, where garden produce goes to the cafeteria to supplement healthy snacks and lunches (e.g., at the Edible Schoolyard in Berkeley, CA (112), and the Screaming Avocado in Stratford ON (113). For these types of programs, the infusion of fresh food from the garden (which the school does not have to purchase) can reduce the raw costs and point of purchase costs to the students. These economic benefits to the school may translate into reduced costs to the household food budget, if healthy, nutritious and affordable foods are available to students at school. On a cautionary note, however, according to Vozoris (114), the contribution of child nutrition programs available at school (breakfast or lunch programs) to the monthly household food budgets of low income Canadians was minimal, at best nine percent for a two parent household. In theory, and perhaps of more importance, students and families involved with school gardens can use skills learned in the garden to grow food at home or in community gardens to reduce their household cost of fresh produce (56, 115).

The value of community or collective gardens in addressing urban food security and regenerating the local food system has been explored in Canada (105) and Cuba (56). The Canadian case studies illustrate the complexity of community gardens as they relate to CFS (and citizenship discussed above under *Socio-cultural Effects*) (105). Though these case studies did not discuss economics per se, Baker suggested that through the acts of gardening (planting, tending and harvesting their produce), gardeners are drawn into

the CFS movement as they create landscapes which offer avenues for participation in the transformation of the food system to one that is more accessible to traditionally marginalized groups like immigrants and people living on low incomes (105).

Urban gardening is a common practice in Havana, Cuba, as a result of promotion by the Ministry of Agriculture in the early 1990's as a strategy to address acute food scarcity problems (56). In depth interviews with 42 Cuban gardeners revealed how gardeners were able to increase food availability for an average of six household members, and to provide food to 10 members of the extended family. During the interviews, the gardeners provided their household income, and an estimated savings per week in Cuban Pesos. Using the average savings (50 Cuban Pesos/week) and the average household income (125 Cuban Pesos/week), the researchers were able to calculate that the harvest had a profound effect on the weekly food bills – an average savings of 40% of the average household salary. Government support for gardening programs and commitment to organic methods was key to the successes in advancing CFS in Cuba (56).

The findings of one mixed method research study of Canadian schools, which explored school greening in relation to socioeconomic status (SES) is particularly important when considering the economic benefits of school gardening are (116). Schools in lower SES communities consistently ranked the school greening initiatives as more *important* than their higher SES counterparts, but felt the *adequacy* of their own greening initiatives was lower. The level of teacher and parental involvement was lower in the low SES communities, and fundraising presented more of a challenge compared with their higher income counterparts (116). These findings raise the question of whether school greening initiatives are reaching the children and households that could most

benefit from them, and indicate that provincial or school board level support may be necessary to ensure equity in access to adequate programs.

School gardens also have economic benefits that have implications in the broader food system. The monthly cost of a basic nutritious food basket for a reference family of four increased 18% between 2002 and 2008 in Nova Scotia (83). In 2007 alone, the global cost of wheat (and other food staples) doubled between May and September (117). Rises in staple foods prices has been attributed to two main factors (111, 117). The first is increased meat consumption in emerging economies. To produce one kilo of beef, for example, requires eight kilos of grain feed; grain that could have provided food for humans (111, 117). The second is the increasing cost of oil. Increasing oil prices have resulted in both an increase in the cost of transportation, which is crucial to our globalized food economy, as well as an increased diversion of food crops to produce biofuels (111, 117).

Rising staple costs are felt throughout the food system, as the products made from these staples also increase in price (111). This has both positive and negative implications for CFS. Food producers benefit from a rise in the cost of staple foods (at least in direct purchasing arrangements) (110), and this rise is a welcome change from the past three decades of steadily declining staple costs (117). The urban poor, however, who generally rely entirely on purchasing as a means of obtaining food, experience increased food insecurity (117). In comparison, for rural dwellers, that generally have more access to land for producing food, increasing food prices are only positive if a household is a *net* producer. That is to say that they produce and sell more than they need to purchase. For most rural households, this is not the case (117). For this population, increasing at home

food production (i.e., gardening) may decrease the household food bills, perhaps even tipping the scale towards net production and therefore benefit. In turn gardening holds the potential to encourage food system localization, which decreases reliance on transportation (and the associated costs), equalizing access to food through decreasing costs.

2.12 *Rural-Specific Issues of School Gardens*

In addition to potential for increasing individual, household and community food security, gardening has shown positive results with increasing overall fresh produce intake for rural parents and their children (97). In the US, fruit and vegetable intake among rural children is lower than the national average (118). In Nova Scotia, the cost of a basic, nutritious food basket, based on Health Canada's National Nutritious Food Basket (1998), is on the whole higher in rural grocery stores than urban (67, 70, 77, 83). Exploratory analysis from 2004/05, however, suggests that some locally grown food, if available, is less expensive than non local food in the grocery stores (67). Rural areas are often scattered with small, roadside farm stands, and home vegetable gardens, making – it would seem – fresh fruits and vegetables more available. It appears then that making fresh food more affordable and available to rural populations by focussing on local food, including that grown at home, is possible. In a study that aimed to identify associations between frequency of eating *home grown* produce among rural parents and preschool children and overall fruit and vegetable intake, it was shown that frequency of eating home grown fruits and vegetables was associated with increased availability of produce, increased preschooler's preferences for them, and positive parental role modeling around eating fruits and vegetables (97). Both parents and children from rural households who

almost always ate home grown fruit and vegetables ate more servings and of higher quality in terms of vitamin A, C and fibre than those from households who rarely ate home grown fruits and vegetables (97). Though the researchers did not specify whether “home grown” was from a home garden, from a neighbourhood farm stand, or other local source, it nevertheless suggests that more attention to local food source awareness and gardening may be worthwhile for dietitians interested in increasing fruit and vegetable intakes in rural populations. Promoting school gardens may be one way to do that; a 20% increase in the number of students who began gardening at home after participating in school garden programs was reported in evaluative research examining outcomes of community garden programs (98).

Parental involvement in gardening may be valuable as parents are responsible for home food environments, including what food is available in the home and as role models (97). Gardening may provide lower-cost access to fresh, nutritious foods, which helps lessen the socioeconomic barriers typically associated with the higher cost of fresh fruits and vegetables from grocery stores. Unfortunately, however, the research on home grown fruits and vegetables supports that of Dymment et al. (116), showing socioeconomic and demographic differences between those who almost always/always ate home grown fruit and vegetables compared with those who rarely/never did so. Those who almost always/always ate home grown fruit and vegetables were more likely to be older, white females with higher education and income. Considering that home grown fruit and vegetables are lower cost than those bought from grocery stores, this indicates that there are other barriers to gardening that need to be considered such as family food culture, knowledge, or time limitations. Also, there were no significant differences between

groups (those who almost always/always ate home grown fruit and vegetables compared with those who rarely/never did so) with respect to weekly grocery expenses (97). It has been shown, however, that community gardeners could save as much as \$475 (tax free) per season (per 720 square foot garden) (115) even in 1989. Almost 20 years later, one family of gardeners at the Quann Garden in Madison, Wisconsin yielded \$563.49 worth of produce over one growing season from an 800 square foot plot (119). This dollar value was estimated by weighing their harvest and applying prices on organic produce at a local grocery, and does not account for input costs; however, it does demonstrate that the monetary contribution of gardening to the household food budget, for those with the time, skill and access to a garden, is substantial. As such, paired with more attention on local foods and gardening, there is a need to work with rural parents experiencing household food insecurity to not only supplement the diet but also to replace other foods with more with home grown fruit and vegetables in order to lower food bills.

2.13 *Barriers to School Garden Programs*

Barriers to school gardening identified in the literature by principals (34) and teachers (17) in California include lack of funding (23, 34), space (23), gardening supplies (34), volunteer time (23, 34), a coordinator (23) who can alleviate teacher time and skill constraints (17, 23, 34), and of curricular materials to support teachers (17, 34). In Canada, lack of provincial policy and leadership, lack of support from school board administration, challenges around maintenance and volunteer participation, teacher turnover and lack of time were the central barriers identified in a report based on key informant surveys and interviews with over 50 representatives from 19 schools across 22 school boards across Canada, conducted by Evergreen (64).

School infrastructure and implementation barriers are surmountable, given adequate resource allocation and policy support (as is alluded to in the Evergreen report) (64). However, it is essential to consider whether school garden programs are the most valuable place to allot limited resources to achieve the health, social, ecological, economic and food security benefits discussed in this literature review. There is sufficient reason to proceed with caution, as these types of community based, unquestionably ‘wonderful’ (43), programs may be reaching most effectively the populations who need them least (116) (e.g., wealthier families), disempower the families that could most benefit from them (39) (e.g., families with social or economic barriers preventing them from participating), or undermine the need for broader poverty reduction strategies that do not place onus on those in need (40) (e.g., increasing the minimum wage). Certainly the economic impact of small-scale, community based programs (such as school garden programs) themselves are insignificant (114) compared to broader social policy approaches, but more research is needed to see whether they lead to participation in home gardening (98), which may have nutritional implications on the family (97), or to community gardening, which has much more significant implications for household food security (56, 115) and participation in the transformation of the food system – to one that engages traditionally marginalized citizens such as people living on low incomes (105).

2.14 *The Potential of School Gardens for Building Community Food Security*

To date, the CFS movement has approached food security using a systems perspective (10, 54), which considers a problem from a holistic perspective, i.e., what is happening at multiple levels, including the individual, family, community, society and beyond (10, 120). From this perspective, a school garden is not a total solution; it would

be just one part of creating a healthy environment around, for example, an elementary school aged child. It would not replace other community, provincial or federal level CFS initiatives. In this way, school garden initiatives are recognized by Dietitians of Canada (9) as one strategy on a continuum of CFS strategies for building CFS (60).

Available research to date strongly suggests that school gardens have the potential to positively influence health (19, 22, 32, 89), socio-cultural (27, 28, 33, 90, 93, 94), environmental (3, 29, 31, 90), and economic outcomes (56, 98, 115). In addition, and specific to this research, gardens can be particularly beneficial to rural youth and family nutrition (97, 121).

There is some evidence to support community gardening as a tool for building community capacity to deal with emergency food deficits, economic struggle, and food security (56), which may be transferable to school gardens with respect to supporting and enhancing school level CFS and skill building. Finally, it should be recognized that the trend towards consumer deskilling and alienation from our food source is a major challenge to sustainable food systems, and therefore to CFS (38, 104). Gardens provide an experiential education tool that facilitates emergent learning around food systems, as well as consumer *re-skilling* around growing food.

No research has been done specifically on the role that school gardens play as a strategy on a continuum of CFS strategies (60). How school gardens contribute to CFS (within the school community and a larger community) and what factors are involved remains unpublished. This thesis seeks to inform this research gap.

Chapter 3: Theoretical Framework

Two theoretical frameworks were fixed in advance to guide data collection and analysis: 1) Garret and Feenstra's framework for CFS (16) adapted by DC, and 2) the Ecological Systems Theory (120, 122). This chapter will describe these two frameworks.

3.1 *Community Food Security*

The first research question, which explores the health, social and ecological effects of the school food garden, from the perspective of the school community and public health practitioners, was framed using Garret and Feenstra's framework for sustainable community food systems (16). This framework captures the underlying role of ecological health, economic vitality, social equity and human health in CFS. In light of the sensitive and confidential nature of household economic status, because the garden was not large enough to make a significant contribution to the school food purchasing budget, and in recognition of the limited time line of this thesis project, this research did not actively collect data related to the economic effects of school gardens. **Figure One** shows the adapted model for conceptualizing school gardens in a sustainable food system used to frame interview guides as well as subsequent coding and analysis related to the observed or perceived effects of this school food garden project on CFS.

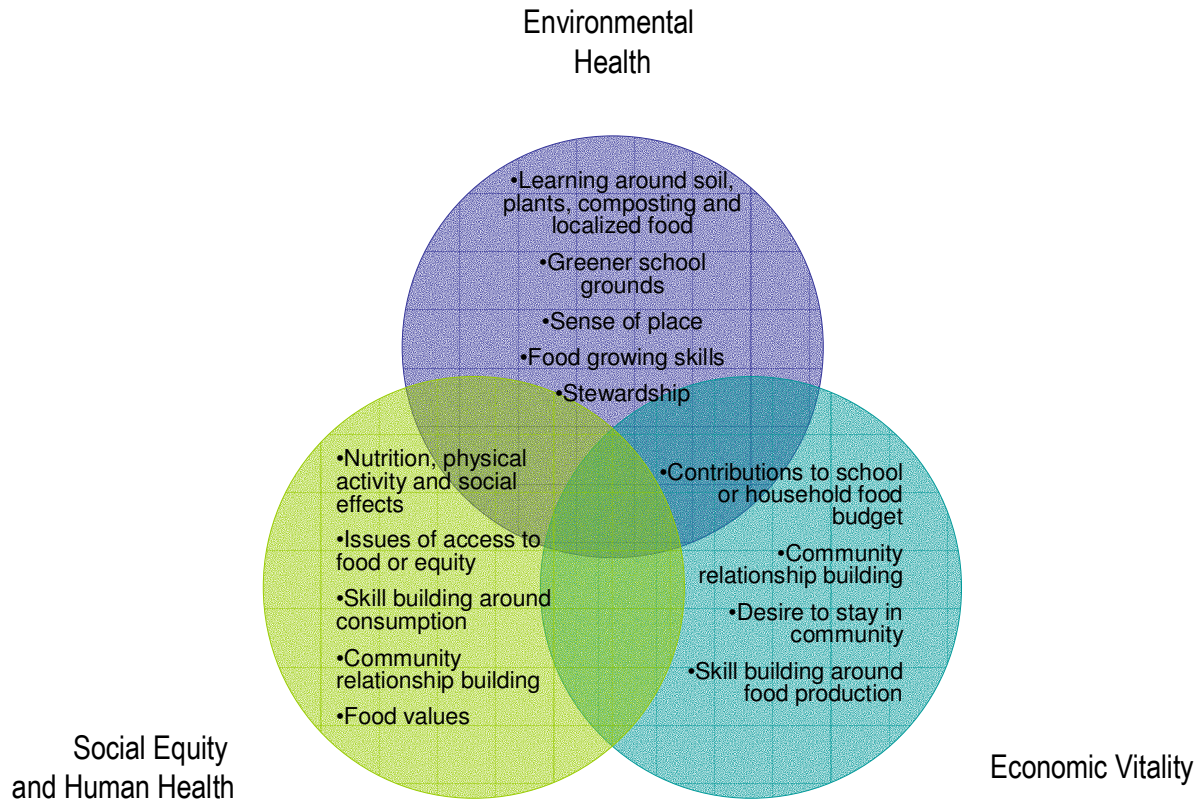


Figure One: Model for Conceptualizing the Effects of School Gardens in a Sustainable Food System: Underlying Considerations for Community Food Security. Adapted from Garret and Feenstra, 1999 (16). Text represents anticipated potential effects, informed by the literature review, categorized according potential contribution to CFS.

3.2 *Ecological Systems Theory*

The ecological systems theory was used not for its original purpose, to guide research in human development, but rather as a framework to organize the contextual factors that are influencing what effects the school garden exerts on CFS. The use of the Ecological Systems Theory in a similar way was done previously by Ozer in her review of the effects of school gardens on students and schools (22). However, Ozer uses this framework to put the effects of school gardens in the context of maximizing healthy development and organizing her findings into proximal (immediate) and distal (potential) effects. Building on the work of Ozer, this research framed the potential factors influencing the anticipated, and subsequently the observed and perceived effects of the school food garden project using Bronfenbrenner's Ecological Systems Theory (120, 122). The Ecological Systems Theory describes five main levels of environmental systems that are integrated and provide context for the system at hand, in this case the school garden. Bronfenbrenner's systems are: 1) the microsystem, which includes the immediate environment (e.g., the school garden), 2) the mesosystem, which is comprised of connections between the immediate environments (e.g., the home, school and garden), 3) the exosystem, which refers to the external environment that only indirectly affects the garden activities (e.g., local public health environment, school board and provincial education policies and funding), 4) the macrosystem, which is the larger cultural context in which the garden lies (e.g., the local food culture, beliefs about curriculum and pedagogy, local ideologies about health, etc.), and 5) the chronosystem, which captures the dimension of time or constancy and change in the external or internal environment (e.g., the global financial crisis or personal development phase respectively). The

chronosystem was a concept that Bronfenbrenner added to an updated version of his Ecological Systems Theory in 1989 (122). Though the original framework guiding data collection used the original Ecological Systems Theory, including only the first four levels, the need to use the later Ecological Systems Theory, including the chronosystem, arose during data analysis, as data pertaining to factors of time and our current ecological and food crises became relevant. **Figure Two** shows an adapted conceptual model of the original Ecological Systems Theory as it relates to the school garden that was used to guide data collection, coding and analysis in this study.

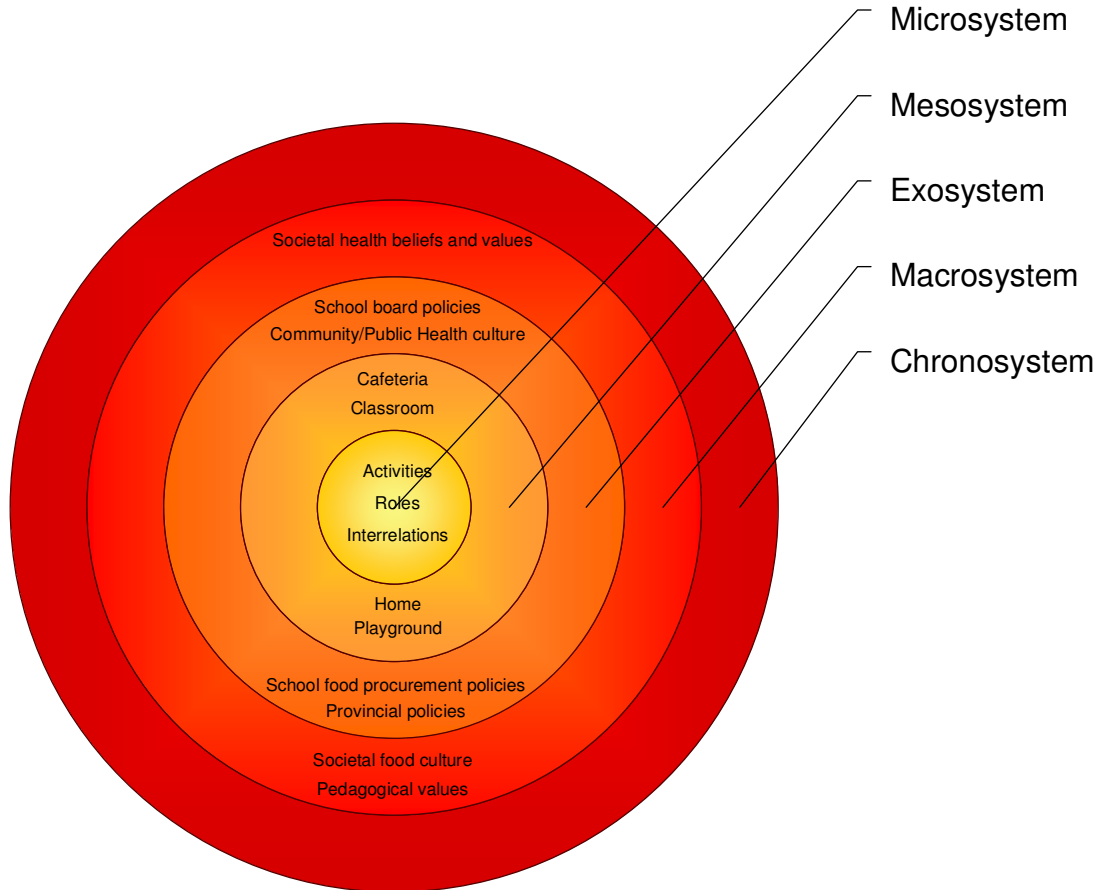


Figure Two: Social Ecological Model of Bronfenbrenner's Ecological Systems Theory Applied to School Gardens. Adapted from Bronfenbrenner, 1979 (120). *Text represents anticipated factors that may influence effects of the school food garden. These were informed by the literature review.*

Chapter 4: Research Methods

This chapter describes the research design applied, and the detailed methods used in case selection, consent, pilot testing, data collection and analysis. Finally, limitations to the study are considered.

4.2 *Research Design*

My thesis research followed a qualitative, exploratory, single case, embedded study design (123) using the River Valley school garden project as the unit of analysis, or case. A qualitative, exploratory approach was chosen for the study because the role of school gardens in building CFS has not been explored yet, and qualitative data offers the advantage of rich description.

Case studies are useful in understanding the specific dynamics of a single setting (124). As an *exploratory* study, the intentions of this thesis research were to observe and discuss with members of the school community the effects of and interactions (or dynamics) in the River Valley school garden, as well as explore the contextual (ecological systems) factors contributing to these effects as they are in the natural setting of the school food garden.

According to Yin, case studies are also appropriate methodologies when the research question focuses on current events or phenomena over which the researcher requires no control and contextual conditions might be highly relevant (123). This research did not aspire to (as Yin described) control school garden environment, though it should be noted that my dual role as volunteer coordinator and research presented limitations around

control over the school garden environment. These are discussed in this chapter under *Limitations*.

An *embedded* case study design refers to the inclusion and analysis of data from different groups of people (e.g.: teaching staff, students, parents, cafeteria staff, custodial staff, etc.) within the school community (referred to by Yin as subunits), as well as the program as a whole (123). Embedded analysis can also refer to different *levels* of analysis (124); in this study the “case” school is examined according to the various systems levels of Bronfenbrenner’s Ecological Systems Theory (120, 122). Incorporating analysis on various systems levels lends strength to this thesis as it helps translate the effects (or dynamics (124)) of the single setting (this case) to other comparable settings (other school food gardens) by providing highly relevant contextual conditions (123).

This thesis research would benefit from a multiple-case design, but because of time and resource limitations investigated only one single case. However, Yin (1994) indicates that a single case design is appropriate where the case represents a unique case. It can be argued that a garden program at any school is unique to its counterparts as a result of differences in implementation models, among other factors (22).

4.3 *Methods*

4.3.1 *Case Selection*

The River Valley school community was chosen as the case using a purposive sampling method, given my previous involvement with the school, described further in

Setting the Scene. “Fairview Elementary School⁶” (referred to hereafter as Fairview) as is another small, public elementary school situated in a rural, Nova Scotian community. Fairview was chosen for the pilot test because it also has a school garden, and because of its similarities in setting, size and population to the case – River Valley Elementary School.

4.3.2 Consent and Ethical Approval

Formal consent was obtained through the school principal and superintendent of schools. In this school board, the superintendent must approve all research in schools, but it is the decision of the school principal to allow research activities to take place within the school. Given my already established relationship with the school, verbal permission was obtained first from the school principal in the winter of 2008, to ensure support for the research. With approval, a letter of request for permission to carry out the research was sent to the superintendent of the school board on March 27th, 2008, which described the research, outlined ethical considerations and addressed how they would be handled (Appendix A). A written statement of permission was returned the following day. Given board permission, a written statement of permission was obtained from the principal of the school on April 2nd, 2008. The approval letters are found in Appendices B and C, respectively.

Ethics approval for the study was granted from the Mount Saint Vincent University Research Ethics Board (UREB). A copy of the Certificate of Research Ethics Approval is found in Appendix D.

⁶ A pseudonym is used to protect the identity of members of the school community and pilot study participants.

4.3.3 Development and Pilot Testing of Instruments

Semi-structured, individual and focus group interview guides were developed in collaboration with my thesis committee, using as guides Garret and Feenstra's framework for CFS (16), Bronfenbrenner's Ecological Systems Theory (120, 122) (described under *Theoretical Framework*) as well as the two central research questions: *1) what are the health, ecological and social effects of the school garden, and 2) what factors contribute to these effects?* One interview guide was designed for children, and its language and content reflected basic questions about their feelings about the garden. A separate interview guide was designed for parents, exploring the effects and contributing factors from the perspective of parents. A third interview guide was designed specifically for teachers, with their involvement and pedagogical perspective in mind. A fourth interview guide was designed for the principal, with a view to gaining a broader systems perspective of the effects and contributing factors involved. A fifth interview guide was designed for health professionals, which had a greater focus on school gardens in general and their role in health. Separate interview guides were designed each for the custodian and Healthy Lunch Coordinator. These were shorter interview guides and focussed on their involvement with the garden, and how it affected them. See Appendix E for copies of the interview guides.

To pilot test the instruments I made initial contact with a community health professional involved with the Fairview school garden, with whom I had had prior contact because of our mutual interests in school gardens. She notified the teachers of the Fairview School Garden Committee of my intent to conduct a pilot study during their

April meeting. Following this, she provided me with names of interested teachers, whom I contacted immediately through the school.

The focus group guide was pilot tested with four teachers at Fairview, and individual interview questions with the community health professional involved with the project. The pilot data from the individual interview are used in the analysis in a few instances where it is applicable (i.e., general to school gardens or rural schools), and adds valuable information to the findings and discussion (e.g., provides contrast between two similar schools with different food garden projects).

No changes to the content of the interview guides were made after pilot testing. Small changes were made to the wording of each question.

4.3.4 Data Collection

Data included transcripts from one focus group interview and 12 individual interviews conducted with members of the school community, field notes and personal reflections, as well as a total of 14 documents related to the school garden. Using several data collection methods strengthens the research by offering opportunities to triangulate the evidence across methods (124) within the case, thereby adding to the credibility of the research (125). Data collection and transcription of recorded interviews, as well as analysis and interpretation took place concurrently. According to Eisenhardt (124), overlapping data collection and analysis speeds the analyses and reveals helpful adjustments to the data collection process. The following section describes the processes of data collection.

Interview Participants and Sampling

Potential participants in the sample were invited to participate based on their belonging in a group from the school community (e.g., parents, teachers, students, etc.), or in the case of health professionals, based on their involvement with school health or food security work. These are described in more detail in the following section.

Participation in all individual and focus group interviews was self selected.

Interview Participant Recruitment

Information letters describing the research and inviting staff to a focus group discussion or alternately individual interview if they preferred were given out personally to staff during three visits to the school during the week of May 5th, 2008 at which time I also gave a verbal explanation of the research. Staff recruitment was done this way because prior experience has shown me that in-person contact is the most effective way of communicating with staff members when a response is needed.

I contacted parents by telephone to invite them to participate in an individual interview, using the telephone list of garden club members as well as the telephone book to find known parents of non garden club members, in June, 2008. Parents were also invited to ask their children if they were interested in doing a separate interview, following their parent's interviews, at the same location. Specific community and public health professionals from the local county and Nova Scotia were also invited to participate in interviews through phone calls.

Parents, students and health professionals contacted by phone were given a verbal description of the research, and upon meeting, were given the letter of information and

informed consent form, which was again reviewed verbally prior to the interview. All interviewees were made aware that they may leave the interview at any time or refuse to answer any questions at no consequence to themselves.

Interview Data Collection Process

Five of the eight teaching staff invited agreed by May 8th, 2008, to participate and provided dates and times that they were available during an agreed upon follow up telephone call. An interview was scheduled on May 12th that accommodated as many teaching staff as possible; a total of four – two teachers and two educational assistants – participated in interviews. One teacher was actively involved in using the garden in classroom activities, one teacher and the educational assistants used the garden on a casual, occasional basis with their students. Given my knowledge of the collegial relationship shared between the teachers and educational assistants, I did not feel that position or power issues would influence the responses of either teachers or educational assistants.

The principal, lunch program coordinator, and custodian also accepted invitations to participate in individual interviews. These interviews were scheduled on June 30th, July 1st and 7th, respectively, after school had finished for the year.

Parent and student interviews were conducted over the summer, making it difficult to coordinate a focus group, as originally planned. I called six families of garden club members and reached four, three of which accepted (in one family, both parents accepted, for a total of four parent interviews). In the first family, I interviewed one parent followed by one interview with two sisters on July 30th. In the second family, I interviewed two

parents together, followed by one daughter, on August 8th. Two families known to me that did not have children participating in the garden club were contacted. One parent agreed to an interview, but her daughter was not interested. I interviewed this parent on July 14th.

After two student interviews (total of three children), it became clear that interviews were not an ideal strategy for collecting information from students. I sensed that their answers were perhaps too predictable and short to contribute to my research needs. In consultation with my thesis committee, I decided to use an upcoming book writing activity with the children as an opportunity to collect information from students. Flexible and opportunistic data collection methods are invaluable to case studies, according to Eisenhardt (124) as they allow the investigator to take advantage of unforeseeable opportunities and emergent themes unique to the case. This book writing activity is described in this chapter under *Document Review*, and proved to be very valuable in gaining insight into how the garden was affecting the students.

Two health promotion professionals involved with the local school board and Health Promoting Schools Program (described under the *Review of the Literature: Schools as a Setting for Health Promotion*) were interviewed, one of whom had completed a teaching practicum at River Valley in 2006. One health professional working at a provincial policy level was also interviewed to gain a broader political and cultural perspective of the factors that influence this school garden. These interviews were conducted in August, 2008.

All interviews were recorded using a combination of field notes and/or audio recordings. On two specific occasions, with a school staff member and with two parents

(in the same family, interviewed together), the audio recorder presented a barrier to the comfort of the interviewee, and I found I got better information after it was turned off, or recognized the inappropriateness and chose not to use it.

All focus groups and interviews with school staff took place on school property. Interviews with parents, students and key informants took place at a location convenient to the interviewee. Interviews with adults lasted approximately one hour and with students, twenty minutes.

All participants, including the students, were given the opportunity to review transcripts of interviews or focus groups in which they participated. They were told prior to the interview and given the opportunity again afterwards to let me know if they wanted to review transcripts for accuracy and/or review my interview notes. Participant review of interview transcripts or summaries so that they can confirm the credibility of the information is one form of member checking, a process of establishing credibility in qualitative research (125). None of the participants in this thesis chose to review interview transcripts or notes; however, throughout the interview, I regularly reviewed my interview notes aloud to the interviewee to check that I had captured their feedback accurately. This process served as a form of immediate member checking.

Participant Observations

In addition to focus groups and individual interviews I acted as a participant observer in May/June (planting) and September/October (harvesting) of 2008 during, at a minimum, weekly visits to the school to lead garden club activities. I also acted as a participant observer during several classroom activities (e.g., food miles lesson) with the

grade five class. The two days that I participated in the book writing activity were also documented in my field notes as participant observations and subjected to the same analysis process as other field notes. In addition, I kept a journal of field notes and reflections to track the context of the observations. Creswell and Millar describe researcher reflexivity a key procedure in establishing validity or credibility in the critical paradigm (125). Prior to school visits, I wrote out a plan for each activity including dates, location of the activity, goals and materials needed. After each visit, I kept notes on what was accomplished and any personal reflections on the activity. These field notes and reflections were hand written and contained in one journal.

Document Review

To collect informative documents, I reviewed all documents in my own files (both electronic and hard copies) from 2004 until present, asked the school principal to provide me with any school documents and any of her own personal documents that refer to the garden. Documents with any content pertaining to the school garden were collected by the school principal; only those that contributed to the purpose of the study were included (n=13). Document review included: two pieces of media coverage, four information notices that went home with students, three excerpts from meeting minutes and memos, a book written by the children (described below), the staff handbook, two funding proposals/requests relating to the garden, and a paper written by the principal as part of her coursework for a Masters of Education program. The process of document collection, selection and review began in May and ended in September, 2008.

In September, 2008, a Family Literacy Facilitator worked with students from the garden club to produce a collectively written book that captured garden club members' reactions to and experiences in the garden through photographs and captions. I was present for the activity, but did not facilitate it. This activity took place over two, one and a half hour periods after school. Students were asked what the garden means to them, what they like about the garden, and what they like to do in the garden. In the garden, students were asked what they hear, smell, see and feel. Responses were recorded and the students chose the ones that they felt represented the group best. Existing photographs from garden related activities were used to represent the student responses, which were recorded as captions to the photograph. Where no picture captured the students' reactions, new photographs were taken and used in the book.

In lieu of further student interviews, the content of this book was used to capture students' experiences in the garden. A reproduction of the content of the book is found in Appendix F.

4.3.5 Analysis

Data analysis involved within case analysis, where data were analyzed and triangulated between data collection methods (e.g., interview data, document review and field notes) within the case (126). The process of triangulation, as mentioned under the section in this chapter called *Data Collection*, is one approach used in this thesis to establish credibility. Peer review is another. Similar to member checking, which transfers the process of establishing credibility to the participants of the study, peer review is a process of establishing credibility by reviewers external to the study but familiar with it

(125). A peer reviewer “*provides support, plays devil’s advocate, challenges the researchers’ assumptions, pushes the researchers to the next step methodologically, and asks hard questions about methods and interpretations*” (Creswell and Millar, p.129)

(125). My thesis advisor acted in this capacity for me, as an external peer reviewer, familiar with the study.

True to the Garret and Feenstra’s (16) and Bronfenbrenner’s (120, 127) theoretical frameworks applied, data analysis took into consideration the broad concepts contained in CFS and contextual factors influencing the garden project.

I did some initial hand coding on interview notes, field notes and reflections during data collection to ensure that the interview guides were gaining valuable information to the study purpose. Full data coding and analysis took place after I had completed the transcription of the interviews.

Analysis of Interview Data and Documents

The qualitative analysis software program, MaxQDA 2007 (copyright 1995-2007, Udo Kuckartz Berlin), was used to organize and manage interview and document review data, with the exception of the book written by the students, because its file type (Microsoft Word document) was not compatible with MaxQDA import capabilities, which requires documents to be in Rich Text format.

A content analysis of all data imported into MaxQDA was done using the coding functions of the software to group data according to the categories set out by the two frameworks. Data relating to the effects of the school garden were coded according to four groups: general effects, effects on environmental health, effects on human health and

social equity, and effects on economic vitality. Data relating to factors contributing to these effects were grouped according to five categories: microsystem, mesosystem, exosystem, macrosystem and chronosystem factors. Two separate categories were given to data relating to specific resources needed (Resources), and to interview feedback on what an ideal garden (Ideal Garden) would look like. The book written by the garden club students was subjected to the same content analysis, by hand on a hard copy.

During the coding process, I made memos attached to quotes I felt captured possible sub-code categories. Later sub-coding was done by hand, in my field notes journal and transferred into Microsoft Word during the writing stage. Sub-codes were created in MaxQDA after the writing process had begun to facilitate peer review of the research process. These codes and sub-codes were then used to inform a deeper level of analysis across sub-codes.

Analysis of Participant Observations, Field Notes and Reflections

Field notes and reflections were neither entered into electronic format, nor imported into qualitative analysis software, MaxQDA. After the coding and sub-coding process, participant observation field notes and reflections were compared with the codes and sub-codes already created and used for triangulation of the data – to affirm or negate concepts raised through interviews or document review. Where useful, field notes were then included in the analysis.

4.4 *Limitations*

Considered in the context of exploring CFS, my inquiry is restricted in its future transferability by limitations of the emerging understanding of the concept of CFS,

described by Anderson as the lack of definition of community, the lack of indicators, and most importantly, the lack of agreed upon framework (41). Eisenhardt also describes theory built through a case study approach as particularly valuable for new research areas, and those where current theory is lacking (124). While the purpose of this thesis was not to create new theory, it was my hope that in borrowing from the still developing concept of CFS, I can in return contribute to its maturation as a field of research through: 1) focusing on a specifically defined community (the school) thereby furthering our understanding of school level CFS, 2) the role that school food gardens play in the transition towards sustainable food systems, and 3) advanced the application of Garret and Feenstra's framework for a sustainable food system (16) used previously by Dietitians of Canada in framing CFS (9).

The fact that student participation was limited to garden club members is a central limitation to this study by potentially eliminating the critical perspective of students. Despite my initial intention to do so, the benefits involved in recruiting students who were non-garden club members were weighed against the barriers, and in consultation with my thesis advisor, the decision to not pursue interviews or a focus group with non-garden club members was made for two reasons. The process of involving these students would cost more in time and effort than the predicted returns in terms of data representing the students' perspective. It became clear to me that interviews were not the best way of gathering data from students, and that a pictorial or creative activity may be a better approach. The decision was also influenced by the fact that recruitment would have been in the fall of 2008, when I was trying to wrap up data collection.

Cultivating Food Security Carlsson

The make up of the teachers' focus group was limited by a self selection bias. The four participating teaching staff have either used the garden previously, or spoke of their desire to use it more often. The teachers came to the focus group interview with a previously established positive sense of the value of the school garden. It is possible that that the mixture of full time teachers and educational assistants participating together in this focus group could have presented a power imbalance, and therefore limited open and honest responses from the educational assistants. However, knowing the collegial culture of River Valley, I felt comfortable that this was not a problem. I verbally checked this assumption with the participating educational assistants, who agreed that this would not present an issue.

The lack of member checking on the interview transcripts is a limitation to the credibility of the findings. While interviewees were offered opportunity reviewing transcripts for accuracy no interviewees expressed an interest. Throughout the interviews I used my interview notes to review with interviewees that I had captured their feedback accurately, which served as surrogate member checking.

Having been involved with the River Valley school garden since the very beginning, and having a central role in both the coordination and activities, I am deeply and personally invested in this garden project. As such, I am aware of several of my own personal biases that I brought with me to this thesis study, which I outline here. My positive experience has shaped my feeling that the school food garden at River Valley contributes positively to the school, despite the amount of work involved in keeping it going; that the project has the potential to introduce some children to new foods; that it exposes children to fruit and vegetables in a fun, experiential manner; and that it helps

some children understand some basic gardening skills. I recognize that my own biases, and my own interest in CFS and food systems has influenced the direction of this particular school food garden project and needs to be considered and accounted for when describing the value of school food gardens in building CFS. I have attempted to be aware of my own positive bias towards the effects of the project, and to position the data under a critical lens during the analysis phase of the research. I used personal reflections in my field notes along with the frequent requests for feedback in interviews to remind me of this bias. My thesis supervisor and committee also served to identify and challenge my biases in the process of writing this thesis.

I consider myself as part of the school community, as a volunteer, a local resident, and during the time of data collection, also as a researcher. The position from which I have written is as a member of this community, rather than an outside observer.

Chapter 5: Findings and Discussion

Chapter 5 includes my analysis of what I heard, read, saw and recorded throughout the process of this case study. As detailed in the *Methods*, the findings presented in this chapter came from field notes, one focus group and nine individual interviews with staff (n = 7), parents (n = 4) and students (n = 3) of the school community that was the subject of this case study, three interviews with health professionals, documents pertaining to the school garden (n=13). In addition, where applicable, I include data that I gathered through a pilot interview with a health professional involved with a school food garden project at Fairview, a school of similar size and rural setting.

This chapter begins with a detailed description of the case to orient the reader to the specific school food garden under study as well as important contextual factors that surround the case. Following this, I will briefly summarize who was affected by the garden, to orient the reader to the focus on children in this thesis. I then present and discuss the effects of the school garden on human health, environmental health and finally economic vitality. Finally, the last section of this chapter will focus on the ecological systems factors that were most influential on the case.

5.1 *Setting the Scene*

In this section I ‘set the scene’, describing the ecological system that includes and surrounds the case, the school food garden at River Valley. This will help readers discern the transferability of this case study to their own needs if applicable. I begin describing the mesosystem (the school and community in which this project is set), followed by the micro- (the project and my own role within the garden project), exo- (school board and

government departments), macro- (local culture), and chronosystem (current geopolitics) factors of this case study. Many of the contextual factors described in this section resurface as part of the analysis in the following sections of this chapter, which follows.

5.1.1 The School and Community

River Valley is a small, rural school with just over 200 students in eight classes ranging from grades primary to six, with several split grade classes. Many of the staff members live in the surrounding communities.

The school is at the centre of a community of just over 500 people, but serves many of the surrounding small, rural communities as well. Farming, predominantly fruit growers, and poultry and dairy producers, supports the surrounding community. Small scale forestry (woodlot owners, and lumber), wine production and tourism also play roles in the local economy.

The school faces a main road to the east with a church, community centre, and houses on it. There is a large playground behind it to the west that opens up into fields and orchards. There is no shortage of green space surrounding the school, although it is mostly sports fields and courts. There are two areas with playground equipment behind the school. On the south side of the school is the Peace Circle (a circular bench large enough for one full class to sit) on a site permanently devoid of grass, from the children running circles around it at lunch. Twenty metres or so east of the Peace Circle, towards the road but still on the south side of the school is the garden.

The garden is partially sheltered from the road by a series of trees. The south border of the school property is continuous with the neighbours' back yard and is defined in the garden by two compost bins and five berry bushes. The design of the garden is enclosed

with the garden boxes forming the core of the square shaped garden area. Other beds, trees and built structures have been built around this core to maintain the enclosed space.

Figure Three shows the location of the garden in relation to the school property, as well as the basic layout of the garden, which is important in the study findings. This sketch is not to scale; the garden is drawn disproportionately large to show more detail of its layout.

Fairview, the school used for the pilot study, is only slightly smaller than River Valley. It is also located in rural Nova Scotia. The garden at Fairview is much larger and was established several years earlier than the school garden at River Valley. These two gardens have similar qualities, but differ in the quantity of food that they produce. Whereas the garden at River Valley is small and used mainly for demonstration activities, the garden at Fairview is larger and provides a significant quantity of food to the school cafeteria in the fall.

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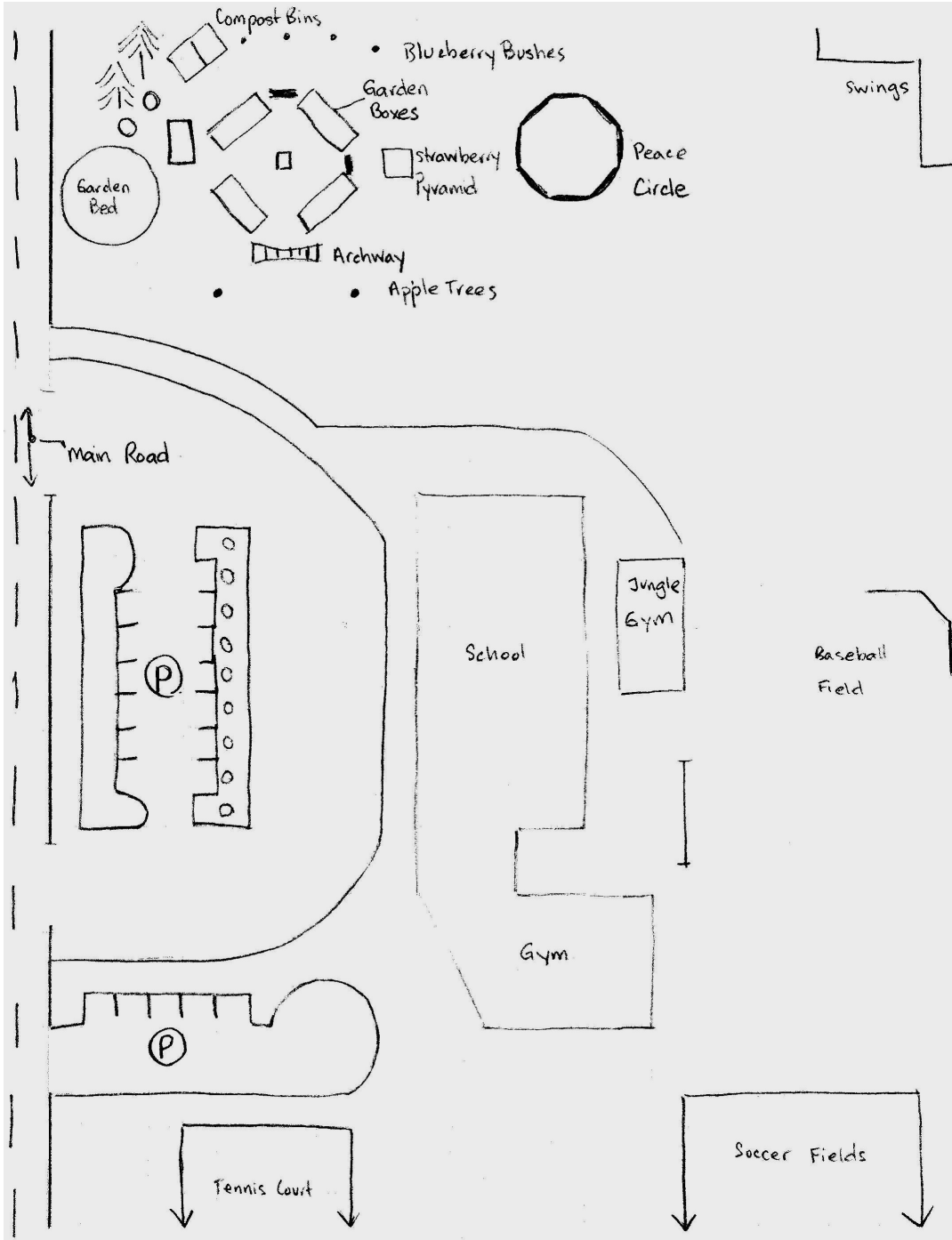


Figure Three: Diagram of the School Grounds At River Valley Elementary School ⁷

⁷ Not to scale

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To foster community engagement in the garden project, the school has over the years welcomed community members to participate through summer care opportunities, donations, and participation in activities. Invitations to the community to participate were sent out to the community one to three times per year through the community and the school newsletters and through any notices sent home with students regarding the garden. These notices in the newsletters were helpful in raising awareness of the project within the community. Though there have been only a few direct offers to volunteer with the project or an activity, when asked to participate, many community members are aware of the project and willing to help. The majority of responses from the community to these invitations came in the first year of the project and in the form of donations such as seeds, supplies and benches. Some guests are invited specifically by the garden club, such as the local winery manager who came to teach us how to prune our grapes and when volunteers are contacted to help with summer maintenance.

Without contributions from the community, the garden project would not offer the diversity of activities that it has. On many occasions, the community has participated in the garden project; some were formally invited and others informally volunteered to do so. Examples of community visitors to the garden include students and staff from the local community college who helped to build compost bins with the children, staff from the local waste reduction and management facility who came to do education around composting, a local woodworker who came to the garden to build an archway with the students, and a Family Literacy Facilitator who came to write a book with the garden club. On a less formal basis, “[m]embers of the community have been seen walking

through and admiring our garden and helping themselves to our wares. This pleases us as this is what we had hoped for” (IB paper_15).

In addition to visits, many members of the community have provided support through donations. Donations of time, labour, and much needed items are essential for a project without core funding. A local nursery donates on an annual basis enough to cover the cost of the majority of our seed needs; a local lumber mill has donated free wood delivery for purchasing their wood; families have donated built items such as child sized benches, plants, rain barrels, manure (delivered), as well as their time to build the planter boxes and care for the garden in the summer.

The culture of volunteerism in Canada is concentrated among a small group of Canadians. The results from the 2004 Canada Survey of Giving, Volunteering and Participating (128), indicate that only 11% of Canadians contributed 77% of all volunteer hours. Although the Canadian context cannot always be generalized to the local context, the feeling among some school staff was that in the school community most people are difficult to engage in school projects. Volunteers are too busy to give their time, while those who do volunteer with the school end up with multiple volunteer roles and giving many hours. My personal experience with volunteers has been different than that expressed by the school community. I have felt at times very supported by a community of willing volunteers and donors, most often when they were asked directly to volunteer or donate.

5.1.2 The Food Garden Project and My Role as a Volunteer

My involvement with the school began in the fall of 2004, when I approached the school principal to see if she would be interested in starting a garden project. With her

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support for the project, she and I initiated a small planning committee of parents, teachers, students, the principal and myself, who organized goals for the project and the initial set up tasks of the garden. The garden goals set out by this planning committee in the first year of the project were:

1. *To involve the children in the process of planning, planting and preparing food;*
2. *To use the garden for experiential learning in ecology, nutrition, sociology, life skills, culture and community engagement;*
3. *To develop strong links between the garden project and the hot lunch program;*
4. *To foster community involvement and celebrate the rituals surrounding food production.*

The garden began as four 4'x 6', one 3'x 4' and one 1'x1' planter boxes that were built by a group of community volunteers one weekend during the spring of 2005. A dump truck full of topsoil was donated and scooped by the bucketful into the planter boxes by students during their physical education classes. The remaining soil became a circular bed approximately eight feet in diameter. With seeds and plants bought from and donated by a local nursery as well as donated by parents, the garden was first planted in the spring of 2005. Each year something new is added to the garden. The garden now includes two rain barrels, two compost bins, one strawberry pyramid (a 3'x 3' pyramid shaped structure that allows space for over 25 strawberry plants in a small area), an archway that the grapes grow on, and a series of fruit trees and bushes that produce blueberries, gooseberries and apples.

After the initial set up of the garden, the planning committee's purpose, the committee dissolved and members have participated to varying degrees in garden activities since then as volunteers, teachers, parents and students. I took on the central coordination of garden project and its activities, with the support of the principal and

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several teaching staff who helped involve students in the project. The school principal has played the primary support role for me as a volunteer coordinator, eliminating resource and communication barriers as well as setting the tone for school support of the garden through her enthusiastic belief in the project.

There are several ways that the garden has been used at school since its inception. These include organized activities such as garden club activities and classroom activities, impromptu play at recess and lunch, some limited use of the garden in supplying the cafeteria, and summer care activities involving families.

I have focussed my time in the past four years on encouraging and facilitating extracurricular and classroom use of the garden. I have run extracurricular activities (either after school or at lunch activities) on a weekly basis during the growing season (May to October) with a group of self-selected students in a garden club, ranging in age from grades primary to six and including both boys and girls. Students are invited to participate through classroom visits by other garden club members to explain the club and welcome new members, friends who bring them to activities, and morning announcements welcoming any new members. The number of children involved varies from five to 15 and the age of the children varies from year to year, although most often dominated by the younger grades. The ratio of boys to girls also varies from year to year, but the majority of members are girls. Examples of garden club activities include: starting seeds indoors, planting, preparing the soil for planting, regular maintenance of the garden, artwork in the garden, painting and building projects, snacking in the garden, and preparing food. In early April, 2008, I did an activity with students in the garden club where we examined seeds saved from 2007, and talked about how to save and plant them

to begin seedlings for this year, which we did later that month. Though we did not save many seeds from the garden, every year the garden club tries to save a variety of types of seeds, normally the ones that are easy to obtain, handle and store. These include, radishes, beans, pumpkins, sunflowers, and marigolds. The idea behind seed saving with the children was to learn more about the cyclical nature of food systems.

Classroom activities are done on the initiative of the classroom teacher or myself, and may or may not involve me. Classroom activities are encouraged strongly, and are a positive sign that some classroom teachers value the school food garden as a teaching tool. One classroom teacher worked closely with me for two years, doing activities focussed on food, planning and planting the garden in the spring, and harvesting and cooking the produce in the fall. In this case, I approached the teacher about involving their class in specific garden activities and helped to organize and lead them. In each of these two years this teacher's class brought the produce to a local restaurant to prepare a gourmet meal with the chef. Examples of food prepared at the meal include leafy green salad with caramelized squash and nasturtiums, served with cantaloupe salad dressing and pizza made with kale pesto and garden vegetables. These foods were foreign to many of the children and adults involved. Most children at least tried the food, and non-verbal feedback varied from disliking to devouring the food.

In the spring of 2008, I led a classroom activity with this same grade five class on the concept of 'food miles', or the distance that food travels from its origin, to its place of final consumption (or other use, or waste), using an activity based on a New Brunswick based Food Miles Education Module (129). The class traced on a world map the distances traveled for a variety of pre-set meals. They then calculated the total distance of

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each meal, and compared it to the distance of locally (regionally) produced foods. In a class discussion following the activity, we then discussed how the garden fits into the concept of food miles, and the implications of increasing food miles.

Other classes have used the garden for activities like reading stories or exploring the soil in different seasons, or by offering to start seeds in their classrooms to be planted as seedlings later in the spring. Occasionally, classes visit the garden and some teaching assistants take children with special needs out into the garden for one-on-one activities such as painting and picking grapes. In these cases, I was not involved in organizing or leading the activities.

In addition to planned uses of the garden, the garden is an open play space during recess and lunch. For many children the garden provides a place for physical activity and non-competitive play on the playground, among other things, as will be discussed in the findings.

There have been several occasions when the produce from the garden was used in the kitchen to help supply the lunch program. For example, in the fall of 2008 much of the produce was used in a Thanksgiving turkey lunch. On other occasions, some of the harvest, such as tomatoes and cucumbers, was delivered to the kitchen for use, but this has been limited.

In the summer eight to 10 volunteer families and staff assume the responsibilities of caring for the garden; each are responsible for one week. Summer volunteers are welcomed to take home some of the produce, in thanks for their contributions. They are also encouraged to go as a family, to bring their children and engage them in the weeding, watering and harvesting. My commitment during the summer is to visit the

garden on a weekly basis to ensure that the rain barrels are filled, which I do using a hose and an outside tap at the school if the rain itself has not filled them. I also take part in maintenance while there. These garden club and classroom activities as well as interactions with summer volunteers were the primary source for my field notes and participant observation data collection.

In the fall of 2008, after a long recognized need for more coordinating support from *within* the school (i.e., staff rather than volunteer, captured in the interviews as well) two of the teaching staff and the Healthy Lunch Coordinator joined me in a team coordinating the garden project. We hoped that more school staff investment in the garden project would result in more classroom use of the garden and therefore more student involvement, and better integration with the cafeteria. Since the time of data collection, I have continued my role as a volunteer, but the teaching staff and Healthy Lunch Coordinator have organized garden club and classroom based activities.

5.1.3 Government Policies and Programs

Government programs and policies act as enablers and barriers to school food garden projects. Health has for a long time been woven into Department of Education policies. One interviewee pointed out that when the provincial government's plan for the public education system, Learning for Life II (130), came out in 2005, it included a chapter on developing "*healthy active learners*". This is one example of how government departments (at the time of the release of Learning for Life II, the Departments of Health and Education) were already working together to make schools healthy settings, in recognition of the mutually beneficial health and learning outcomes (46).

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There are two important provincial guiding documents that indirectly influence this school garden project: Healthy Eating Nova Scotia (HENS) (84) and the Food and Nutrition Policy for Nova Scotia Public Schools (85). Healthy Eating Nova Scotia is a provincial policy developed in 2005 under the leadership of the (then called) Office of Health Promotion (now the Department of Health Promotion and Protection), with four pillars representing priority areas in promoting healthy eating for all Nova Scotians: Breastfeeding, Children and Youth, Fruit and Vegetable Consumption, and Food Security. The provincial Food and Nutrition Policy for Public School is a settings-based policy developed collaboratively by the provincial Departments of Education, Health Promotion and Protection, and Agriculture, which helps to implement the goals of HENS within the public school setting. The policy divides foods into three categories of increasing nutrition density, from minimum to moderate to maximum nutrition, and includes binding directives around serving almost exclusively maximum nutrition choices in schools at an affordable cost to families. It also includes non-binding guidelines around issues such as purchasing locally grown produce and providing children with environments conducive to enjoying their lunch, such as sufficient time (20 minutes). Together, HENS and the Food and Nutrition Policy support an environment for nutritional health and food security promotion at public schools.

Many school boards in Nova Scotia nurture a culture of health in schools that could be supportive of school gardens. They are structurally integrated with District Health Authorities, through involvement in the Health Promoting Schools Program, which itself is supportive of school gardens for the reason that food gardens in schools help further their goals. As one health professional summarized, “*Health Promoting Schools looks at*

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a supporting environment for healthy choices and sort of supporting the culture of health in the school, so with the garden being there it's easy" (LL 36). Program support comes in the form of financial contributions or organizational support and skill building for schools that have school gardens. Schools are eligible to apply for up to \$2000 per year from the Health Promoting Schools Program to support a healthy environment at school, with the focus being on nutrition and physical activity. River Valley has in the past accessed this money to support other school health initiatives, but other schools with gardens have used it to support their gardens. While the Health Promoting Schools Program employees in the school board to which River Valley belongs supports the idea of school gardens as a means to foster a culture of health in the school, its employees do not have the time to coordinate and maintain school gardens.

Developed by a working group including representatives from the Health Promoting Schools Program in the regional school board to which River Valley belongs, Strive-For-Five is a resource binder of seasonally appropriate, seasonally organized, recipes and nutrition information that meet the standards required of the provincial Food and Nutrition Policy for Public Schools. Strive-For-Five aims to *"...support fruit and vegetable consumption for students, with a focus on the food service workers and volunteers. Because [food service workers are] also part of the school, and they have a role, it's helping build their understanding and their ability to create healthy menus in the school"* (LL 36). The Health Promoting Schools Program has complemented the release of the binder with skill building workshops for cafeteria staff around using the recipes in the binder.

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The provincially funded initiative, Strive-For-Five, is recognized to support more than just the Health Promoting Schools Program objectives, but on a broader scale the objectives of the provincial healthy eating strategy, Healthy Eating Nova Scotia (HENS) (37). Strive-for-Five supports three of four pillars of HENS and the Food and Nutrition Policy through promoting locally grown produce (Food Security; Fruit and Vegetable Consumption) at public schools (Children and Youth), while demonstrating “*how to prepare them in ways that fit... with the [Food and Nutrition in Public Schools] policy, that would be in season, that would be at the least cost, and accessible to people, is the idea*” (LL 36-38).

Time to Learn, a strategy, implemented in 2002 under the Department of Education (131), is concerned with “*what students are doing during the time that they need to be learning*” (LL 42), or maximizing the learning that occurs during the school day. Time to Learn makes recommendations according to grade levels about how many minutes per day or week should be spent on various subjects. For example, in grades four to six, instructional time for mathematics should equal a minimum of 60 minutes per day (including five minutes per day for mental math), for a total of 300 minutes per week or 21.1% of the total teaching time (131). Policies like Time to Learn could be perceived as a barrier to school food gardens because by nature, gardens are time consuming to start and maintain, and experiential, emergent or project based learning may take more time than more traditional classroom based learning projects. Where teachers are already pressured by highly specific guidelines around minutes per day per subject, time consuming projects like gardens become complicated for teacher accountability to the Time to Learn guidelines.

5.1.4 Local Health and Food Culture

The local health and food cultures are complex and interrelated, valuing both individual and collective responsibilities for health and spanning a full spectrum from the dominant culture of disconnect from food to a counterculture reconnecting with food. In public schools especially, the food culture is currently in an uncomfortable transition from processed foods to healthy foods.

While at the government level there is a general culture of collective responsibility for children's nutritional health and an acceptance that the school as a setting significantly influences health, the findings suggest that there was a general reverence for individual self sufficiency among members of the school community. Interviews revealed that while it appeared admirable, and even perhaps a matter of survival, to have skills that lend one food self sufficiency (individual) during a time of crisis, it was equally admirable to some community members to share both skills and food with others (collective).

When asked to generalize about our current food culture, interviewees described a range that placed "*foodies*" at one end, and the "*processed family*" at another. Some interviewees also expressed this as "*growers*" (i.e., gardeners) vs. "*shoppers*" (SEF 356-361; CL 78). There seemed to be various stages along the range between the two, but the majority of people were perceived to reside on either pole. These categories might have represented stereotypes, and even personify class related assumptions about food culture in families of different social classes.

The "*processed families*" and "*shoppers*" categories represent the local food culture showing signs of disconnect between food and people. To provide an example, in a

discussion about Canadian food culture one father relayed a story about a Scouting exchange he was involved in as a boy, between Scouts from a rural area (himself included) and other Scouts from Toronto. His group brought the Toronto Scouts to three different meat farms, ending with a chicken farm. From there, they bought “*a few feed bags full*” of chickens with them to camp, feathered and slaughtered them, and roasted them whole on a spit. The country Scout leaders received complaint letters from parents for exposing their children to such a horrific experience (like preparing and cooking a chicken). This father’s story demonstrates that our culture of disconnect from our food source is not new, it began at least one generation ago, and urban upbringing may be a critical factor.

Descriptions of “*foodies*”, “*growers*” (gardeners), “*back to the landers*” and “*alternative types*” substantiated the idea that there exists in Nova Scotia a food counterculture that is reconnecting with food through production and consumption. Members of the counterculture appear to reject the current mainstream culture of fast food, eaten quickly, with little appreciation for where food comes from or the effort involved in preparing it. Clearly some families are already making changes at home to place value on food. One student, when asked, “*so if you think of the three most important things in your life, what would [they] be?*” responded, “*my mother, I mean my parents, food, home and god*” (Student Interview #1 92-96).

In addition, one health professional felt that in the general public in Nova Scotia, “*there’s something different*” (LL 105). Paraphrasing a member of the Organic Agriculture Centre of Canada, she said, “*We’re so behind in Nova Scotia, we’re actually farther ahead*” (LL 111). There exists a heightened awareness of food security and local

food issues among Nova Scotians that she attributed to some of the work of *Select Nova Scotia* and the provincial *Food Security Network*. She shared a few examples of how this is so: people in Nova Scotia still want to know how to preserve foods for storage or farmland for the future, Slow Food Nova Scotia is a strong and growing network, and with a primarily rural population, many people are still living close to the land.

The food culture in Nova Scotia public schools is currently in transition toward valuing health. Food service in public schools used to be *revenue* focussed; however, as one health professional described it, we are currently in an “*uncomfortable zone*” (LL 93) making the transition (on the menu and on children’s taste buds) towards *nutrition-*focussed food service. To align this transition with the language used to describe the food culture in the rest of the community, the schools are transitioning from selling processed foods to more wholesome foods.

In addition, the children attending River Valley are growing up in a time when concerns about childhood obesity related to nutrition and physical activity, and creating healthy environments at school is, more so than ever, at the forefront of discussions among policy makers, health professionals, education professionals and parents. This is evident not only in our school board, but also internationally; Health Promoting Schools, for example, is an international movement (132). Supporting the notion that a nutritional transition is occurring, the principal felt that there is an increased awareness about health in the current generation of children, which increases the acceptance of healthy foods in schools. She pointed out that children are not immune to this increasing culture of health, noting that there are only a few obese children at River Valley, which she speculated was related to the local culture of nutritional health and physical activity.

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“... I think in the four years that I've been here, ... I've seen improvements ... just because, because I think kids our generation of kids now who are becoming school aged, it's what they're being brought up on, ... because the message is out there more so. 'Healthy is good, healthy is better.' So I think our kids are coming now, are coming to school with that education about good food, good nutrition, that type of thing, so they're going to the things like veggie and dip. If you looked at our school community, we have very few obese kids here” (IB 100).

Often in the context of children's disconnect with food, many members of the school community, as well as health professionals outside this community, described what they saw as a culture of immediacy. Microwaves exist, the Internet is high speed, and we are used to seeing *immediate feedback* for our actions. A feature of our culture of immediacy is that we often do not recognize the importance of taking *time* to eat. Public school lunch schedules are a perfect example, usually allowing between 10 and 15 minutes for children to eat. This schedule fails to teach respect for time to eat. However, “*it is not the school system, it is people*” (LL 103). The school system is simply reflecting what is important to decision makers in that system, and their job is to make sure children graduate with math, science, and language skills, not an appreciation for sustainable food systems, for example.

In addition to the new Food and Nutrition Policy's focus on nutritious foods in schools, the policy is trying to influence food culture in Nova Scotia schools through guidelines around taking time to eat at lunch. However, these guidelines are not binding directives, and it is up to the school to find the time to implement them. Strive-For-Five plays a role in trying to 'slow' the food culture in schools by encouraging preparation of whole foods (which often take longer to prepare); this, according to a health professional, has landed its creators the label “*Food Zealots*” (LL 105) (i.e., whole food fanatics) because currently school cafeterias are not equipped to prepare slow, whole food.

5.1.5 Current Geopolitics Affecting the School Garden

This case study was done during a time of heightened attention to rising food prices in Nova Scotia (67, 70, 77, 83) and around the world where some staples such as wheat rose steadily from 2006 to a record high in June 2008 (133). Among other things, the rising food prices have been attributed to the cost of oil, which also steeply rose during the period that this study was done (111, 117). Increasing oil prices have resulted in an increase in the cost of transportation, which is crucial to our globalized food economy, and an increased diversion of food crops to produce biofuels, an industry that pays higher prices for the food commodities it relies on (111, 117).

There seems to be steadily increasing awareness among global leaders of environmental issues such as greenhouse gas emissions and global warming as evidenced by commitments at a 2008 international G8 Summit on Energy Security and Climate Change about confronting the “*interlinked challenges of sustainable development, including energy and food security, and human health*” (Government of Canada, 2008, p. 1) (134). As well, awareness of social injustices in international trade is beginning to influence how many Canadians are purchasing food. For example, there is a current growth of the availability of Fair Trade products (e.g., coffee, cocoa, tea, sugar, etc.). The increasing popularity of Fair Trade as a solution to counteract unjust trade has led to municipalities being declared Fair Trade Towns or Cities in Canada (135). Wolfville, Nova Scotia became the first Fair Trade Town in Canada April 17th, 2007.

The confluence of these current geopolitical factors (or chronosystem factors), rising food prices and attention to environmental and social issues effecting our food supply, has situated CFS and sustainable food production issues at the forefront of the minds of

many Canadians, especially those working in the fields of food and agriculture. The program agenda for *Reclaiming Our Food System: A Call to Action*, the 2008 National Assembly of Food Secure Canada (a national association of stakeholders interested in food security) (136) and the National Scan of Food Security Related Research Projects within the Canadian Social Economy Research Partnerships (61, 137), are both examples of the current degree of mobilization around food security and system issues in Canada. It is important to note that the growing interest and mobilization in these issues is in response to the dominant system, which some would argue still relies on economically, social and environmentally unsustainable practices (38, 104).

Awareness around food system issues is influencing practices in the education field as well. For example, "... *[River Valley's] school board is doing a really good job of supporting local now*" (IJ 80), according to one school board employee. The timing of the school garden as a tool for teaching and learning about food and food issues is favourable. A political climate of heightened attention to environmental and food system issues influences among other things broader cultural ideals (macrosystem factors), provincial and local policies (exosystem factors), as well as a local home and school culture that is relatively receptive to school food gardens.

5.2 *Who Benefits from the School Garden?*

Prior to a more detailed description of how members of the school community are affected by the school garden, this section will first briefly summarize who, specifically, is affected by the garden project. The reason for this summary is to familiarize the reader with the groups of people being discussed, and the overall focus on children, which emerged in the findings.

When asked, “*who benefits?*” perceptions among interview participants were that children were the leading beneficiaries of the school food garden. The body of school garden literature also seems to focus on the benefits to children (19, 22, 27, 89, 90, 138). Interviewees also pointed to other members of the school staff, home and community as benefiting from the garden project, though this was less frequent.

Some adults, like this school staff member, discussed benefits as mainly conferred to those students involved in the project: “*I think any kid that is involved would benefit from it because they’re learning skills*” (RD 134), whereas the general perception among adults was that *all* children in the school benefit from the garden. However, there were several subgroups of children that were identified as receiving particular benefits. These include: children with behavioural issues, special needs, or low self esteem, children who have gardens at home and those who do not, children who “*don’t like dirt*” (SEF 142-44) (i.e., lack a connection to the natural world), lower elementary children, and those from families of low socioeconomic status.

Community members, including parents and volunteers who were both directly and indirectly involved with the project were perceived to benefit from the opportunity to participate at the school through involvement in the garden. Teaching staff, especially those with an interest in experiential education were thought to benefit.

When asked about any negative effects of school gardens, no interviewees felt that children were affected negatively. Some adults themselves, however, experienced negative effects from the garden including feeling pressured to maintain the project. Though not discussed by any interviewees, exclusion from the project as a result of

transportation, time or other social barriers was identified in the analysis as a potentially negative effect on either adults or children.

Table One outlines the groups of people that are most affected by the school food garden at River Valley, the direct effects observed and the indirect or potential effects suggested in the findings. The findings revealed a multitude of direct and indirect effects, each interrelated in complex ways. I have made attempts to link these in a linear fashion, showing how direct effects may be related to indirect effects, and then connected them to how they may contribute to long term environmental and human health, social equity, and economic vitality – the three central constructs of Garret and Feenstra’s model used in this thesis. Because of the multitude and complexity of the direct and potential effects, only some will be discussed in detail.

Table One: The Direct and Potential Effects of the School Food Garden at River Valley Elementary: Contributions to Community Food Security

| <u>Who Benefits</u> | <u>Direct Effects</u> | <u>Potential Effects⁸</u> | <u>Potential CFS Outcome</u> | |
|---------------------------------|--|--|---|-----------------------------|
| Children | Experiential learning | Improved learning outcomes; self esteem | Social Equity & Human Health | |
| | Peace | Environmental & civic values | | |
| | Cooperative learning and play | Self esteem; belonging; civic values | | |
| Children | Pride | Self esteem; belonging; agency | Social Equity & Human Health | |
| | Exposure to & willingness to try fruit & vegetables | Increased fruit & vegetable consumption at school, home or later in life | | |
| | Development of food skills (growing and preparing) | Starting a garden at home; self sufficiency; agency | | |
| | Alternative, moderate physical activity at school | Increased physical activity for less active children; lifelong activity | | |
| | Exposure to/comfort with natural environment | Connection to nature; decreased behavioural issues; lifelong activities | | |
| | Outdoor learning opportunities | Connection to nature | | Environmental Health |
| | Learning about composting | Knowledge of food systems; environmental & civic values; | | |
| Long term thinking | Sustainable food choices | | | |
| School Staff | School pride | Connection to school | Social Equity & Human Health | |
| | Peaceful “sanctuary” at school | Peace; spiritual health | | |
| | Pressure to keep project going | Stress for some adults involved | | |
| | Cooperative learning & attitudes among students | Improved learning; decreased behavioural issues | | |
| Families & Community | Opportunity for volunteer involvement with school -or- | Broader ownership; shared work; pride; increased connection to school; agency over food | Social Equity & Human Health | |
| | Exclusion from involvement due to transportation, time, social exclusion, etc. | Decreased connection to school | | |
| | Sense of hopefulness | Spiritual connection at the school; sense of hope for future food systems | | |
| | Opportunity for moderate physical activity | Increased physical activity | | |
| | Gardening knowledge & skills | Starting a garden at home; self sufficiency; decrease household food costs; community capacity building; spark interest in food production or horticulture career (for children) | Economic Vitality | |

⁸ Potential Effects are those suggested in the findings by participants, but were not directly observed or measurable during the data collection period.

5.3 *Direct and Potential Effects of This School Food Garden*

This section is organized into three main subsections that present and discuss effects on 1) social equity and human health, 2) environmental health, and 3) economic vitality, according to the Model for Conceptualizing a Sustainable Food System, and Underlying Considerations for Community Food Security (adapted by author from Garret and Feenstra, 1999), presented in the *Methods*. As though recognizing that there is considerable overlapping of effects between the three conceptual realms of this model, one health professional said, “... *it’s citizenship, it’s knowledge, it’s nutrition, it’s environmental, I think it’s difficult to separate all those things that happen*” (LL 22-3). Indeed there are instances in this section of the results where it was difficult to categorize effects, but for the sake of organization, effects have been placed where they made most sense, not necessarily in the only place they may have fit.

There are several direct effects that this school food garden has, including: cooperation, development of food skills (growing and preparing), and outdoor learning opportunities. However, the most significant effects on CFS are those that are indirect, or potential effects, some of which will not be felt for generations to come. These include a wide range of knowledge, skills and values that may influence social equity and human health, environmental health, and economic vitality of the school community, now and in the future. As articulated by a health professional in the pilot interview, in reference to school food gardens in general,

“I think the effects are going to be seen when these kids are adults and have their own children. And we just have to believe that yes, this is a good idea, and yes there are going to be some effects. You know what, it seems to me so obvious that this is a good thing to do. But I think it is going to be extremely difficult to measure it, in any short period of time” (JZ 17).

Long term or potential effects are discussed alongside direct effects in this chapter as they contribute to the broader picture of how this school garden affects the school community, as identified by the school community.

5.3.1 Effects on Social Equity and Human Health

The garden was perceived by participants to be a peaceful place that encouraged cooperative learning and play, a sense of belonging, self esteem and confidence among students who participated, as well as skills and values central to the notion of citizenship. These perceived effects of the garden can be considered as *contributing to* the development of social equity experienced within the garden itself, within the school, and extended beyond the school to possible contributions to more global social equity. In and of themselves they do not constitute social equity. Many of these effects also contributed to human health through emotional and spiritual well being. In addition, interviewees and observations suggested that the garden project also affects the physical health of those involved through nutritional health, physical fitness, and skills related to self-sufficiency.

Peace

'Peace' and *'peaceful'* were words used to describe garden related activities, and the garden itself, by several members of the school community. One student, when asked what she likes about the garden, responded, "*it's so peaceful...*" (Field notes, August 14th), meaning both that it is lush green and that it is quiet. Her comments suggest that *peaceful* has both environmental (physical surroundings) and social (quiet place to be) significance in the garden.

Describing the annual planting of an apple tree in the garden, the school principal used peace as a concept to weave elements of environmental health with citizenship and community. Referring to the planting of an apple tree in the garden on earth day, she said,

“...each year we add something [to the garden] as a school as part of peace and giving back to our [environment], our world, and you know the trees that we planted and the bushes and those types of things that will be there... we take so much from this earth and I can get all philosophical, but it’s really quite basic, it’s true, it’s a way of giving back to the earth in the most simplest forms. You don’t have to be a millionaire to give back to the earth. And it’s also just a symbol of ... we want calm and people to get along and to support one another because when it’s all said and done we have to live here together and we have to you know, its just a symbol” (IB 38-44).

The principal felt the planting ceremony was offered to the students as a chance to reflect on giving back to the earth, from which she says we take so much, and making peace with the earth the way we do with each other in learning to live together. The social dimension of peace in relation to green school grounds arose in a recent study (94), where students learning and playing on green school grounds (see: *Schoolyard Greening under Definition of Key Terms*) were perceived by some adults as being more civil and reports of aggressive behaviour decreased; one principal also perceived the trees, plants and bushes as contributing to a more peaceful schoolyard (94). A health professional involved with the pilot school identified children with behavioural issues as directly benefiting from the learning environment that a garden provides. She reported that the child with behavioural challenges did not exhibit the same disruptive behaviour while engaged in his garden related activities. Improvements in disruptive behaviours and benefits to children with behavioural issues is supported in the school gardening literature (28, 94, 106).

Through reflection in a green, peaceful, quiet place, and through an activity like planting a tree in the name of peace, as is done annually at River Valley, the garden may be contributing to the development of emotional health (quiet place to be), environmental values (giving back to the earth), and citizenship (i.e., learning to live together, decreased aggression, civil behaviour, etc.). Certainly there was direct evidence of cooperative behaviour in the school food garden.

Cooperation

The principal felt the comparatively equal or non competitive environment in the garden fosters cooperation among children (especially those who do not normally get along), an outcome recognized by several other studies of school gardens as well (27, 90, 94). She described the garden as an “*equal playing field*” (IB 26), and a place that “*provides that social interaction where everybody, everyone is equal. You’re not the best dancer or the best soccer player, you know. [The garden] takes away that inequity...*” (IB 34), as well as a place where “*[they’re] all [in the garden] for the same reason and there’s no segregation ... no one is being ostracized, they’re all just working together for a common goal*” (IB 73). As such, the garden represented for her a place where cooperation, teamwork, getting along, and accepting differences are learned. These sentiments of non competitive collaboration were reiterated by a health professional, reflecting on her experience with school gardens.

“It’s this little microcosm. You’ve got these little people in there working together, so what happens during... you know, you’ve got different [grade levels] doing things, and they’re all working together to plant seeds and it’s a collaborative effort, and... it’s teaching cooperation ... to produce food and share food which is interesting” (LL 48).

Cultivating Food Security Carlsson

I would like to think of the garden as the equitable place that the principal described, but am not convinced that this is *always* true. The members of the garden club vary considerably in age, and I witnessed how this effects their interaction. Younger children looked to older children, who looked to me for direction and approval in many of our activities. On occasion, I overheard extroverted children overpower introverted children in a situation such as taking a turn with the watering can. I was surprised to hear children using controlling language with each other, trying to reinforce non-existent rules (like not being allowed to go to the garden if you're not in the garden club) in order to assert power over other children, I can only assume. Though I observed these types of incidents only on occasion, they do indicate that though garden activities may be by nature cooperative, they do not preclude some children from trying to establish their own hierarchies.

Rather, I agree with the principal's second conjecture, that supported by the health professional, that the non competitive nature of most garden activities is what fosters cooperative play and learning between children who may or may not be "*on an equal playing field*" (IB 26). I have also observed cooperation in an activity with several grade five boys planting delicate tomato seedlings, which are easily damaged or broken. One boy who knew how to plant the seedlings without damaging them taught the other boys in his group to successfully plant each seedling in pairs, one to hold the plant delicately upright, and another to dig a hole and press the earth back in. Only two were broken, and in the fall, the tomato bed overflowed with plants – a sign of their successful cooperation. Like many activities in the garden, approaching the planting of delicate tomato seedlings in a competitive manner (e.g., rushed), does not enhance the final outcomes for anyone.

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Adult members of our school community saw cooperation, especially between children who do not normally get along, as a critical life skill, as much as practical skills such as growing food and planning skills learned in the garden are critical life skills. One staff member noted,

“And so a lot of these kids probably aren’t exposed to the skills of gardening and how to grow things that can be... you know, how to start from dirt and go to food on your table. I think those are important skills. Not only that but you’re working with other skills. Cooperation and planning, I think those are important as well” (RD 27).

The principal echoed this opinion, elaborating,

“But they’re learning those skills ok. Because lets face it, as adults, [you] don’t get to choose who you work with. But it’s an awful good skill to at least try to get along. ... it’s over coming those likes or dislikes and still doing for the better good of someone, still being the better person, still being you know, kind, giving kind of person. Because I’ve seen the kids... if you’re looking at a school community of kids... I’ve seen it. I’ve seen kids that wouldn’t normally interact with one another and wouldn’t be kind, doing it” (IB 96).

The sentiments of the principal, and other adults in the school community about cooperation and getting along as *“important life skills”* (RD 27), are echoed in the literature. In a study of the effects of a school garden program on six constructs of life skills on elementary school students, Robinson and Zaijcek found that gardens help students develop self understanding and teamwork (27). Like the school principal at River Valley, the authors propose that these life skills are transferable to all aspects of life and particularly important for the development of socially responsible and productive citizens (27).

Citizenship

Many of the concepts discussed by the members of the school community as effects of the school garden: equality, respect and tolerance for others who are different than oneself, and respect for natural beauty resonate with those that, according to Osborne, are included in citizenship education (101). Osborne points out, in the first quarter of the 1900's, school gardens were thought of as important tools for citizenship education in public schools (101). The garden at River Valley was never intended to be a learning tool for specifically citizenship education, but the fact that there are common elements or outcomes supports the idea that citizenship education may be occurring.

School food garden programs offered in conjunction with nutrition education programs have shown promising results in influencing children's food choices, as discussed later in this section. Food choices (i.e., the choices one makes around how one accesses food, and which food one accesses) and growing food in community gardens have also been associated with concepts of citizenship in the literature (108, 109, 139).

One health professional speaking about school gardens in general felt that the skills learned in the garden, such as cooperation, planning and land stewardship, were important in fostering citizenship and moreover, *global citizenship*. She described opportunities to learn about issues such as global poverty and food security, and what it means to be a citizen in this world, presented through garden related activities (more appropriate at a high school level). Though fostering citizenship was posed as a *potential* outcome of school garden projects, her suggestion is affirmed by one parent's story of how her child, a member of the garden club, came home one day curious about whether the hungry children in developing countries she had viewed on a television commercial

were able to grow gardens too. This parent felt that her child's connection between growing food and concern about global poverty and food security were directly related to participation in garden club activities. While we had not talked about issues of poverty in any garden club activities, this child understood that the garden was for growing and sharing food, which she connected with the opposite she had seen on television – hunger and inequality. In essence she was displaying the three of Osborne's twelve C's of citizenship education: 1) C seven, *curiosity*, a willingness and capacity to ask questions and continue learning, a curiosity fostered more so in the garden than classroom according to her parent; 2) C nine, *community*, students becoming informed, participating, and involved members in their various communities – local, regional, national and global – and vice versa; and 3) C 10, *concern*, and a readiness to act on that concern both for other people and the environment which makes life possible (101).

The garden club children involved in a book writing activity about the garden (described under *Methods*) were asked as a group to whom or what they would like to dedicate their book, entitled *Our Garden*. After deliberation on many suggestions, they dedicated their book about the garden *to the whole world*. Though this is not a specific display of global citizenship (e.g., social or environmental responsibility), it does convey a sense of caring for the rest of the world, and is connected with the garden through context.

There is clearly historical (101, 102) and conceptual reason to consider that school gardens indeed contribute to citizenship education through teaching about food choices and food systems, public participation, and core social values such as equality, tolerance, respect, curiosity, community and concern.

Cultivating Food Security Carlsson

Beyond citizenship education for the children involved, the teaching staff felt that the garden “*can be a really positive thing if there’s someone in your community looking for something to do*” (SEF, 161-3). While this comment may have referred to my own involvement with the school through the garden, teaching staff and others also mentioned the prospective of involving seniors with gardening experience in the community as a mutually beneficial relationship; one that benefits the school garden through volunteer work, the school through stronger connections to the community, and the volunteer through an opportunity to fulfil civic values through participating in their local community.

Community guests volunteer their time and skills for garden activities approximately two to three times per school year. Grandparents, parents, local businesses and community college students have all been involved in garden related activities. Though I did not speak with any past volunteers about their motivations for volunteering, and the issue was not raised in any of the school garden literature, it may be that their donation was an act of citizenship, a donation to an activity that is meaningful to them. Involvement in personally meaningful activities and the social connections that ensue may in turn contribute to a sense of belonging to a community, for myself and, as captured by a quote from a paper written by the principal for a Masters of Education course, others in the community too.

“Inviting people from the surrounding community and sharing a sense of community pride is essential to the schools personality and environment. Schools that invite community in are welcoming and provide a sense of belonging or connection for both the students and local people. It becomes the centre of the community. It provides an opportunity for everyone to share life skills and experiences...Community involvement creates a unique and special place to be for all” (IB Garden Paper, 17).

Belonging, Self Esteem and Confidence

Health professionals, parents, teachers, and the principal described the garden as a place that gives all children an opportunity to feel as though they belong, regardless of their family's economic status. Belonging included feeling as part of a group; feeling safe, comfortable and confident about who they are, and why they are there; and feeling important. Describing one student in particular, the principal said,

“I really don't know what she would have done if it hadn't been for the garden committee. I don't know where she would have gone. Shy, quiet, but this gave her something, a place to go and be creative and just be. She felt safe. She feels safe there. It takes... and also those kids... a sense of belonging, and also it provided another way for staff to show that they support them and they care for them. Just as simple as picking them up and giving them a drive home” (IB 26).

Some staff also felt that self esteem and self confidence built among students in the garden may translate into successes in other areas at school; a concept supported by several studies (28, 89, 90). For example, children with low self esteem were thought to benefit from the school garden because of its non-competitive learning environment. The staff felt the non competitive environment was related to the potential for increased overall self esteem and in turn success in other areas of learning, such as math.

Two teaching assistants at River Valley also identified children with special needs as directly benefiting from the learning environment that a garden provides. Relating a personal experience with a student, one teaching assistant described the benefit for one child she worked directly with to engage in activities outside of the classroom, learning through doing a hands-on activity, and the opportunity for one on one attention from an adult. Being out in the garden, the child with special learning needs was able to have the time he needed, away from the classroom to focus.

Emotional Well Being

In addition to improving learning outcomes in other areas, a sense of belonging, self esteem, and confidence are part of one's emotional well being. Some adults felt that children who are "loners" or "socially awkward" (SEF 131-140) at school benefit from the garden as it provides an activity that is less intimidating (than traditional sports or arts clubs), fostering a sense of belonging and increased self esteem in those who take part.

One parent speculated that children from families with gardens at home gravitate towards the garden club the same way that children who are good at basketball gravitate towards the basketball court; it allows them to build their confidence through an activity that they are comfortable with or perhaps good at. Others speculated that perhaps it is the children who do not have a garden at home who would get the most out of a school garden, but agreed that it is unethical to exclude children with access to home gardens from participating in a garden project.

Feelings of pride triggered by involvement in the garden may also have contributed to teachers' and children's emotional health. Staff expressed that having the garden at the school gave them a great sense of pride in the school community, made stronger by public recognition that the garden project drew from local media. Students also showed a sense of pride in their work in the garden, and pride in being a part of it, which was not missed by the adults working in the school.

"I was amazed at how jazzed the kids were about the garden! Like some of those little girls in grade one and stuff, they were just so proud of it and so amazed by it. And still I go by the school... I was just at the school I guess in June for the sports day thing, and the little [girl] ... saw me in the hallway, and she was like '... Have you seen the garden!', and so I said 'no I haven't been out there today', and so she grabbed my hand and took me out there and showed me everything and brought me around to all the different parts of the garden and told me what everything was and stuff. Just seeing that,

was like wow, this has really had a good influence on... at least her, but I know others as well” (IJ 15).

The garden also exerted some negative emotional effects in the form of “*pressure*” on those running it. This is linked to limited resources and the small number of volunteers and staff who have been directly responsible regular maintenance of the garden, and implementing new ideas for the project. When asked about the negative effects of the garden, the principal responded,

“...the negative is that we can’t do it all and that’s what I was talking about we need more people. We need more people that we can count on to help support and keep it going and growing and to me the negative effect would be, and only because I can’t think of another word, Liesel, it’s the pressure...and then the other things is that being that we’re the only school [in this area] with the garden...the negative effects are the expectations are there now, which creates more pressure. Because you don’t want to see it fail” (IB 129).

Not wanting to see the project fail, the obligation to make the project happen was a source of stress for the principal, who is already administrating many other school programs, policies as well as regular curricular activities. As a perceived source of stress, the garden may be contributing negatively to the emotional health of some of the adults involved, though no other interviewee mentioned it. In part in response to the pressure identified during interviews, the 2008/09 school year has seen the involvement of several new staff members in a decision making capacity, and classroom involvement in regular gardening activities by a new, previously minimally involved class.

The negative emotional effects of the garden on primary adults involved in organizing the garden project did not seem to transfer to the other teaching staff or to the students. From the perspective of the children interviewed, their experiences in the garden were primarily positive, though it is important to consider that this positive

perspective may be biased by which students participated in interviews and the book writing activity. It is possible that those who did not participate in the book writing activity and interviews had different experiences in the school garden and therefore may have brought forward a more negative perspective.

In the book that the children wrote about the garden, they begin the story by saying “*it is very special to us to have a garden*”, setting the tone for an overall positive experience. They describe their experience in the garden through what they like to taste (cucumbers), watch (things ripening), smell (mint), see (colours), hear (the wind) and do (plant flowers, take care of the garden, have radish picking races). Negative experiences described included common frustrations like bugs that harm the garden or when one child was spilling dirt onto what another child was doing. When asked how they would feel if the school garden was not there, one child responded “... *half the school would be missing...half of the fun part of the school would be missing. So it would be no fun at all*” . This reflection captures the overall positive (fun) feature on the school ground that the garden provides for some of the students at the school.

Related to emotional well being, the teaching staff described the garden as a “*sanctuary*” (SEF 16, 340), not just for the children who use it but one that the teachers used as well.

“... *I must say that as a classroom teacher, that when it's cold, dark and claustrophobic in my classroom and it's the first warm sunny beautiful day, not just only my students, but I too need to get out. ... Just to be in that environment for a little bit on a nice day. And I mean that's essential for young children*” (SEF 156).

The children seemed to agree. Again, during the book writing activity, we took the children out into the garden and the Family Literacy Facilitator asked them to listen to

what their senses were telling them. The children responded: “*We can smell the mint*”; “*We can hear the leaves blowing in the wind*”; “*We can see yellow, orange, pink, red, purple, white, green, blue and brown!*” (Our Garden, P. 10-11). Both the teaching staff and the students are describing a *connection to nature*. The former, that she *needed* to be outside, surrounded by her environment, the latter, that they were experiencing nature through each of their senses. One study involving preschool and kindergarten students engaged in school garden and greenhouse activities supports that connection to nature through exposure to the garden effects environmental health through the development of a respect/reverence for the environment and a sense of ownership and responsibility to become good stewards of the environment (90). I believe at River Valley, the staff and students are describing a connection to nature that is equally important to human emotional health. The garden is providing an “*essential*” (SEF 156) place for young children and adults, to escape the “*cold, dark and claustrophobic*” (SEF 156) winter classrooms and expand into the much needed light, surrounded by smells, sounds and sights. Offering an opportunity to connect to nature clearly contributes another avenue through which the garden influences the emotional (and spiritual) well being of some adults and students involved in the project.

Spiritual Well Being

“*...at recess and noon hours the kids will use it because it’s such a wonderful sanctuary to just go and sit and chat with each other. It’s just such a ... spot*” (SEF 15-17).

Several comments led me to think that the garden has a connection not just to the emotional health of the school community, but also to their spiritual health – a concept

cited in the community gardening literature. Thirty six of 42 Cuban community gardeners who participated in a case study of the contributions of urban agriculture to gardeners, their households and communities, related their gardens to spiritual satisfaction (56). Some hobby gardeners (all born outside of Canada) in a study of backyard gardeners in Toronto felt gardening provided them with a connection to their cultural past (140). It is important to consider that both of these studies involved adults; however, in this thesis research both adults and children suggested spiritual connections to the garden.

For one child in particular who was in grade three, there was no question that the garden had spiritual symbolism. In a discussion about where her food comes from, she incorporated Christian spiritual values into her description of her understanding that *“When the world was created... the first thing that was created for human life was a garden. So everything that Adam and Eve needed was in that garden. So the first thing that ever happened that was in Christian life was a garden”* (Student #1 81). When asked *“a garden of what”* she responded, *“Of home. For home”* (Student #1 83).

One parent described the garden as an incentive to send her child to this school in particular because *“it’s refreshing, it’s encouraging, it’s hopeful... hopeful just for life. For the world...”* (RA 243-245). Related to the discussion around how gardens are teaching values of citizenship, and moreover global citizenship, this parent believed that children involved in growing food is a hopeful sign, not just for the immediate school community, but the *world*. Furthermore she continued, *“It’s almost like the spiritual life of this school lives in the garden to some extent...”* (RA 248).

The literature suggests that the spiritual satisfaction of gardening can be immediate (56) and it seems that one parent and one student in particular made immediate

connections between the garden and a spiritual “*sanctuary*” or “*spot*” (SEF 15-17). The connections to spiritual health was not mentioned by other interviewees; however, civic values learned in the garden and the hope – for life and for the world – that growing food can represent suggest that the garden may have further reaching effects on those not directly involved in the garden.

Nutritional and Physical Health and Well Being

Gardens were perceived to be a perfect fit within a Health Promoting School, or a school that creates an environment supportive of the physical and emotional well being of the students and staff in the school. Integrated into students’ curricular and extracurricular time, the school garden helps achieve the physical activity and nutrition goals of the school – and is therefore a “*perfect health promotion project*” in a school (JZ 7).

Increasing Fruit and Vegetable Consumption

Health professionals and some school staff felt that school gardens, by increasing positive exposure to fruit and vegetables, would be helpful in increasing children’s interest in and enjoyment of fruit and vegetables. For example, one health professional saw the garden as promoting consumption of fruit and vegetables – benchmarks for health.

“And I think too, this last little while ... it seems that fruit and vegetable consumption has been a benchmark for health so the fact that you know, because it’s a garden, you’re also looking at promoting fruit and vegetable consumption. Because we still see statistics that children and youth aren’t eating the amounts that you would like them to, to be healthy. The amounts that in Canada’s Food Guide. So through the garden process and through all those things, the familiarity and the comfort and all that, you’re also building exposure and interest and enjoyment of fruits and vegetables through that garden experience... learning skills, both gardening skills, food prep skills, if they’re involved in ... preparing food and whatever, so food safety, recipes, how you put things

together, parts of... I know people don't know what part do I eat and what part do I throw away" (LL 23).

Some teaching staff observed the children's willingness to try new foods at a garden harvest meal hosted by a local restaurant and gourmet chef, and even their enjoyment of the tasty albeit unfamiliar meal, which included kale pesto and nasturtiums, two pungent foods not typically liked by children.

Teacher: *"And you know I think that because at the restaurant, a lot of those kids were eating things that they never, never had before. And I think that there was a little part of them that because they had taken part [in] the whole process, they were willing to try it" (SEF 107).*

While the findings that children's willingness to taste, eat and enjoy fruit and vegetables increased through this garden based school nutrition education program in school has also been supported in other research (17-19, 28, 30, 34, 89, 91), this is the first study to document this in the Canadian context. Some participants also speculated that even if the garden had comparatively small influence on children's current food choices (especially those from low income families), exposure to a variety of fruits and vegetables might influence food choices later in life through awareness, knowledge and values developed in the garden. One health professional commented,

"[the garden] can help in food security because you would have a better appreciation for where food comes from, and it might not help the low income family be able to buy more fruits and vegetables, but it might make it more of a priority for that child, as well as they might understand some of the importance of buying locally or buying more fruits and vegetables. They might not be able to do anything about it when they're a kid, but it might influence them when they're an adult" (IJ 80).

While it is known that food preferences and attitudes do influence healthy eating in children, it is also known that collective determinants such as the economic, social and physical environment are also strong influencers (141), moreover these factors may change as a child grows into an adult.

I also observed willingness among garden club members to taste and eat vegetables from the garden in my fieldwork with the school. The most common example was in the tomato planter, which had three different varieties of small, snack sized tomatoes in it. With the overabundance of tomatoes in the garden, I would invite each participant in a lunchtime garden club activity to take three tomatoes to eat on the spot. Though many children immediately began eating, others complained that they did not like tomatoes. When I told them that they have never tried *these* tomatoes, “*these* ones were grown especially by *you*,” most children would then at least try one, and many ate more than one, willingly. It appeared that the reminder that they grew the food themselves unlocked a sense of pride or ownership over the produce, and that perhaps this sense of control, or agency, prompted them to eat what they otherwise would decline. As a place conducive of emergent learning, the garden may be encouraging the experience of agency and ownership over food knowledge, food preferences and choices.

The children in the garden club’s behaviours in the garden were matched by their expressions of their own feelings about the garden. During a book writing activity with a local Family Literacy Facilitator, children were asked “*what does the garden mean to you?*” Answers from the group of students, ranging in age from six to 11, included “*It gives us fresh food when it is all ripe!*”; “*All I like to eat are the cucumbers, that’s all I eat!*”; “*We like eating blueberries when they are fresh*”; and “*We like to pick things and eat them!*” One of the meaningful experiences in the garden, for the children, is clearly that they like to eat their harvest, supporting the notion that school food gardens do influence willingness to taste, eat and enjoy fruit and vegetables. If this were only true of fruit and vegetables grown in the school garden, actual effects on a child’s nutritional

health would be very limited, given the small scale of the garden. However, one mother confirmed that these nutrition behaviours occasionally make their way home, relaying that her youngest daughter was a very fussy eater, and now attributes her daughter's interest in vegetables to the garden club.

“Her interest in food just in general since she joined the garden club has improved immensely! ... and for the first time she ate raw carrots. And you couldn't get the kid to eat a raw carrot before she joined the garden club, and she tried radishes. ...but [she] would never have done that before ... [she] joined the garden club” (CL 124-26).

This same parent also felt that the primary factor influencing children's experience of success with the garden was parental support or involvement. Given that this family had their own home garden, and the parent expressed to me during the interview that she was very supportive of her children's involvement with the school garden, the nutritional 'successes' that this parent experienced with her daughter indicates that the home-school connection may be an influential factor in the garden's effect on nutritional health, and needs to be explored through further research. None of the school garden literature to date has examined how children with gardens and/or support for gardening at home are affected by school garden programs compared to their peers without gardens or support for gardens at home.

A school food garden that produced significantly more fruit and vegetables per child at school has the potential to have greater direct nutritional impact on a child. One health professional involved with Fairview (a much larger garden) reported that she had observed children willingly polishing off baskets of raw green beans from the garden, noting that each child likely had at least one additional serving of vegetables that day. However, there is no way to know whether only the children in the class who already

liked and ate green beans at home ate the majority of the class basket; a point also raised by school staff at River Valley. One member of the staff highlighted the possibility that children involved with the garden club may already like fruit and vegetables – which might motivate them to be involved in the project. The implication was that the project may not be reaching those who need it most (children who do not like and therefore do not eat fruit and vegetables). Undoubtedly some children involved in the project are naturally drawn to the garden because they like fruits and vegetables; however, the example provided above of a child who previously did not like raw carrots clearly demonstrates that it is not always the case.

Nutrition Skills

Several interviewees from within and outside the school community noted that children involved with the garden at River Valley are learning valuable life skills around food. These included the skills related to growing, harvesting, and preparing food. That students involved with school gardens are learning life skills is supported in the literature. One study of a school based food garden's impact on fruit and vegetable attitudes and identification skills concluded that school based food gardens were associated with skill development such as preparation of fruit and vegetable based snack foods, and that these skills were conducive of increased fruit and vegetable consumption (89).

The notion that garden project skills (growing food, harvesting, and cooking) can be take 'home skills' was also supported by a health professional working with the pilot study school, Fairview. Here the grade six students cook in the kitchen on a rotational basis, with seasonal menus that are, in the fall, planned around the garden. She relayed to me:

“One mother called me up to tell me that her child and his friend, when they were in grade 7 or 8, a year or two later, summer after grade seven, they were just routing around together in the summer, and went to mom and said, can we cook dinner tonight? And they cooked dinner for a family of four. ...And a good dinner, she said. She was so impressed” (JZ 82-86).

While not all children who participate in school gardens may become home gardeners or cooks, these findings show that *some* children did. The cooking component of the garden project at River Valley is currently limited to one harvest meal and a few cooking activities in the fall (e.g., zucchini muffins and fresh juiced grape juice). One goal of the garden is to increase garden-kitchen integration, recognizing the possibility for development of food skills. There is both hope and potential, as shown by the example from Fairview, that the gardening and cooking skills learned at school will be applied in the home.

These ‘take home’ skills were discussed as being particularly important practical skills for children coming from families of low socioeconomic status, the *“very poor”* (SEF 131-40), or simply children who regardless of family economics do not have access to a *“nutritional cornucopia at home”* (i.e., a wide variety of nutritious foods at home) (RD 123, 130-33), according to adults both within the school community and health professionals outside of it. While at the same time not wanting to *“paint them all with one brush”* (IB 32), these statements revealed a recognition among school staff and health professionals of the importance of social and economic status as a determinant of healthy eating at home (142), and that the relationship between socioeconomic status and nutrition is complex and influenced by a host of other individual (food choices) and collective determinants (environmental determinants and public policies such as those within a school setting) (143).

The garden could benefit children from all economic backgrounds because it is a free program held at lunch time, so membership costs and transportation barriers (including cost) often associated with after school programs are minimized. In this way, it allows all children to participate in extracurricular activities, experience a sense of belonging associated with participation in a group, and learn skills involved in home food production and preparation.

However, these ‘take home’ skills might not benefit all children and their families immediately as the support and resources for gardening and food preparation at home may not exist equally in all homes, as one health promotion professional expressed,

“ I think any kid would benefit from realising that food comes from the ground not a grocery store... but are [the kids from lower income families] going to be able to go home and have their own garden? I don’t know. I mean I know where [name] lives, and I don’t know if their family would do something like that. So are those skills transferable...maybe it’s not going to be supported at home” (IJ 57).

This quote questions whether children from families of lower socioeconomic status actually benefit more from the ‘take home’ skills. The notion that families can use home gardens to offset their household food costs has been discussed in the literature (56, 115), and one parent at least felt that indeed the potential for offsetting food costs is there. However, this hopeful strategy hinges on a family’s collective time and skills available to put into gardening, cooking, preserving and storing food. Also, the cost of starting and maintaining a garden may be a factor. Just as with school gardens, home gardens that produce any quantity of food require a significant amount of work, and time to work on the garden may be scarce in families facing economic or social challenges. A 2007 report from the Canadian Centre for Policy Alternatives describes that all but the richest 10% of Canadian families are working more weeks and hours in the paid workforce (200 more

hours annually on average since 1996) without their real incomes reflecting their increased work; only the richest 10% of Canadians saw a significant increase in their earnings during this 10 year period (144). Dwindling available hours to garden without increased incomes may explain in part why lower income families are unable to support children who would like to ‘take home’ their gardening and food preparation skills.

‘Take home’ skills were also discussed as being particularly important practical skills to meet basic human needs in times of natural disaster or scarcity. The value of the self sufficiency skills learned in the garden “*[if] a natural disaster [were] to occur, and we had absolutely no power, and no gasoline and no access to the local grocery store...*” (IB 12), was recognized as intergenerational for all children regardless of socioeconomic status.

“ *...[A] child that can go out and plant a garden and feed themselves and maybe their neighbours is better off than a child with a pocket full of money and the scanners aren’t working. You know. It’s about that. Sustainability. Taking what they learn and using it as a life long skill and in turn sharing with their future generation*” (IB 12).

The immediate benefits of these food skills in a natural disaster situation are only tangible in a situation where a family already has a large food garden at home that presumably is not damaged by the natural disaster described in the example scenario. Families who would be hardest hit by such a natural disaster – the poorest Canadians – are least likely to have the time (or land) to maintain a productive food garden. On the other hand, the intergenerational sustainability of self sufficiency skills is entirely imaginable, and a key concept of a sustainable food system.

Physical Activity

As a “*perfect health promotion project*” (JZ 7), gardens are also part of encouraging physical activity at school. Just by going out into the garden, the children are being physically active, and are participating in gardening, a pursuit that can be a lifelong activity according to one professional involved with physical activity at schools. Moderate and light physical activities are often also described as lifelong activities (e.g., walking, swimming, gardening) encouraging physically active lifestyles that can be carried on even late into life. The children that I work with in the garden are actively digging, turning over dirt, carrying heavy buckets of dirt or water, reaching, bending, squatting, walking and even sometimes running. One Canadian study on green school grounds has shown that they encourage active play in a wider array of activities and in a way that is more integrated into school life, however the degree to which this happens is limited by the design of the green school ground and school ground culture (145). Examples of design and culture factors that encouraged physical activity included whether the green school ground provided opportunities for non-competitive, open ended play. The non-competitive, collaborative nature of the garden at River Valley may also be encouraging of physical activity.

Gardens were also of interest to some participants for their ability “...*to increase... alternative forms of physical activity, other than sports clubs. So getting kids out gardening is one of those alternative forms*” (IJ 76). The importance of alternative forms of physical activity is that they give children who may not otherwise be physically active, such as those not interested in sports, or those with limited options available to them, an avenue to be moderately physically active (20). For example, the opportunities for organized physical activity are limited for the younger children in an elementary school

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(grades primary, one and two). One school board employee, who was also a former student teacher with the school, felt that in her experience with the project, the garden provided an opportunity for moderate physical activity and school engagement for these children, who made up the bulk of the extracurricular garden club during the time of data collection.

Overall, the garden has potential to contribute to overall physical activity at school, equity in availability of physical activity opportunities and therefore to help decrease the gap (or gradient) in physical activity levels between students. Also, there is hope that introducing children to gardening at an early age will trigger a lifelong interest in gardening similar to the hope discussed above that it will result in more nutritious choices later in life; however there are no longitudinal studies that link school gardens to lifelong involvement in gardening activities.

To conclude this section on the gardens social equity and human health effects, though the garden is a small feature on the schoolyard at River Valley, its social, emotional and spiritual effects on the teaching staff and students were predominantly positive. These effects were seen immediately through such examples as peaceful, collaborative learning and play, and held longer term potential in the development of civic values, and emotional and spiritual health.

Combined with the potential effects on children's fruit and vegetable consumption now and in the future, and the overall positive contributions to equalizing immediate physical activity opportunities, this school garden project is part of a holistic approach to health promotion at school, including physical, emotional and spiritual health. It is,

however, not without drawbacks. Those involved with organizing the project experience stress related to a shortage of resources, a limitation discussed in more detail elsewhere (42). Moreover, at its current scale, this school food garden lacks the power to affect the immediate, household (income related) food security of children and families of lower social and economic status.

5.3.2 Effects on Environmental Health

“And I mean they plant it and they watch it grow and they look after it and they see that, you know, you’re not putting, they’re not putting things on it that are not friendly to the things that grow (i.e., pesticides). I think that’s important, and I think that’s going to get way more and more and more important too” (SEF 91).

Members of the school community expressed beliefs that the garden project directly influenced (mainly) children’s knowledge of principles of ecology and, by extension, of *food systems*, through which they may develop *environmental values* and grasp *long term sustainability* issues. Through their involvement in gardening, some children learned about waste management issues, seed saving, and alternative growing strategies, and ‘food miles’; some developed a sense of ownership and responsibility over the environment, respect for farming, food and soil; some gained a sense of the long term implications of their actions. In this section, these findings are discussed in more detail.

Knowledge of Ecological Food Systems

Understanding seasons and lifecycles is one key science skill that children develop through garden based education (90), and some teachers at River Valley used the garden to teach principles of ecology such as the cyclical nature of growth and decomposition. For this and other cross curricular and experiential learning, the garden was a useful tool

for showing visual learners concepts that were talked and read about in the classroom, thereby benefiting both students and teachers. For example, one teacher explained that she took her class out in the fall, winter and early spring to show her class what is or is not growing during those seasons.

As described in *Setting the Scene*, there are compost bins in the garden. The garden club uses them to dispose of organic materials from the garden; however, they are currently not used for organic waste from the school. One health professional felt that composting in the school garden may to increase knowledge of broader waste management issues and thereby also food systems in which they are an integral part (60, 146). Embedded in an awareness of waste management and food systems are civic responsibilities, according to one parent who remembered that composting and waste management awareness did not exist when she was going through school and felt it was an opportunity to teach children that they could

“...make a difference in their world, in their community. And that gives them that opportunity [to act], which may or may not [have been] there if the garden club was not there” (CL 62-64).

Though some children are learning about composting, the learning opportunities could be extended to food systems (composting is one part of a food system) and civic responsibilities (waste reduction and management), were the school to use the compost bins for all organic waste from the school.

The seed saving activity, described under *Setting the Scene*, was intended to give children in the garden the opportunity to explore the cyclical nature of food systems. There is potential that in doing so, children also become empowered to *“make a difference in their community... to [act]...”* (CL 62-64) in favour of a more sustainable

food system, which includes individual food producers' sovereignty to save and use their own seeds.⁹

In addition to waste management and seed saving participants felt that the garden held promise for learning about other aspects of food systems such as organic strategies for planting crops, and the connection between environmental health and human health. One health professional felt that school gardens were useful in learning about different methods of planting (that could lead to discussions of) land use, farming methods and farm size. At River Valley the garden is planted each year guided by the principles of companion planting (see *Definition of Key Terms* section), one approach used in organic gardening. Teaching staff felt it is important for children to make the connection between 'organic' (the school does not use pesticides or fertilizers in the garden) and nutritious food, suggesting a connection between ecological health and human health. One lower elementary school teacher aims to help her young students to see this connection.

"I've taken my class there many times for... hitting on areas of science curriculum mostly, and... one of the examples would be to get them to think about what this plant needs and... what we're, how we're going to benefit from this plant, and if it's healthy and how we can make it healthy. And another one has been... just looking at the soil before anything is growing to see if there is anything in the soil" (SEF 9).

In her visits to the garden, she is teaching the students to recognize the connection between the health of the soil to that of the plants, and then to our own health, or *"how we're going to benefit from this plant"* (SEF 9).

Another example of how lessons about ecological food systems were introduced into the classroom is the lesson on 'food miles' that I led with the grade five classroom (129), described in more detail under *Setting the Scene*. In our discussion of the implications of

⁹ Sovereignty over seeds is an important part of *Food Sovereignty*, a concept related to community food security in their mutual focus on justice and sustainability of the food system (136).

increasing food miles, and how the school garden fit, some of the children in the class could identify the effects of increasing food miles on the environment, in the form of pollution from transportation, and on the local economy. Some of the children in the class come from local farm families and may already have been exposed to discussions at home about local markets, given the current provincial and global attention to food related issues. However, there is some evidence, based on one intervention study that introduced a school-based food garden and a part time garden education coordinator to an elementary school, that school gardens lead to greater attention to the *origins of produce* (89).

The sporadic nature of food system education activities at River Valley, such as composting, seed saving, companion planting, and food miles, limits the extent to which children are learning about ecological food systems. A part time garden education coordinator, such as the one described in the research by Somerset (89), may increase the frequency, scope and reach beyond what was possible at River Valley, as would more classroom based activities.

Environmental Values

“...and it shows an attitude more of caring... caring for your environment around the school. Growing vegetables, growing flowers. And the kids getting interested. Shows that they care. You know, they care what the outside of the school looks like” (SEF 54-56).

The teaching staff at River Valley felt that having the garden at school helped to encourage *environmental values* in the students and the school community through modeling *caring for the environment*, and fostering *an environment of caring* at the school. This is consistent with recent research showing that school gardens are perceived

by teachers to be useful in developing respect/reverence for the environment, and developing a sense of ownership and responsibility to become good stewards of the environment (90). This reciprocal relationship between the environment and caring, described by the teachers, is similar to the expression of *peace* described by the school principal, where in an act of caring for the environment, students are also engaging in an act symbolic of caring for one another, which she described as *peace*.

Gardens may encourage children to care for the environment through outdoor learning opportunities that expose them to the natural environment. This could increase their comfort with and even connection to the natural environment. One teaching staff member, for example, felt that the children “*who don’t like dirt*” (SEF 144) benefit from gardens because it may help them to become comfortable and familiar with soil, and expose them to lifelong pursuits like gardening. It is simplistic to categorize children into those who do and do not like dirt, but speaks to the notion that school food gardens may be useful tools for teaching children to be comfortable in and value nature for both the child’s own future health, and that of the environment.

School food gardens may also foster environmental values through learning about ecological food systems, as discussed in the previous section. Beyond the immediate case, several school staff, and health professionals from outside the school felt that by growing food in *any* school garden, the school is fostering *respect* for and interest in farming and food, which extends to valuing soil and where food comes from. One health professional relayed the relationship between school gardens and learning respect like this:

“... it’s also changing the cultural understanding of what food is, and to us, because for a lot it’s fast fuel, it’s throwing these 10 minute meals together, trying to minimize

effort and trying to be more efficient. That's fine. At some point there's a cost to that. There's a cost nutritionally, there's a cost environmentally, there's a cost respect wise, if you're cutting so (many) corners are you respecting the people that work the land, are you respecting the people ..." (LL 30).

The perspective of this group of health and teaching professionals is clear – that there is an increasing need to cultivate respect for the people and land that are responsible for producing the food that we eat. It is likely this perspective is influenced by the current political climate of heightened awareness of rising food prices and the affordability of a nutritious diet in Nova Scotia (7, 67, 70, 133, 147), as well as environmental issues (134) (see *Setting the Scene*).

In the context of poverty and busy family schedules, however, this seemingly benign sentiment about fostering a culture of respect for farmers and the land runs the risk of implying individual responsibility for protecting food systems rather than systemic changes that would protect our natural resource base to produce food. As one parent put it, it is not that people do not care, *"...I don't think that is the issue. I think the issue is the pressure of our society of our life that um, make it necessary for both [adults in a family] to be out working"* (CL 97). She also felt that these societal pressures which ultimately lead us to one-stop supermarket shops, fast and even (to paraphrase the health professional) 'less respectful' ways of eating, are *in some cases* individual choices or responsibilities. She says, *"... [T]here are pressures in life that we can't do anything about, and there are pressures in life that are really choices"* (CL 97). But clearly uncomfortable with the risk of making judgmental statements, this parent also clarified that the societal pressures that limit our time may for some families *not* be choices.

"And I would certainly not be in the place to say 'well if they chose to not do this, then they could have more time'. That would not be appropriate. That would not be my

place to say that, but whatever those pressures are, they limit our time, and in that way, limit what we can do” (CL 97).

For 90% percent of Canadians employment conditions of the past decade have been characterized by working more weeks per year and hours per week with stagnant salaries, as discussed under the *Social Equity and Human Health* section, (144). With more hours spent at work, fewer hours are available for purchasing, preparing and enjoying food in a way that is more respectful of food system actors and the environment. These foods are those with the smallest ‘footprint’, lowest ‘food miles’, are those that are least processed, organic, and locally grown. These whole foods inevitably take more time to prepare, time that most Canadians find that they have less and less of (144).

That the school food garden at River Valley can foster a greater understanding of food systems and development of environmental and food system values seems likely, and this finding is supported by the literature (29, 31, 36, 90). It is less clear, however, that school gardens do not have the power to influence some of the economic conditions and other societal influences that dictate how people translate their knowledge and values into how they purchase, prepare and eat food.

Understanding Long Term Sustainability

Sustainability is a key concept in CFS (see *Definition of Key Terms*). The school food garden at River valley is helping a few students to think about sustainability, and has potential to reach even more students with this same message.

One parent felt that the school garden project was helping to teach her children about “*bigger life issues*” (CL 8). She relayed, “*One of [my children] came home talking about how um, what they’re doing now was going to impact things that happen in years*

to come. That if they do a good job now, that it would continue to be passed on” (CL 15).

This parent felt that through their engagement with the garden club, her two children were beginning to think long term about their actions.

Affirming the same perception, a staff member described the long term learning outcomes of the school food garden using the example of planting and nurturing a fruit tree now for these student’s future children and grandchildren to reap the benefits from for generations to come.

“So it’s just a way to make them stop and think, and call us and reflect and you know... and it’s gonna take a long time for that tree to grow so it’s not instantaneous. Kids are sort of used to the here and now, but it’s thinking ahead and we have to nurture it. ...and [generations] and again we talked about [sustainability]. We have kids here whose parents went to [this] school so and you know, and community and their kids will come and maybe they’ll be eating the apples off the tree that they planted in 2005/06. So it’s making those connections too...” (IB 42-50).

Given that the whole school is involved in an annual planting of an apple tree in the garden, the learning potential about long term thinking and issues of sustainability reaches beyond just the children in the garden club to all students in the school.

In summary, it is clear that many of the environmental effects of this school garden project are not immediate. Rather, how this garden project affects the health of the natural environment is over the long term – generations or more. While measuring the extent to which these longitudinal outcomes may occur is beyond the scope of this case study, what this case study suggests is that through outdoor learning opportunities in the school food garden children are beginning to understand principles of ecological food systems, value their natural environment, including the food system that it supports, and think longer term about how their immediate actions will impact their future environment and health. This knowledge, these skills and values do not guarantee that children will be

(and become adults) empowered to act accordingly (i.e., societal pressures or economic circumstances also influence decisions), but these findings suggest that there is the potential that it will.

5.3.3 Effects on Economic Vitality

Considering the small size of this particular school garden, I did not expect, nor seek, comments connecting this school garden project to the economic vitality of this community. Nonetheless, ideas I had not anticipated arose, enriching this case study's contribution to our understanding of the potential school gardens hold as one strategy in building CFS, and our understanding of how people perceive a connection between food, agriculture and community health and development.

One concept that emerged from the data was the difference between school gardens focussed on food production for the cafeteria vs. those focussed on learning and demonstration. This first surfaced in an interview with one school staff member, and I subsequently offered for debate in later interviews. The school food garden at the pilot school, Fairview is an example of the former, while that at River Valley, the latter. Though this case study focuses on River Valley, both will be discussed, as the comparison is useful in showing how school gardens can contribute to economic vitality in the context of CFS. The possible economic effects can be grouped into two main economic effects: direct and indirect effects on the local economy and therefore CFS (9, 10, 16).

Direct Effects on Economic Vitality

The food garden at Fairview, where the pilot study was conducted, is a good example of a ‘mini-farm’ at school, which focussed on food production for the cafeteria. The school garden that is a mini-farm may influence short and medium term food security. Food would go directly into the cafeteria supplies, presumably offsetting the cost of fresh food in the school, lowering the cost of meals somewhat for students, while at the same time teaching them skills around growing and preparing food (if there is a cooking component to the project). However, it should be noted that there was no discussion among pilot study participants or in the school garden literature of lowering meal program costs for children.

The mini-farm also can give students direct access to fresh vegetables and fruit at school, which are well recognized as a key component in nutritional health (148), and more expensive items (relative to caloric density) often left out of the grocery cart when income related household food insecurity is an issue (78). One parent stressed the importance of at school, direct access to fruits and vegetables for all children provided by the mini-farm.

“I grew up extremely poor. So fresh vegetables [were] not something that we could not just go and get. And to see people giving kids that may be in that situation that I was in as a child the opportunity to do that, and to be able to, um, have access to stuff they can’t afford [at school], that completely impacts their own health, and it impacts their self esteem, and it impacts their self worth” (CL 64).

While supporting this parent’s perception that access to healthy, fresh food impacts a child’s health, self esteem and self worth, there is evidence which challenges the idea that small scale, community based projects have any substantial impact on a child’s overall access to nutritious food, or their *household* level food security. Community and food

based nutrition programs such as school breakfast programs have been criticized for disempowering parents (39) based on evidence that they run the risk of institutionalizing child feeding responsibilities and undermining the larger need for long term, centralized poverty reduction strategies (40) and strategies that directly address CFS (such as an integrated national food policy). Critiques of disempowerment and undermining centralized food security strategies did not arise in my fieldwork; rather, findings suggest that this particular school garden is one small part contributing to a broader CFS movement. Nonetheless, school food gardens are growing in popularity, touted by some health professionals as intuitively good (paraphrased from JZ 21) and recognized by the Canadian and American professional dietetics bodies as strategies for building CFS. It is essential to look critically at school garden projects on a case by case basis, and settle on measurable school garden based CFS indicators before we can address whether seemingly ‘wonderful’ (43) school food gardens are subject to the same critiques of disempowerment and undermining centralized strategies, or whether they are contributing to CFS. This is prudent before making broader health policy recommendations and resource allocations.

Another challenge to the mini-farm’s potential to influence CFS, as any gardener or farmer will know, is that there is a lot of work involved in growing food in quantity. The mini-farm requires many human hours of work, whether volunteer or paid. This becomes relevant to the economic vitality of the community, as was pointed out by one health professional, in that the mini-farm at school might be more expensive or break even to the school’s food budget. The amount of work involved in a mini-farm is more than most teachers are willing take on themselves without the help of a hired garden coordinator.

However, the cost of hiring someone, and time involved in securing grant money to pay that person, may negate the cost offset in the cafeteria. This is also important because this particular school serves a food producing region, where it might be more cost effective to spend the money used to hire a coordinator to instead buy produce from a local farm, thereby also supporting the local food economy.

The desire to expand the garden project at River Valley was commonly expressed by members of the school community, when asked what their ideal garden would look like in 10 years. Though the mini-farm idea has very attractive, immediate potential benefits to the school and children, by providing a supply of fresh, ready to eat produce at very low cost and equalizing access at school to fresh produce among students regardless of socioeconomic status, there is need for schools wanting to expand their gardens to weigh the *full* costs and benefits. Using a CFS framework such as the one used in this case study might be useful in this cost benefit analysis.

Indirect Effects on Economic Vitality

“But boy oh boy, it would be interesting to talk to some of those students in a few years and see what some of them are doing. I bet you some of them are going to go into agriculture” (LL 88).

A small garden project focussed on learning and demonstration – a ‘learning garden’ – such as the one at River Valley, does not necessarily produce a large quantity of food for the cafeteria. However, the River Valley learning garden’s impact was recognized as important for *indirect* and *long term* food security and the local economy by the school community.

Just as with a mini-farm at school, learning focussed gardens may also help students to *build skills* around food production, making their community more resilient to shocks

such as food or economic scarcity. These sentiments were reiterated by a health professional working outside the community, saying that gardening “...*might spark interest in either [gardening as] a hobby... which could serve their own personal [needs]... if people could grow their own food and supplement their own diet so much the better*” (LL 24). If gardening did spark an interest in hobby gardening, what they grow in the school garden (i.e., food) may be important to what they grow as adults. One study of backyard gardeners in Toronto found that personal significance, perhaps tied to childhood memories, is connected to the plants adults choose to tend (140). As discussed under *Social Equity and Human Health*, however, food growing and preparation skills learned at school may not be impacting children of all socioeconomic backgrounds equally according to whether or not they are able to ‘bring home’ these skills, putting them to use in family gardens or kitchens.

A learning garden, as discussed previously under *Effects on Environmental Health*, may also foster an appreciation and understanding for the process of growing food, and values such as respect for the food system and actors within it. A health professional working outside this community highlighted the relevance of this to the economic vitality of the community. She felt that a school food garden may spark an interest in a future career in food production, agriculture, or even horticulture, which are typically not encouraged in schools, and

“... *if you’re never exposed [to these career options in school], how do you know? ...We’ve got these farms disappearing all over... who the heck do they think is going to grow our food, and where? So I think some of it is really bringing back that idea of this is a really important job that people have*” (LL 24).

Though speculative, this supposition is supported by the findings of a study with horticulture students at a US college where they identified experiences with gardening in

childhood as a strong influence in their postsecondary pursuit of horticulture studies (149).

While acknowledging that children involved in the garden project may learn about the importance of food production as a career and gain an interest in agriculture as a career, and the potential to also influence the future economic vitality of the community, the majority of the children attending this school either live on a farm or are exposed to the career option by surrounding farms. However, as this idea arose late in my interview schedule and from a professional outside of the community, I was not able to pursue this idea with members of the school community. Nonetheless, the research based on horticultural students suggests that childhood exposure to gardening may indeed influence career choices (149).

The economic learning opportunities extend well beyond the community into the complexities of global economic issues as they relate to our own food production and consumption habits, as one health professional pointed out.

“[T]here’s certainly links you could make with agriculture in general and how if you don’t take care of the land it’s not going to produce for you. And then you can talk about if you’re going to grow your own food then maybe it doesn’t have to be trucked in. I mean there’s so many links we can make. But then you can get into, you know, if we don’t ... import food from some of these third world countries, then right now, that’s their [livelihood]... that’s actually creating and income in some of these African countries” (BV 28).

Though the garden provides an opportunity for direct experience and learning that has implications for community economic vitality, it is up to the classroom teachers to draw the links between sustainable land use for production with more global issues such as food miles and global economic equity issues.

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To summarize, in theory larger school gardens that produce a significant amount of food may benefit a school by lowering the cost of some meals at school to all students. These benefits should be weighed carefully against the costs of having a paid staff run the garden, the alternative use of this money for purchasing produce instead directly from local farmers, and against the criticisms of institutionalized child feeding programs.

At River Valley, the potential effects identified in this thesis on economic vitality in the community are longer term, and difficult to measure. These include encouraging members of the school community to value food production, as either a hobby for their own consumption or especially as a career, and wanting to remain in their community. They also extend to self sufficiency skills, which may decrease household food costs (56, 115), though not necessarily for all families equally (116). Findings also exposed student learning opportunities related to inequities in global economics and trade, if a teacher is so inclined to make this connection.

As stated in the beginning of this section, and reiterated throughout, the findings of this thesis show both direct and indirect effects that result from the school food garden at River Valley. While direct effects, such as cooperation, development of food skills (growing and preparing), and outdoor learning opportunities may have immediate benefits to the students, the most significant findings with respect to CFS are those that are more indirect, or potential effects. These include a range of knowledge, skills and values that may influence social equity and human health, environmental health, and economic vitality of the school community, now and in the future. **Figure Four** depicts a summary of these direct and indirect effects within the conceptual model of CFS described in *Chapter 3: Theoretical Framework*. Many of the components in **Figure**

Four were anticipated, based on the literature review, in **Figure One: Model for Conceptualizing the Effects of School Gardens in a Sustainable Food System: Underlying Considerations for CFS**. Other components are reframed, such as the anticipated learning around soil, plants, composting, and localized food. These are reframed in **Figure Four** to “Knowledge of ecological food systems,” which captures a broader concept from the analysis. **Figure Four** also adds new concepts that were unanticipated, such as sparking an interest in farming as a career, and education about the global food economy.

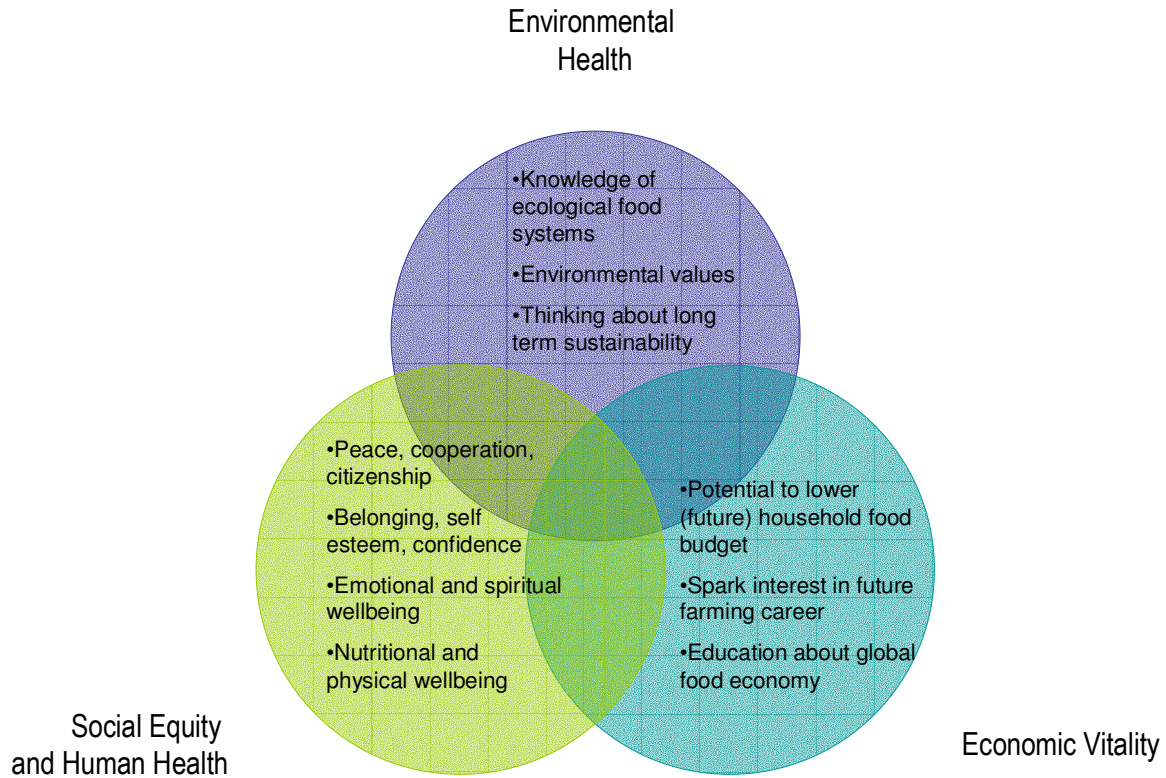


Figure Four: Model for Conceptualizing River Valley Elementary School Garden as it Relates to Community Food Security. Adapted from Garret and Feenstra, 1999 (16).

5.4 *What Factors Contribute to These Effects?*

In this section of the *Findings and Discussion* I explore what factors contribute to producing the effects discussed under *Direct and Potential Effects of the School Food Garden*. Factors identified by the school community as contributing to the reported effects of the school garden and the influence they exert on issues of CFS at the level of the school were analyzed according to the five layers of Bronfenbrenner's Ecological Systems Theory (120, 122) and are presented in this section accordingly under the headings: *Microsystem*, *Mesosystem*, *Exosystem*, *Macrosystem*, and *Chronosystem Factors*. These factors were introduced under the heading *Setting the Scene*, at the beginning of this chapter to orient the reader to the garden (considered the microsystem in this thesis), the school and community (the mesosystem), the school board and provincial government (the exosystem), the overall culture (the macrosystem) and factors specific to the time period in which this study took place (the chronosystem). In this section, I will discuss their relevance to CFS at a school level based on the findings of this study.

Table Two summarizes the environmental factors involved and their resultant effects. Only key factors and their resultant effects will be discussed in relation to the school food garden and its overall contribution to CFS; other less significant factors identified will be mentioned but not discussed in detail.

Table Two: Environmental Factors Associated with the Direct and Potential Effects of the School Food Garden at River Valley Elementary

| Environmental Factor | Resultant Effect |
|--|--|
| <i>Microsystem Factors</i> | |
| Physical Qualities: 1) Location & Layout: (natural beauty, built structures) | Visibility; awareness that the garden is there; less vandalism Pride Use of the garden; desire to go outside, ability to sit in the garden; experiential & outdoor learning tool <i>at school</i> Opportunity for alternative, moderate physical activity at school Peace; peaceful “sanctuary” at school |
| Activities | Garden goals guide focus of activities (classroom vs. cafeteria focus) Non competitive; cooperative learning and play Exposure to/willingness to try fruit and vegetables (role modelling) |
| Roles and interrelations: 1) Garden Coordinator 2) Volunteers | Guides focus of activities (e.g., learning about food & food systems) Pressure to keep garden going and successful; stress Experience of success; shared workload between volunteers Key to sustainability |
| <i>Mesosystem Factors</i> | |
| School, Home and Community Interactions | Curricular/home/community reinforcement of (food related) knowledge, skills and values learned in the garden (between Microsystems) |
| Barriers to School, Home and Community interactions | Limits curricular/home/community reinforcement, limits participation in the garden by students/parents, and limits broader benefits |
| <i>Exosystem Factors</i> | |
| The Local School Board (Health Promoting Schools, Strive-For-Five)* | Promotion of gardens as a health promotion tool Mutually supportive goals Exposure/willingness to try fruit and vegetables at school |
| Community Health Boards and Foundations | Influence funding opportunities |
| Government Departments: Education; Health Promotion & Protection; and Agriculture | Nutrition, health and education strategies and policies with mutually supportive goals: setting level tool Time to Learn policy limits teachers’ perceived time to dedicate to experiential, or other time consuming learning strategies |

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| <i>Macrosystem Factors</i> | |
|--|---|
| Health Culture | Collective responsibility for health (public health) reflected in exosystem policies; Health Promoting Schools ¹⁰ Individual self-sufficiency promotes local culture supportive of gardens; resilience in times of scarcity; pride in work/garden |
| Local Food Culture: Transition period or “ <i>uncomfortable zone</i> ” between 1) Disconnect with Food 2) Food Counterculture | Learning about/ valuing ecology and food systems (need to know/desire to forget phenomenon) Support for Health Promoting Schools & Nutrition Policy Shared/ reinforced (food related) knowledge, skills and values learned in the garden; exposure to fruit and vegetables Cultural support for the garden; volunteer involvement from community Media attention leading to school pride Starting a home garden Choosing food production or horticulture as a career Long term thinking and sustainable choices now or later in life Sense of hopefulness (<i>potentially as a symbol of future sustainability</i>); spiritual connection at the school |
| Culture of Immediacy | Hinders developing food growing and prep skills; food and environmental values Hinders starting a home garden Hinders long term thinking; sustainable choices |
| Pedagogical Beliefs/Norms | Teacher’s skill and confidence with experiential education Use of gardens in classroom and school |
| Volunteerism Culture | Availability of volunteers and donations |
| <i>Chronosystem Factors</i> | |
| Global awareness of rising food prices | Food habits and culture Sense of hopefulness Choosing food production as a career |
| Global awareness of environmental issues | Learning about and valuing food systems Long term thinking; sustainable choices Cultural support for the garden |

¹⁰ The **Health Promoting Schools Program** is a provincial project operating in the regional school board to which the case study school belongs, which currently focuses on facilitating physical activity opportunities and nutritious food at school for all students (48). **Strive-For-Five** is a resource binder of seasonally appropriate, seasonally organized, recipes and nutrition information that meet the standards required of the provincial Food and Nutrition Policy for Public Schools, which helps facilitate the introduction of local, healthy foods into the school.

5.4.1 Microsystem Factors

In this case study, I am using the microsystem to represent the garden itself. This section will discuss the key characteristics of the school garden, the activities, roles and interrelations experienced by people in the garden, in relation to their effects.

Physical Qualities of the Garden: Location and Layout

The location of the garden in the schoolyard, visible from the parking lot, school, playground and road, was a common feature named by parents and staff alike, as contributing to the success of the garden. In its location the garden is visible, which contributed to student pride, made it inviting to community members, decreased vandalism, and made it available for use by classroom teachers.

The visibility of the garden from the road and from the parking lot where children arrive at school made the students “*proud*” (IB 34) according to one staff member, because “[*t*]hey see it every day when they pull in on the bus... first thing” (IB 34). Student pride was an unanticipated outcome related to the location – one that may contribute positively to emotional well being for some students.

The garden was “*strategically placed*” (IB 34) by the original planning committee “*so that cars going back and forth should see our edible garden. So because we wanted [it] to be a community event, for people to be a part of that*” (IB 34). The strategy worked. For one parent, seeing the garden right next to the school was inviting, and part of her decision to send her daughter to this school. “*Just seeing it when you drive up to the school, or walk up to the school, to see that there’s a garden. To me that’s a big... incentive for us when we thought about sending [our youngest daughter] there*”(RA

243). For this family, the garden instigated their involvement in and possibly their connection to the school and community.

The location and visibility of the garden within the immediate community was also believed to be a part of why the garden has not suffered vandalism. The teaching staff pointed out that vandalism to the school does happen, so it cannot be location alone that protects the garden. Teaching staff speculated that pride and collective ownership of the garden also played a factor.

Being right beside the school the garden was immediately available for teachers to use for experiential, cross curricular and outdoor learning experiences, possibly contributing to the health, ecological, economic and overall improved learning outcomes for some students discussed under *Direct and Potential Effects of This School Food Garden* such as development of food skills, connection to nature, and career choices. The layout and design of the garden also contributed to its use. One teacher who used the garden explained,

“ I think the design of this garden contributes to our use, well to my use of it, and to our value of it. It is a work of art, meaning that it isn't just your 8'x16' roto-tiller garden. Which isn't bad, the crops grow, but this one is an artistic...” (SEF 340).

Built structures like the benches and raised beds, for example, allow children to sit within the garden facilitating activities like reading stories in the garden. But the availability of the garden and artistic layout was not enough to entice classroom teachers to use the garden on a regular basis. The garden was still underutilized, according to both teaching and administrative staff, limiting its learning potential.

Teacher: *“it's not anything we would have taken on ourselves.”*
Another Teacher: *“Just because there is a general feeling amongst staff, and not just this staff, but among teachers in Nova Scotia that we're being handed more and more and more things to do. And it just seems, just to get through the curriculum of what we're*

supposed to do is challenging enough, without saying okay, lets do something extra here. Even though we know this is something worthwhile, this is something we should be doing, you know, it's just a challenge to take on something extra at this point" (SEF, 166-168).

The principal backed this feeling of teachers being unable to take on “extra”

“worthwhile” learning activities. She discussed her challenges in,

“Trying to make it as user friendly as possible so that teachers don't perceive it as one more thing... Is there room to grow? Yah. I'd like to see it get bigger to be utilized more. Into our hot lunch program. I'd like to see the teachers take the kids outside and use it as a learning opportunity and... take more ownership over it, so that it becomes a more natural part of the learning process at the school...” (IB 6).

The garden's design also seemed to be a central feature that inspired comparisons to a sanctuary, and contributed to pride and beauty. One teacher explained,

“... and 'sanctuary' fits it because it's enclosed, it's surrounded. Even though there's a busy road right beside it. There's the trees that break that off and it just seems that when you're sitting in the garden with a class of 25 or 26, it just seems like we are in a little sanctuary” (SEF 340).

The beauty of the garden certainly played a large part in generating pride, especially among the staff. The teachers described the garden with phrases like *“It's particularly eye catching”* *“very eye pleasing”* *“it's a work of art”* (SEF 62-66). The principal felt that the *“ [slide show for end of year assembly] that was probably one of the most powerful visuals that [she had] seen of the garden”* (IB 38). It made her feel that *“as small as it is, and it is small, it just looked so big there. It made [her] go 'wow, we've got a darn good garden up there”* (IB 38). The slide show described in this quote transported this staff member into the garden, and helped her experience the beauty of it, which brought on feelings of pride.

Students too appreciated the beauty of the garden, like the *“...flowers and things that are beautiful like butterfly wings and ... all the vegetables that are growing in there like*

tomatoes and other things and ...the little pine tree around there..." (DL 59). It gave them a sense of pride in their involvement in the garden, and more importantly "*so that kids could have nice places to play and stuff*" (DL 63). Another younger student, when asked what the school would be like if the garden was not there, she responded, "*Well, it wouldn't be pretty!*" (NN 72-75), succinctly summing up the idea that beauty is important in this garden.

Activities in the Garden

The garden goals, developed by the garden planning committee (a group of teachers, parents and students invited by the principal to develop the project in 2004/05), influenced the focus of the activities done in the garden. The garden goals, listed under *Setting the Scene* in this chapter, had an important influence over what types of activities were carried out in the garden, who was involved, and therefore on the findings in relation to CFS.

During the data collection process, it became clear to me that the goals may have been too broad for the size of the garden project. They were set broadly in order to guide decisions over the years that the garden developed. Consequently, two goals in particular, (*#2: To use the garden for experiential learning in ecology, nutrition, sociology, life skills, culture and community engagement; and #3: To develop strong links between the garden project and the hot lunch program*) guide the garden in two different directions, as described by one school staff member. Goal number two towards using the garden as an education focussed demonstration tool, and goal number three towards using the garden as a mini-farm, focussed on food production. This staff member felt that the garden needed to focus on one goal, rather than both.

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“It either needs to be a kids project, or a school food supplier, in order to be a food supplier it needs to be bigger and more geared that way... [there needs to be] leadership in one direction, instead of two or three directions. And if it’s going to be for the kids, then the kids make the decisions and the kids do it and eat it and enjoy it and then there’s a little extra for the [cafeteria]. Or it needs to be for the school, and bigger, and led by what the school needs and it needs to [have] backing by the school or whatever so we can store the stuff and all that kind of stuff, and the kids can get in and help. Type thing... And it feels like we’re trying to do both, and I don’t think we can have equal partnership. I think it needs to be one or the other, and the other is a minor. You know what I mean?” (RD, 153).

This divergence between goals two and three has led to difficulties in decision making about, for example, what to plant in the garden. For two years one grade five class decided what to plant in the garden. The children decided on plants according to which plant they wanted to do a classroom research project on (an activity set up by their teacher), and how well it grew in this climate. While this helped meet goals one and two, it made the third goal especially difficult to achieve. Though the idea to survey the cafeteria for their produce needs was mentioned every year, it has happened only on an informal basis in conversation between the healthy lunch coordinator and myself. The cafeteria is not yet using any of the food in a consistent manner during the harvest season. As a result, the ways in which the garden may affect CFS directly, for example through access to lower cost food in the cafeteria, are limited. However, the focus on using the garden as an experiential education tool has resulted in other indirect or potential benefits to CFS, like fostering positive environmental and citizenship values. In order to accommodate each of these goals, the garden project will need to grow in both size (production) and involvement (people), or alternatively redefine the goals of the project to match its capacity.

In addition to the focus of the activities, the *nature* of the activities in the garden also influenced the garden’s potential impact on CFS. The majority of the activities done in

the garden are non-competitive by nature contributing to cooperative learning and play, and potentially as a result, the development of self esteem, belonging, and confidence.

To illustrate, when asked whether any one group of students in particular benefited from the garden more than another, one staff member replied,

“I also believe that one group benefits more in that if they have low self esteem they now have high self esteem. Whereas another group would go and be part of it and there’s no self esteem issues because they’re part of a lot of things. So for me it just boosts, provides an opportunity for those kids [who might have low self esteem] to feel good about themselves in a non threatening environment because there’s no competition there. ... with the garden there’s no test. So it takes away [the competition]... I believe... but yet you can still feel success” (IB 38).

As discussed under *Effects on Social Equity and Human Health*, children’s development of social skills such as cooperation, and their development of self esteem, belonging and confidence may also be key in the development of civic values and contribute positively to their emotional health.

Roles and Interrelations in the Garden

Roles and relationships between people in the garden also influenced the nature of activities done in the garden, and how children, who seem to be the most important project beneficiaries, experience the garden. The central actors in the garden are the children who use it, activity leaders (either the garden coordinator or classroom teachers) and volunteers.

The vision of a school garden – the goals, activities that are done in the garden, how much community involvement occurs, etc. – is directly related to the interests of the school garden coordinator (or champion, a term used by some interviewees). If the direction and activities of the garden were, until the fall of 2008, directly related to my own interests, then it would be fair to say that activities in this garden project were

motivated by my desire to see students connect with food, in whatever way is meaningful to them. This is important in the implications of this research, as not all school garden coordinators will have the same focus and therefore not all school gardens will have the same effects on aspects of CFS as it pertains to the school community, the outcome of interest in this study.

Most of the school garden projects that have been written about in the literature have a distinct focus on student learning about nutrition (17, 19, 30, 89), environmental ethics (13, 29, 31), or for a broad spectrum of learning outcomes including physical activity (32, 145), life skills (90), or other academic outcomes (34). However, a few models proposed (35, 150) and described in the literature do directly focus on children learning to establish healthy relationships with food and food systems (28).

More than just providing direction, my influence extended to my relationship with the children while at the school in the garden, and according to one parent, this relationship is important to the overall experience of children while in the garden. Just as children's interactions with each other in the garden can positively or negatively affect what they learn and feelings they experience in the garden, so too can my own interactions with them. My own personal reflections, supported by parent feedback in two interviews, led me to believe that my relationship with the children and influence on their experience was largely positive and that my curiosity for and attitude towards growing and eating food affected the children that work with me in the garden.

The success of the garden is reliant on a team of eight to 10 families who care for it in the summer. If children involved in planting in the spring came back to school in September to find it overgrown, or dead, their overall experience might be that of failure.

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Though some of these same children may be involved with their families in summer care, not all families are able to volunteer. Especially for children who are not involved in summer care, these summer volunteers (often parents/families and teachers) help the students experience success in their garden activities.

For the adults involved, the involvement of other community members in the garden helps to share the workload, and increase the use of the garden for curricular and extracurricular activities. Though sharing the workload is helpful, staff felt that without a volunteer to take on the organization of the garden, they would likely not make the time to organize activities in the garden themselves. Staff members already have a significant amount of extracurricular and obligations outside of classroom time that limit their ability to take on more time consuming initiatives like organizing a garden and using it in their teaching. As one teacher described,

“um, I mean that I do believe that we have to have lots of different approaches to teaching and learning and that kind of thing. But if it hadn’t have been for you, coming into my classroom, and really taking charge and being in charge of the garden, I don’t know, you know, even though my belief is there, at the time the commitment to everything, and I think that without a volunteer like you it would be extremely difficult” (SEF 160-64).

In summary, leadership from volunteers (including parents and teachers), and especially a volunteer coordinator (myself) were the key factors in the existence and sustainability of the project. Their, and my leadership in the garden activities was the key factor steering the nature and focus of activities in the garden, which in the case of this school garden were focussed on exploring and connecting with food, and integrating the garden into curricular activities as much as possible.

5.4.2 Mesosystem Factors

This section will focus on the *interrelationships* between the school, home and community, and how they can reinforce the food garden's contributions to CFS, as discussed under *Direct and Potential Effects of This School Food Garden?* This section will also discuss barriers to school, home and community involvement in creating mutually supportive environments for the school garden.

Home, School and Community Interactions

As reviewed in *Chapter 2: Review of the Literature* and reinforced by one health professional, schools are ideal settings for health promotion (151); however, preferably, health promotion is “*structured as part of a societal commitment that makes the health of its youth a matter of high priority*” (Bandura, 2004, p. 158) and integrates the school, home, community and society at large (47). In the case of this garden project, the home, school (including classroom and cafeteria), and community can act as support systems and reinforcers for the social, health, environmental and economic effects that the garden exerts. For example, if a child is learning how to grow and value fresh greens from the garden at school, the strength of influence this message has on the child will be greater if this message is reinforced within their larger environment. For example: if the greens are served in the lunch program where s/he learns to taste and like the fresh greens; if the teacher is doing a unit on food miles, using organic greens from California as an example; if the school belongs to the Health Promoting Schools Program and focuses on maximum nutrition in schools; and if his/her grandparents who live next door also grow

and value fresh greens, then the research shows that this child is more likely to value, eat, and like fresh greens (47).

If any, or ideally all of these situations are present, there is mesosystem reinforcement of a healthy message. Therefore there is a need for continued home, community and school involvement in the continuous shaping and maintaining of the project. However, for many reasons, there are barriers inhibiting a child's various microsystems from reinforcing the garden-related learning and effects. Barriers to school, home, and community support and reinforcement will be discussed here.

Classroom

There are barriers to teacher and curricular involvement in the garden. Teachers felt that they do not use the garden as often or extensively for curricular activities as they and other staff would like because of time and curricular restraints related to their job demands and accountability structures related to the Time to Learn Strategy, as discussed under *Setting the Scene*. Central questions that arose from the school administration were “*how do you implement a garden program without overburdening the teachers?*” (IB 6), “*how [do you] encourage staff to use it?*” (IB 77), and how do you keep and maintain staff interest? “*They need constant reminders that this can be an excellent teaching tool and there are resources and materials which have been bought specifically for this reason*” (IB paper 15).

One former student teacher that was involved with the garden project during her time at the school recognized the importance of having an adult who is in the school on a daily basis (such as a staff member), as an active leader in the garden project. She felt this could provide continuity for children involved, someone to ask questions about the

garden to, put out regular announcements, and provide continual monitoring of garden-school related issues. She explained, “*it would be someone who could kind of continue to foster that excitement*” (IJ 39) that the students hold about projects they have just completed or plants that are growing. Without an internal school coordinator, there can a week or two between meetings or activities. Several members of the school community firmly believed that an internal coordinator, preferably a paid staff member specifically tasked to the garden, needs to be involved as the responsibilities are too great for teachers to take on themselves.

It is possible that a teacher’s lack of confidence in using the garden as a teaching tool also contributes to limited use of the garden for curricular activities. This same former student teacher explained that

“*...I guess I felt like I didn’t have a lot of confidence with it. I was glad you were there to take the lead on it, because I don’t know if I would have gotten involved with it without you being there because I feel like I didn’t know that much about gardening at that point*” (IJ 13).

Another challenge to using the garden as a teaching tool that was identified was that “*because [the kids are] outside of their natural, you know, boundaries that they are used to within the classroom*” (SEF 38) behavioural issues could be an issue when trying to teach outside. While this may be the case with some students, where outside time means play time and kids end up throwing dirt or tomatoes at each other, other members of the teaching staff felt that this was not unique to *outside* behaviour. It runs contradictory to suggestions in the literature that gardens and green play spaces foster interactions that are cooperative (90, 94), civil (94), and less aggressive (94) or disruptive (28). My own experience working with children in the garden is that there is indeed more *movement* in

garden activities as compared to activities held inside the classroom, children are running when they have a chance, but incidents of aggressive or malicious behaviour are few.

Others (including teachers) commented that that perhaps the age of some of the teaching staff is a barrier to more teacher involvement. They speculated that perhaps older teachers have less energy and motivation to try new teaching approaches, or to take on such an intensive project. In a discussion with me about school gardens during my data collection period, another trained teacher who was not part of the staff at River Valley, nor an interview participant, implied that perhaps teachers of an older generations were not trained to teach in outdoor environments like younger generation teachers are, and one health professional suggested maybe in general younger teachers might be more interested in gardening. I feel criticisms based on age may bear some truth, but do not outweigh the importance of curricular restraints related to time. The teacher who identified age as a barrier is one of the older teachers at the school, was one of the teachers most involved at a curricular level, and most vocal about supporting experiential education methods.

Cafeteria

There are several factors that limit how the cafeteria is able to reinforce the value of the garden through using and serving food grown in it. The first is that the garden that is the subject of this case study is very small. It will not supply the cafeteria with a significant amount of food, but could for example, grow the vegetables to provide a fresh salad bar for a couple months in the fall.

The second is that the time I am able to spend at the school as the volunteer garden coordinator is very limited. Orchestrating the planning of regular harvests for use in the

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cafeteria requires much more involvement from cafeteria staff, which has so far has been limited, not for lack of interest, but because I have focussed my time in the past four years on encouraging and facilitating classroom use of the garden.

The third is that having a food garden at a school can contribute to the added time burden of using fresh produce in a school cafeteria. According to one health professional, cafeteria staff in most schools in the board were likely to be receptive of fresh food coming into the kitchen, but were faced with barriers that often made cafeteria staff in this board hesitant to comply with, or resentful of the new Food and Nutrition Policy that requires them to use more fresh food. *“They don’t have enough time. They’re not paid for enough time. Many of them don’t have the skills. And they don’t have the resources and they ... the cost of producing it can, not always, can be higher”* (BV 95). While at River Valley, skills are not the issue; the Healthy Lunch Coordinator conceded that more integration of the cafeteria and garden will have to acknowledge and address some of the barriers faced by cafeteria staff in working with fresh foods, especially time, *“in terms of time... we only have a small window of time to get things ready”* (RD 25), which is *“[t]he main barrier in order to ... to take something that’s just coming out of the garden, you have to take time to do something with it”* (BV 95) according to one health professional.

Even if the connections between the garden and cafeteria were stronger, *“ [they] don’t use a whole lot of veg’ in [their] program”* (RD 109) anyway. Better integration of the garden and kitchen will require not only an effort on the part of the garden to grow foods that are useful to the kitchen, but also an effort on the part of the Healthy Lunch Coordinator to serve foods using more fruits and vegetables. At River Valley, the Healthy Lunch Coordinator is prepared to put forth that effort. She felt *“...that there*

needs to be more input from the [Healthy Lunch Coordinator], more cooperation between the kitchen and the people that are planting” (RD 37).

Home

The role of the parents in the success of the garden, and their children’s experience in the garden, is paramount according to one parent, who said,

“I really think that one of the biggest things is either the encouragement of the parents. Or the lack of the encouragement. That if the kids come home excited and the parents say ‘oh, whatever’, that’s going to have a very negative impact on not only the success of the garden itself, but the success of these children...as well as the reverse” (CL 110).

This parent felt that gardening activities or even encouragement at home helped children to feel success in their garden experience, interest in the school garden, and a sense of belonging and confidence when in the garden. Parents’ participation in the school garden would also be an example of reinforcement from home; but home gardening and participation at the school garden may not have been available to all families. Some participants felt that often in families of low socioeconomic backgrounds, the support for gardening – at home or as summer volunteers – was not there.

When asked directly whether she felt the garden project particularly benefited low income children, one health professional responded, *“I think access has a lot to do with it. I don’t know if it would benefit them. I think any kid would benefit from realizing that food comes from the ground not a grocery store. [B]ut are they going to be able to go home and have their own garden? I don’t know” (IJ 57).* Here she acknowledges that while all children would benefit from being involved in gardening activities, not all children come from families where these activities are supported at home. Without implying that this example applied to all families of low socioeconomic, she went on to

describe one family in particular that she was familiar with, whose children belonged to the garden club in the past.

“[T]hey do have a yard and they could do something there, but that willing[ness]... Until they get older, that willingness from their family is not there. I mean what about... it'd be neat if each kid from the garden club got to take home seeds and plant them at home...If they got a potted cherry tomato plant that they could put on their...I could see if [these kids] were given something like that, and they got to take it home and take care of it, I think they would. But I don't see their parent's going out and buying them seeds or buying them starters or anything like that” (IJ 56-67).

As was suggested in the above quote, providing plants in pots for garden club children to place near their home could minimize the need for parental involvement or access to soil, if these were not available, regardless of socioeconomic status.

Teachers felt that, through the school garden, the potential to encourage home gardens was certainly there. Similar to the discussion with the health professional, one teacher felt that *“... with little bits of encouragement... we might see families start gardens. Small gardens. Or a few little plants, like a couple of tomato plants in planters or something...”* (SEF 379), suggesting that if parental support for gardening was not available to children, their experience with gardening could still be supported by encouragements for home gardening from the school. In the school gardening literature home gardens were noted as an outcome of exposure to a school garden (98).

It is important to note that the goal of the school garden at River Valley was not to encourage gardening at home, but rather what these teachers were alluding to was that the reinforcement of a message (such as the possible benefits of gardening and healthy eating) at both home and school helps to strengthen the message that the child receives and strengthen the health promotion potential of the message (47). It is also important to acknowledge that healthy eating messages may be a source of stress and guilt for low

income families who do not necessarily have the resources (time or financial) to reinforce them – i.e., start a home garden or volunteer in the school garden. We know that for some low income Nova Scotian lone mothers who face food insecurity, public health messages such as including milk as part a balanced, healthy diet (148), became a root source of stress (78, 152). To them milk represented an elite commodity (i.e., for the financially privileged); though vital to health it was a source of stress because they were unable to *reinforce* the healthy eating message at home – i.e., provide their entire families with the recommended number of servings of milk per day (78, 152). This is not to undermine the importance of teaching health and healthy eating at school, or the valuable effects of school gardens discussed in this thesis, but rather to present a critical view of the importance of mutual reinforcement of health messages between home and school. The strength of home-school reinforcement of growing food is yet another way in which lower income families are and feel excluded from CFS, while families with the resources to participate benefit.

Community

The community's support for the garden project is also crucial in the sustainability and vitality of the garden and suggests that the school garden reflects something that is important to many in the community. In turn the garden supports community values by offering opportunities at school to teach them. Participants suggested that in this community, culturally there is support for gardening (macrosystem level) but there is often lack of participation in the garden. Farming is a way of life for many of the families in the school community and so it makes conceptual sense to integrate gardening into the school. It provides many children with experience that is very applicable to a successful

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future in their own community, a concept explored in detail by Corbett in his book, *Learning to Leave: the irony of schooling in a coastal community* (153). It was suggested in the pilot interview that farming families linked to Fairview are not likely to volunteer their time in the garden because busy times in the gardening and farming seasons coincide.

“Unfortunately, the ‘back to the landers’ type, the parent’s are not very involved in the garden because they’re so busy at home in the same season, trying to make their living from this. So they don’t have the time or energy... to...” (JZ 96).

This suggestion is also applicable to the community surrounding River Valley. During the gardening season farming families are very busy with their own activities; they contribute to the project through role modeling a food production career, but are likely unable to contribute their volunteer hours directly to the school garden.

There are other barriers for some community members, like time, transportation to and from school, or physical or social exclusion that prevents them from participating at the school. For example, one parent who called me during the summer to make a donation and offer to help out with the garden club, was unable to follow through on the offer as they were physically limited by a health condition. Also, what is important to or valued by people who do not support or participate in the garden may or may not be reflected in the school garden project. This type of exclusion from participating in the school garden can affect the broader sense of ownership, pride and connection to the school.

In summary, positive reinforcement between school, home and community effects the outcomes of the school garden, including who is effected and how. However, there are several barriers that prevent strong interrelationships between school, home and

community with respect to reinforcing the effects of the garden. At River Valley, classroom teachers, cafeteria workers, some parents and community members are most limited by *time* constraints. Strengthening of mesosystem reinforcement surrounding the effects of the garden, to make it part of an ideal and integrated health promotion model described by Bandura (47) will require addressing time and resource constraints to participation.

5.4.3 Exosystem Factors

Surrounding the garden and the other settings with which it immediately interacts, is the exosystem, or settings that though they are not in direct contact with the garden, indirectly affect the garden and how the garden effects CFS at the school level. Exosystem factors which indirectly effect the outcomes of the school garden project at River Valley include the school board, or more specifically several policies, programs and resources under its jurisdiction, as well as the provincial Departments of Education, Health Promotion and Protection, and Agriculture. Individually and collaboratively, these exosystem factors work to support or inhibit this school garden. Given that these factors are described in detail under *Setting the Scene*, only their significance to school gardens is discussed here.

Exosystem Factors that Support This School Garden

The Health Promoting Schools Program and Strive-For-Five resource are manifestations of a board level culture of health promotion and of increasing awareness of local food systems within schools. This has indirect implications for school gardens in general, most of which engage children with healthy fruits and vegetables grown on site.

Health Promoting Schools is a strong supporter of buying healthy, locally produced and processed goods. The Health Promoting Schools Manager “... *works with all the suppliers and producers to make sure that they’re getting as much [local food] as possible, and she is a hard core woman about local*” (IJ 91), and was involved in the development of the Strive-For-Five resource that helps facilitate the introduction of local, healthy foods into the school. For many schools, buying locally combined with or without a school food garden brings about issues such as finding consistent suppliers that support local or seasonal menus, among many other barriers, reviewed in greater detail by Carlsson and Williams, 2008 (42). Health Promoting Schools is helping schools source locally through the efforts of a working group.

The ‘buy local’ message, which is the campaign message of the provincially funded *Select Nova Scotia* campaign, like the presence of a school garden helps communities, including students, to think about the implications – social, environmental and economic – of their food choices (154). *Select Nova Scotia* may be paving a smoother road for the introduction of school gardens. As mentioned under the *Environmental Effects* section, in an activity done with the grade five class in May, 2008, many of the children in the class could already identify the effects of increasing food miles on the environment, in the form of pollution from transportation, and on the local economy. This signifies that indeed some of the children in this class are already exposed to thinking about the implications of food choices, whether from exposure to the *Select Nova Scotia* campaign, the school garden, or a general culture of rising environmental and food system concerns (discussed under the *Setting the Scene* section).

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Healthy Eating Nova Scotia (HENS), which is the provincial healthy eating strategy, as well as the Food and Nutrition Policy for Nova Scotia Public Schools, both described under *Setting the Scene*, are government initiatives that have created a more hospitable environment for school gardens. Together, these two documents have involved collaboration among three separate provincial government departments and many community and academic partners, and according to one health professional, are “... *trying to promote healthy eating in the school setting*” (LL 36) and in the case of the latter, also encourage procuring school foods locally wherever possible.

The year that the garden project began at River Valley, the school principal felt that the garden project was a good fit with the Health Promoting Schools Program and the, then upcoming, Food and Nutrition Policy; that

“it was just a way to... get the kids involved and help work towards those goals or those expectations that were being made on [public schools] because we had to switch from chicken nuggets to you know, veg and dip and that kind of thing and so, incorporating into the school made it a more natural transition for us here, and I believe more readily accepted” (IB 6).

Just as the Food and Nutrition Policy may have created a hospitable environment for school gardens, the garden at River Valley may also have eased the nutritional transition that the policy demanded of schools – from fast, less healthy foods such as chicken nuggets, to more healthy foods, such as vegetables and dip. And as the principal implies in the above quote, an important part of easing this transition at River Valley was involving the children in it, giving them some ownership over the food culture in their school.

Exosystem Factors that Inhibit This School Garden

Just as provincial strategies and policies can support school gardens, there are those that do not. For example, Time to Learn, a strategy of the Department of Education described in more detail under *Setting the Scene*, holds teachers accountable to highly specific guidelines around teaching minutes per day per subject. Experiential and time consuming projects like gardens are more complicated for teachers to account for their teaching time because many subjects might be covered to various degrees under one cross curricular project, spanning several days or weeks. Though more complex to account for, as many members of the school community and surrounding health professionals pointed out, the cross curricular nature and inclusive learning benefits of garden projects make them efficient with learning time and undermines or even outweighs the argument for Time to Learn challenges.

To summarize, exosystem factors considered in this case study at the school board and provincial government level were overwhelmingly supportive of school gardens, albeit indirectly, because of an overall support for nutritious food in school, and a move towards supporting local agriculture. That is not to say that the mechanisms to support school gardens themselves as a provincial strategy exist. As the Time to Learn example shows, there are still many structural changes that would need to occur. However, exosystem level support, even in principle, sets a positive precedent for school gardens and facilitates the development of a case for support for such initiatives.

5.4.4 Macrosystem Factors

Macrosystem factors are concerned with qualities of the society within which the school garden is embedded. These include issues of local culture and belief systems; dominant ideas that pervade the subsequent exosystem and mesosystem that influence the microsystem directly. Macrosystem factors considered in this section are: local values about individual versus collective responsibilities for health, qualities of our food culture and culture of immediate gratification, beliefs about teaching and learning pedagogy, and our culture of volunteerism. As with the previous section, these have been described in more detail in under *Setting the Scene* and are only discussed here in relation to how they influence school gardens and the school food garden at River Valley.

Societal Health Culture

One health professional interviewed, who was working at a provincial level explained that “...[P]rovincially, nationally and actually internationally where there seems to be a good agreement that schools influence the health of children...” (LL 7). However, she went on to explain that this does not make schools exclusively responsible for child health.

“And it’s not to put the school as the catch all for all the social issues, because I hear a lot from Education colleagues that sometimes they feel like that, but at the end of the day, I guess my opinion is... children and youth are in [the school] setting, so even though they’re within... the Department of Education while they’re in the school, they’re still a population, and [health professionals] still need to be able to influence what happens to them from the aspect of justice... and health...” (LL 15).

Not only was child health viewed as a responsibility that is shared between various departments, participants felt that individuals themselves played an important role,

indicating that a complex relationship between individual and collective responsibility for our health exists. Government supports collective responsibility for health, as illustrated by the above quote and policies such as the Provincial Food and Nutrition Policy for Public Schools, and programs such as the Health Promoting Schools Program. At the same time there was a local reverence for individual self-sufficiency. This reverence seemed to stem from various sources: 1) fear or inevitability of a natural disaster that disrupts food systems; 2) experience with situations of poverty or food shortage; and 3) the desire to help others. For example, one staff member felt that during a crisis situation that disrupted our normal food systems, *“a child that can go out and plant a garden and feed themselves and maybe their neighbours is better off than a child with a pocket full of money”* (IB 12). One parent, who described her own experience with inability to access fresh fruit and vegetables as a child for economic reasons felt that even prior to any crisis situation, *“you can save a lot of money if you had your own garden...”* (CL 78), and furthermore, *“[y]ou can help a lot of people if you grow your own food”* (CL 78).

I can also speculate that *pride* was involved in the finding that the school garden was influenced the local reverence for individual self-sufficiency. I observed, heard about during interviews, and experience myself a significant amount of pride in producing food for eating and sharing. Pride may be felt for many reasons. For some, myself included, this pride might come from knowing the amount of work involved, the fresh taste of newly harvested food, the fact that it was ‘free’ (of purchase), the knowledge that it was grown without harmful chemicals, or the fact that there is more than enough to share with others.

School food gardens incorporate both aspects of individual responsibility for health through the development of self-sufficiency skills (such as growing and preparing food, already discussed under *Direct and Potential Effects of This School Food Garden*), and learning about collective responsibility through collaborative, non-competitive, collective work and play (also already discussed under *Direct and Potential Effects of This School Food Garden*). The position of school food gardens within a public institution and support (either monetarily or politically) from provincial policies and programs such as the Health Promoting Schools Program also situates them as places of collective or public health promotion.

Societal Food Culture

“So nowadays, we’re so removed from our food that we don’t know really what it is, what it looks like and where it comes from...I think a lot of kids now... because we live more urbanized settings, the enrolment in rural schools is going down, so you’re having more and more people that are detached from the source of where their food is” (LL 23).

Cook, Crang and Thorpe (1998) warn against simplifying consumers to a simple dichotomy between the knowledgeable and the ignorant consumer, suggesting instead that there is a much more complex relationship that exists between consumers and food and food systems, one that includes a coexistence of consumer’s need to know and simultaneous need to forget the origins of food (108). What Cook and colleagues suggest is that the notions of a dichotomized food culture identified in this research, between “*foodies*”, “*back to the landers*”, and “*growers*” at one end and the “*processed*” or “*packaged family*” and “*shoppers*” at the other (as discussed under *Setting the Scene*) is actually less of a dichotomy than a paradoxical mixture of the dominant food culture

(disconnect or “need to forget”) and the rising counterculture (reconnect or “need to know”).

One parent suggests that in part, this situation of disconnect may stem from the prevalence of double income families (some by choice, others by necessity) mentioned under the *Effects on Environmental Health* section. One parent felt that there were few “growers” (i.e., gardeners) (CL 78) and more “shoppers” in the school community despite the opportunities that gardens provide for teaching, learning and saving on grocery bills. She felt that where it is the norm that (where present) two parents are working to earn a living, there is often not the time to prepare time consuming meals or grow food at home. As such, the shopping culture expands in a double income society, which she felt comes with nutritional implications, for example, less nutrients in produce picked early that travels far to the grocery store, as well as perpetuating a disconnection between people and food.

Participants in this study alluded to a food counterculture in Nova Scotia, which is encouraged by campaigns like *Select Nova Scotia* and the work of organizations like the *Nova Scotia Food Security Network*¹¹, *Farmer’s Markets Nova Scotia*, *Slow Food Nova Scotia* and the *Halifax Community Gardening Network*. The food counterculture could also be described as a culture of support for an alternative food system, or resistance against a dominant food system as people become aware of problems underlying it such as social, economic or environmental injustices.

There are many family structures, income or social classes involved in a varying mixture of participation in both the dominant and alternative food system, muddying the idea of a dichotomy with complex social class structures and lifestyle choices. A

¹¹ The NSFSN formed in 2008 as a result of Nova Scotia Participatory Food Security Projects

common assumption, captured by the school principal, was that increased awareness about health and the food counterculture is not reaching all families equally.

“The ones that are low socioeconomic status, they tend to come [to school] more with the packaged food. And I think what happens is that they get... you know, they get their monthly check and um, the day they get it is like a big celebration, and so they tend to spend... I think they go with the idea, you know ‘we go so long without the treats...’ and all of a sudden they get this check and they’re buying all these treats and it’s like ‘ahh’. Because one day I ran into this family at the supermarket and it was nothing but junk food. And I just said ‘oh, you must be having a party’ and they said ‘oh no, we got the security check’ or whatever check it is, child check, and ‘we’re just buying them some treats’ and I’m thinking ‘oh, you need to go the dentist’ you need to you know, because they could be using their money differently ” (IB 100).

Unfortunately, these assumptions and observations about how families on social assistance make food decisions miss the point that the ‘treats’ in the cart (more energy dense, less nutritious foods) are more often be purchased by lower than higher income families (155) because they are cheaper than healthier choices. It is possible this family really was not aware of the nutritional implications of their choices. It is also possible that they did but were too ashamed to discuss this with their school principal in the grocery store.

Although the food counterculture is gaining momentum provincially, one health professional felt *“[I]t’s also nice if you can infuse the school system with some of [the food counterculture] too” (LL 117)*. And it is; the food counterculture is only just beginning to influence school food, *“[W]e’re now in the uncomfortable [zone] of moving from food that was very fast food type and not very nutritious to something nutritious...” (LL 93)*, and school gardens are one way that it is taking hold.

One mother, who I would categorize as belonging to the food counterculture, felt the school garden gave her a fresh idea of what the school culture was about, and helped her make the decision to let her children attend the school.

“[W]e knew a little bit about [the school] and over the, like in the past, like I didn’t feel like I really wanted the kids to go there. It felt like a stale space, not much going on. But when (youngest daughter) said that, the garden was there and that was one of the first things we said, ‘there’s a garden at the school, maybe she can go.’ It was already a little incentive to think ‘on yeah. Maybe she could go after all; maybe it’s a good place’” (RA 61-65).

But the transition to a more wholesome food culture at school, between the provincial Food and Nutrition Policy, the Health Promoting Schools Program, Strive-For-Five and initiatives like school food gardens might also create tension among families who do not identify with the food counterculture but feel it is imposed upon their children at school. The cafeteria manager did not *“see any harm in trying [new foods]. I know even in my experience in the kitchen we try to make new foods (like hummus). We’re constantly changing the menu and trying new foods and the kids that know they like it buy it”* (RD 56). If children unfamiliar with the new foods at school simply do not eat it, the cafeteria is catering to one group of students who are already exposed to and benefiting from healthier food at home. This also raises the issue (again) of stress or guilt felt by families unable to reinforce health messages at home for economic reasons, discussed under *Mesosystem Factors* (78).

Given that schools are a key setting for health promotion (46), the transition to healthy foods at school has great potential to create change in the food culture of the student’s generation towards valuing healthy food. Moreover, the incorporation of CFS elements like sourcing more *sustainable* foods (e.g., Health Promoting Schools Program efforts towards supporting local food) has great potential to create changes towards a food culture that also fosters sustainable food systems. However, in order for this to happen in a way that is not exclusionary of some families, it must be done in a way that is respectful of the local food culture (which is complex) and in conjunction with

centralized poverty reduction strategies that address the root cause of income related food insecurity – poverty (40) .

Societal Culture of Immediacy

“And I think in life, the way our culture is now, everything is instant. When you actually have to plant something, and water it, and care for it, and watch it grow, and then watch the bugs kill it, and it doesn’t grow, so you’re left with something else and that whole process of ‘this is a lot of work’ ...” (LL 23).

Despite our culture of immediacy, and expectations for rapid results, it was surprising to some that children were willing to wait for the garden to grow. Children put hours into the planning, planting and tending the garden in the spring, knowing that their efforts would not be rewarded until the following year. Even in the first year, there were several grade six students actively involved that would not be returning to the school to harvest their bounty. These observations show that perhaps the garden, in some way, helps to foster patience to work and wait for food to grow and ripen; that you can not hurry nature. As one health professional put it,

“so the effort part of it is knowing that if something is important, it sometimes takes more time, and it takes a little bit of work to do. Just like preparing a meal from scratch is going to take some thought, and a little bit of time, and a little more effort than basically going to get fast food, or going to get the ready made meals from the supermarket... and I can talk from my own experience, but I heard from kids too, that when they make something themselves, ...there’s this pride that comes with it. When they grow it and make this salad...” (LL 30).

To paraphrase, important things require effort. Effort leads to quality. Quality leads to pride. In a culture of immediacy, this garden might be part of teaching children to experience pride in respecting the time that nature takes to turn a seed into food, while at the same time helping them to understand food systems. One parent, when asked what she felt that children learned from the garden, replied that she felt the garden was crucial

to understanding all the steps involved in growing food, and to learn the time and effort involved in creating food while at the same time, to appreciate the miracle and the magic of it; a process that most children now take for granted.

From a different perspective, growing food might not be earth shattering news to many rural children living on or near farms, who may already know where food comes from; perhaps more likely, anyway, than urban children, though there is no indication in the literature to support this assumption. The reasons that school gardens are important in rural areas are different, according to one health professional – being part of something, pride in being part of the group, belonging, contributing, and building something. Similarly, another health professional pointed out, rural people may not necessarily want to garden at school because they may already have plenty of room in their back yards. But the reasons that they might are different – social interaction or expert advice, for example.

Beliefs About Curricular Approaches

“...[B]ut I believe very strongly that children have far greater thinking abilities than adults given them credit for. And if they have that freedom to think, then we will be amazed what they come out with” (CL 52).

Verbal support for experiential education, in the context of how the school garden project ‘fits’ from a pedagogical perspective, came from some parents and teaching staff alike. One parent, from whom the above quote came, expressed that the best way to teach children is to not necessarily set up a lesson about something, but to set up an activity that allows the children to explore and learn about what emerges, and what they are individually equipped to take from it; a learning approach in the garden best captured in my reading as emergent learning (26). In describing an inner city youth gardening

program, Rahm describes the experiential nature of the particular learning environment in the garden as one that supports the *emergence* of learning opportunities. This parent felt that the approach taken in the garden club lunchtime activities reflected consideration of emergent learning styles.

Another parent felt strong support for a well known model of education, the Waldorf education model, that she explained focuses on rhythms and cycles of the earth and incorporates imagination and magic to ‘bring to life’ lessons life for younger students. She felt that the garden was a good tool for this approach to education, and had even used the garden and this approach for activities done with her child’s class.

Teachers agreed that the garden contributes to the learning environment at the school.

“Well, I once heard a quote that a picture is worth a thousand words, and the actual thing is worth a thousand pictures... And I’ve always thought that education, and ... that real hands on learning is what was most effective with kids. And so the garden is a good example of that” (SEF 85-87).

The garden helps teachers create meaningful applications of the school curriculum that are sometimes otherwise abstract. For example, one group of children applied geometry to divide up the circular garden bed into six equal wedges, and one class learned about scale multiplying centimetres on a map to kilometres in real life during an activity on calculating food miles. Another teacher felt that the garden is useful in reaching students of all learning styles. It gave her the opportunity to tell the children about, for example, a pumpkin, and then have them read about it, and then to see and touch the pumpkin out in the garden.

While some teachers and parents expressed positive views of experiential and emergent learning, the type of learning most commonly applied in school gardens, these

educational approaches are still considered *alternative*; they are not the standard learning approach in the local school board to which River Valley belongs. Teachers complained that they lack the time and skills to teach in the garden setting, hindered by standardized testing and everyday structures, a phenomenon also documented in Thorp's participatory ethnography of a comparable American school food garden project (138). There is a need for a more mainstreamed acceptance of experiential and emergent learning approaches at the school, board and provincial level (such as more flexible accounting of curricular time than is encouraged by the Time to Learn strategy) before integration of school gardens into the curriculum and school occurs. Though there was no specific discussion of board level culture towards experiential learning in the school garden literature coming out of California, Governor Schwarzenegger signed legislation in 2007 that provided \$15 million for school gardens through the 2008-2009 school years (156), indicative of a culture of support for *gardening* as an approach to education.

Volunteerism Culture

As previously discussed, volunteers have been a critical factor in the success of the garden. Yet despite the many visits and contributions from the community, there is always the sense that there could be more. The waning culture of volunteerism in Canada, described under *Setting the Scene*, is an important consideration for a project so dependent on volunteers and donations. It may influence the need to secure funds to pay a garden coordinator where more volunteers are not available. However, in the case of River Valley, there are many volunteers in the community that interviewees felt were untapped.

“... Not just parents, but shall we say seniors in the community. I think that’s something that we could really perhaps tap into. Because I know around here so many of the seniors will often have huge gardens, right, and so they have the knowledge and it’s a great opportunity for them to engage with the kids and share their knowledge and stuff like that” (BV 11-12).

It could be argued, however, that although more volunteers can be recruited, if the school feels strongly that the garden is helping them meet specific health related and curricular goals, for the sake of project sustainability and effectiveness it may be more efficient to hire a garden coordinator. However, specifically if the project goals are more related to institutional participation in more sustainable food systems, the decision to hire a garden coordinator needs to be weighed carefully against the cost of using that money to invest directly in local food procurement (and thereby the local economy) instead, as discussed under the section titled *Indirect Effects on Economic Vitality*. To date, no cost-benefit analysis has been done on hiring a school food garden coordinator vs. initiating a local purchasing policy at school on outcomes to CFS.

To summarize the influence of macrosystem factors, it can be said that the local health and food culture is complex, yet the school food garden seems to function well and even facilitate learning within this complexity. It honours both collective and individual responsibilities for health, and though the current pedagogical culture does not support experiential and emergent learning styles implicit with school gardens, this may change as teachers and parents supportive of alternative learning styles try them out. It cannot be denied, however, that school food gardens are a significant amount of work, and perhaps more work than can be expected of a community of volunteers. Though volunteers are an integral part of the activities within the school community, there may be a need for more coordinated efforts, requiring a paid staff.

5.4.5 Chronosystem Factors

This section will frame the findings in the historical context of current political geography, described in detail in *Setting the Scene*, that may have influenced the various social, health, environmental and economic outcomes related to the case. I will consider the implications of rising food prices during the time of this study, increasing global awareness of environmental and social justice in the food system. Being aware and interested in global food, environmental and social justice issues, it is to be expected and should be noted that my interpretation and discussion of the findings have been influenced by the chronosystem factors discussed in this section.

Rising Global Food Prices

The price of some world commodities reached a record high globally in June 2008 (133), during the period of data collection. Media coverage of this global crisis brought public attention to the contributions of rising oil prices and the biofuels industry to this crisis. In return, public attention to food system localization as a solution has also increased (157), especially among those working in the food and agriculture field (61, 136, 137). During my interviews, one provincial public servant noted, “*It’s interesting to hear people talking about local, and asking more questions*” (LL 105). Individual attention to food system localization was also matched by private and public sector attention. She continued, “*Our supermarket [is] advertising [local], our [provincial Food and Nutrition] policy has local as part of it...*” (LL 105) referring to the non-binding directives of the Food and Nutrition Policy for Nova Scotia Public Schools to purchase local food whenever possible; a directive that the Health Promoting Schools

Program advocates for strongly. It is clear that global attention to food prices is contributing to an increased attention to promotion of local foods at the school level.

This is just one example of how current geopolitics were affecting the food habits (choosing locally produced food) during the period that this study was done. Sustained and institutionalized over time, these changes to food habits may in turn influence food culture towards one that values purchasing local food, either for economic or ethical reasons. And food culture in turn influences the dominant food system, which responds to market demands. School food gardens can play a role in influencing local food culture, and institutionalizing localization of the food system through their ability to provide and educate about local foods (42).

The garden at school left one parent feeling “ *hopeful... hopeful just for life. For the world...*” (RA 243-245). In times of food crises leaving many in the world to go hungry, and fear of our unknown future food security, it is no wonder that this parent feels that seeing children engaged in growing healthy food provides hope. It provided hope to some that children are reconnecting with food within an alternative food system that may be necessary to overcome the global crisis. It provided hope to others that children may even, through exposure at school, choose food production as a career path thereby influencing future food security in the community.

Environmental and Social Injustices in the Food System

Interlinked with rising global food prices, increasing awareness of environmental and social injustices around the world, especially those directly related to the food system, also set the scene for increased food system awareness at the public school level. These issues, among others have brought to the forefront of the attention global leaders (134)

and the Canadian public (157) the relationship between environmental health, food security and human health. In a draft resolution of a National Comprehensive Food Policy, following public consultations in early 2009, the Liberal Party of Canada acknowledges a growing consensus that local, sustainable agriculture can improve economic and health outcomes, and that there are undernourished Canadians who would benefit from a comprehensive food policy. The draft resolution reads:

“Be it resolved that a new Liberal Government adopt as part of its core mandate the creation of a national comprehensive food policy, which includes mechanisms to ensure that the production, distribution and consumption of food in Canada, including the protection of traditionally harvested food by First Nations Peoples, and is based in the principles of food sovereignty, environmental sustainability, accessibility, public health and safety.

Be it further resolved that this policy will support economic enhancement to ensure thriving Canadian agricultural and fisheries sectors that will protect land and oceans, and will meet the larger 21st century challenges of climate, energy and water supply” (157).

Though this resolution is only in draft form, and still in process, it demonstrates that in response to public attention, opposition parties in Canada are currently mobilizing and situating themselves to address issues of income related and CFS through a national food policy.

Just as with awareness of the global food crisis discussed above, awareness of issues of environmental and social justice in the food system appeared to foster cultural support for school food gardens from staff, parents and health professionals. In my interviews with members of the school community, attention to these issues manifested in descriptions of the importance of children learning about composting for example, and about thinking beyond the immediate to how their immediate actions will influence their future environment. School food gardens, as experiential environments for developing

environmental, health, and economic knowledge, skills and values, have the potential to influence a transition towards a more sustainable food system.

To summarize this section on factors contributing to the effects of this school garden, members of the school community identified many factors in and surrounding the garden, school and community that influenced the effects that the school food garden at River Valley had on the students as well as adults in the school community. The most important of these were: microsystem factors such as the physical qualities of, activities and people involved in the garden itself; mesosystem factors such as mutual support and reinforcement for gardening as a CFS learning tool between home, school and community; exosystem factors such as supportive school board and provincial level policies and programs like the Health Promoting Schools Program; and macrosystem factors such as the local health, food, educational and volunteer culture. In addition, though not discussed in the interviews, chronosystem factors such as current geopolitics around the environment and food systems were identified as influencing both the level of support for the school food garden as well as my own interpretations of the data collected in this thesis study.

All of these ecological factors are depicted in **Figure Five: Contributing Factors to the Effects of the School Food Garden at River Valley Elementary School Organized by the Ecological Systems Theory**. **Figure Five** builds on **Figure Two**, which framed anticipated factors, informed by the literature, using Bronfenbrenner's Ecological Systems Theory. **Figure Five** adds to the anticipated factors, based on the findings, in several ways. The physical qualities of the garden (e.g., location and layout) are added to the Microsystem. At the Mesosystem level, **Figure Five** underscores the importance of

mutual reinforcement and support between home, school and community. Provincial policies at a proved to be the focus of Exosystem factors, and are highlighted in Figure five, which does not include the anticipated focus on school board or food procurement policies, or community/public health culture. At the Macrosystem level, **Figure Five** adds to the anticipated factors of the local health and food culture with more specifics. Though the anticipated pedagogical values did arise in my findings, these, and other Macrosystem factors, are left out of **Figure Five**, as they were less of a focus in this thesis. Finally, **Figure Five** adds Chronosystem level factors that were not anticipated to be part of this thesis. These geopolitical issues (global food prices, environmental and social injustices in the food system), arose during data collection and analysis, and were added later in the research process.

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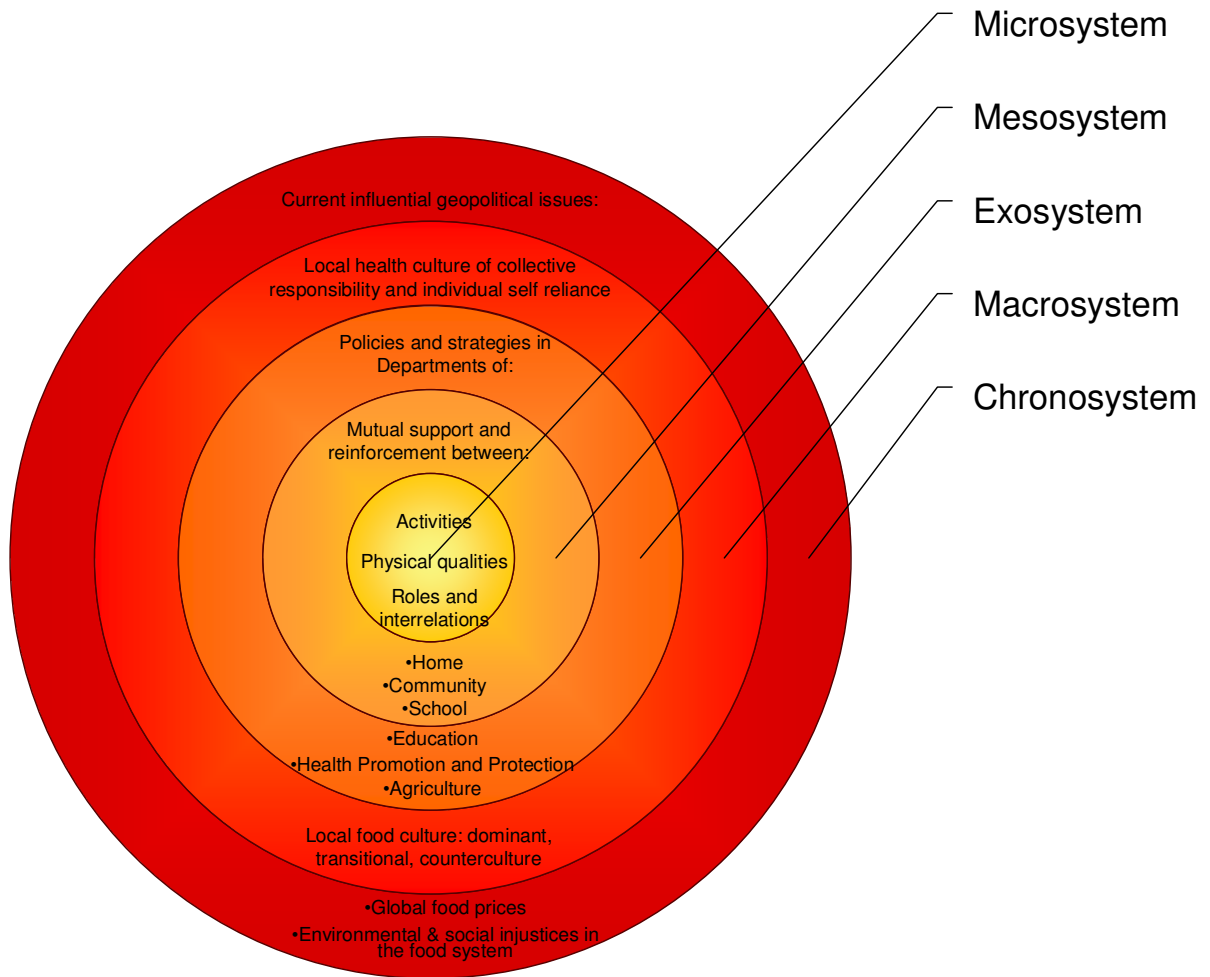


Figure Five: Contributing Factors to the Effects of River Valley Elementary School Food Garden Organized by the Ecological Systems Theory. Adapted from Bronfenbrenner, 1979 (120).

Chapter 6: Conclusions, Implications and Recommendations

This thesis is the first study to examine the health, social and ecological effects of school food gardens, and what factors contribute to producing these effects, in a rural Canadian context. The case study drew on individual and focus group interviews with seven staff members, three parents, three students and three health professionals. All except two of the health professionals were members of the school community at River Valley, with direct or indirect experience with the school food garden. The study also drew on my own personal field notes from the period of data collection, as well as 13 key documents relating to the school garden.

The scope of the single case study design used in this thesis limits the conclusions presented in this chapter to this particular school food garden. However, in exploring the effects of the garden at River Valley, this study highlights the potential for similar school garden projects to advance long term community food security (CFS) through human and environmental health, and economic vitality. The suggested potential is strengthened when embedded within the body of CFS and garden research, in turn strengthening the conclusions, implications for practice, policy and research, and recommendations made in this chapter.

6.1 Conclusion One

*The school food garden at River Valley is an emergent learning tool that has the potential to influence long term community food security through **development of knowledge, skills and values that encourage participation in sustainable food systems**. This development is seen most especially in **children**, an important*

consideration given that today's children will be tomorrow's consumers and decision makers.

6.1.1 Implications for Practice and Policy

The existence of similar garden programs at other elementary schools regionally, provincially or nationally could help build a network of community members, starting with children, that possess the knowledge, skills and values conducive of building CFS on a broader level. In this way, school food gardens are an important piece in the movement to build food security in Nova Scotia. Their potential must not go unnoticed among policy makers and practitioners.

Knowledge Development for Community Food Security

Within the context of the Food and Nutrition Policy for Nova Scotia Public Schools and the Health Promoting Schools Program, both supportive exosystem factors for the school garden studied here, the finding that the garden may be criticized for teaching only 'external' and 'expert' knowledge (e.g., nutritional value of vegetables), rather than fostering community involvement and ownership in the development of knowledge (e.g., what plants grow well in the soil at the school). We know based on the literature that school gardens are building knowledge in the areas of nutrition (25, 34), science (34), and environmental studies (29, 31, 34). Without necessarily challenging expert knowledge, which also has its place in building CFS (i.e., vegetables *are* nutritious), the children's involvement at all levels, including decision making in the garden (e.g., what plants to grow and where) is building beyond expert knowledge; it has helped develop among some a more 'internal' or 'local' knowledge such as what the foods tasted like, what the

soil felt like, feeling a sense of pride and belonging among the people and plants in the garden, and ownership or agency in the process of producing nutritious food. By providing opportunities for members of the school community to experience the development of local knowledge, pride and ownership in the process of growing food, the garden seemed to empower those involved, whether or not they were affected by food insecurity, to experience agency over their food.

Skill Development for Community Food Security

Results showed that some children, while involved with the garden club, demonstrated the ability to consider the long term effects of their actions, a skill which one parent felt was beyond their normal developmental stage. This has implications for the choices that they may make with respect to sustainable food, now and in the future; how they might consider important aspects of CFS – long term social and environmental costs as well as the specific price of food.

Findings clearly showed that children increased their food skills in the garden. In a time when home economics is no longer taught in elementary schools (158), the school food garden contributed to skill building around growing and preparing foods, in effect contributing to consumer ‘re-skilling’. Consumer *deskilling*, or the progressive alienation of consumers from their food and consequent loss of skills, has over the past half century been led by and contributed to the success of the current industrial food system (38, 104).

The findings from this thesis add to the discussion in the literature of “life skills” (mainly inter- (e.g., cooperation) and intra-personal (e.g., pride) skills (27, 90)), and “nutrition” skills (e.g., vegetable identification) (89). By fostering long term thinking and

food skills at school, children develop the knowledge and skills to participate in a more sustainable food system while also being capable of growing and preparing their own ‘nutritional cornucopia’ at home. Growing fruit and vegetables at home has been shown to positively influence fruit and vegetable intake in the family (97), to be cost saving (56, 115) or as suggested by one interviewee, in an extreme case even life saving in times of crisis.

Value Development for Community Food Security

The findings suggest that children’s involvement with the garden contributed to environmental values such as caring for the environment and each other at school, and respect for food, food system actors (such as producers) and factors (such as soil health). These values are consistent with other research showing that school gardens teach respect, ownership and stewardship of the environment (90, 91), valuing differences between people, and understanding the food system (91). Put into the context of CFS, the values developed in the garden at River Valley may influence immediate or long term decision making around consumer choices such as what, from whom, and how to access food; all of which ultimately impact sustainable food systems and subsequently CFS. Food choices, as an act of public participation, are part of citizenship (105).

Civic values, or a sense of citizenship may also be important in building sustainable food systems and CFS. School gardens have historically been used to foster civic engagement, reconnect youth with the food system (102) and citizenship education (101). The social skills developed in the school food garden at River Valley such as cooperative learning and play, a sense of peace, pride and ownership, in combination with the environmental values developed, can be described as civic values, such as those

described previously: curiosity (to learn about food, among other things), community (interacting with the community in a cooperative way) and collective concern (for the environment and each other) (101).

By fostering civic values, belonging, participation, and student re-skilling, school gardens are contributing to CFS through a concept called ‘food citizenship’ or ‘food democracy’, which implies that we move beyond food as a commodity and people as consumers to understand that citizens have both rights and responsibilities in their food system beyond those of consuming goods and services (109). Food citizenship implies participation and belonging in our food systems at all levels (109). Food citizenship involves the practice of food system localization and embodies values of caring for *place*, the community and the environment (105).

Community gardens have been promoted as one way for people to become food citizens, and are purported to be an important part of a shift forward ecologically sound, economically viable and socially just food systems (105). This school garden fostered food citizenship within the children involved, and consequently may also be an important part of a shift towards public school participation in sustainable food systems within this region.

Health and education professionals should encourage and support the implementation of school gardens, wherever possible, based on their potential as a learning tool to build CFS in the long term. Similar suggestions have been made based on school gardens’ ability, as an experiential learning tool, to positively influence dietary behaviours at an early age (25). There is reason to believe that school gardens may be one way to increase attention to (local) fruit and vegetable consumption at home too through

their potential to encourage home gardening (98), and that home gardening may increase fruit and vegetable intake in the family (97).

The findings in this thesis further suggest that the positive influence of school gardens goes beyond individual health, potentially influencing long term CFS through human and environmental health, as well as economic vitality. School gardens could prove to be a critical tool in the provincial CFS movement, as an emergent learning tool that encourage children to build knowledge, skills and values that are foundational to a society where by sustainable food systems and CFS are realized.

To ensure that all students in a school have equal access to garden projects, they will need to be organized in an inclusive and participatory manner. For example, involving students in decision making, being free of cost to families (facilitated by funding), having activities organized at lunchtime, and integrating the garden into the classroom curriculum are ways that River Valley attempted to make the garden inclusive of all students and participatory in decision making processes. Findings highlight that these measures contributed to the feelings of pride and ownership found in this garden, and were central in allowing some children otherwise limited by, for example, transportation issues to participate.

School food gardens are not without their potential limitations. Findings suggest that it may be prudent to weigh the potential health, social, ecological and economic effects of school gardens against the cost of implementing and running garden programs with consideration for allocating limited resources. Caution has already been called for, questioning community based programs (which the garden would be considered) for their

implicit “wonderfulness” (43), potential to disempower families (39), and undermine the need for more centralized strategies for poverty reduction (40).

6.1.2 Recommendations

- ♦ Health and education professionals should encourage and support the implementation of school gardens, wherever possible.
- ♦ School garden projects should focus on modelling a small-scale sustainable food system, providing experiential education about issues of CFS rather than scaling up food production to meet short term demands.
- ♦ The concepts of *agency* and *inclusiveness* should be included in future school’s garden program design and implementation (for example: involving the school community, especially the children, in the decision making processes; organized in a manner that considers inclusiveness in program costs, the timing of activities, transportation of students; and strive to engage family and community members regardless of social, cultural or economic barriers).

6.2 Conclusion Two

For this school food garden, a societal culture supportive of healthy, sustainable food at schools, backed by relevant government and school policies, were key systems factors reinforcing and supporting the school food garden’s effects on human and environmental health, and economic vitality.

6.2.1 Implications for Policy

School gardens alone will not create long term food security. Findings showed that the school garden at River Valley was supported by ecological factors at the macro-, exo- and mesosystem levels such that the project had immediate benefits and showed potential for building CFS. At the macrosystem level, many ‘pockets’ of the local food culture in the community, which was complex and diverse, supported the garden and vice versa. Some community members were described as “*foodies*” and their support for the garden could be linked to the whole, healthy foods offered by the garden. Similarly, “*back to the landers*” described by participants may identify with the school garden because children are learning to grow their own food. From another perspective, the community surrounding the school is a farming community, and the garden could be seen as a teaching tool indicative of the importance placed on growing food. Though a school garden alone will not change the local food culture, it may play a role in mutually reinforcing local values around healthy, whole, home or locally grown food.

At an exosystem this school garden was a good fit with the nutrition and physical activity goals of the provincial Health Promoting Schools program. The garden was also an appropriate initiative within a Public Health system working to ensure the availability of healthy foods to children in the school setting. However, no government, school board or school level policy or funding program specific to school gardens exists. Policy examples might include: a Department of Education policy to commit food garden space in all newly built schools, or school board level food policies mandating sustainably procured food services in schools. Such policies would send a message to the students

consistent with the values learned in the garden – the value of food, respect for the food systems and a civic responsibility to sustain them.

At a mesosystem level, the school principal and staff were very supportive of the school garden and wanted to see the garden continue and expand, but similar to the exosystem level, no school policies were in place specific to the garden (e.g., ensuring access to the garden for all students and community members). More systemic shifts toward a sustainable food culture as well as policies directly supportive of school gardens from the government to the school level are required to build on current success, and enable school gardens to effectively play a role in building long term CFS.

Dietitians of Canada's position paper on CFS lists school gardens as one indicator of CFS. This thesis shows that the contribution of school gardens to CFS is indirect or potential and long term. Though this contribution is important, practitioners and policy makers must not overlook the necessity of policies that address the root causes of food insecurity for all citizens. Institutional food policies supporting local food produced in sustainable ways and effective poverty reduction strategies are two key supports in addressing food insecurity.

6.2.2 Recommendations

- ◆ The Food and Nutrition Policy for Nova Scotia Public Schools should be amended to include binding directives pertaining to school participation in more sustainable food systems¹². These must be backed with sufficient resources from the Departments of Health Promotion and Protection, Education, and Agriculture.

¹² Examples include school gardens, farm to school programs and minimum 10% organic procurement.

6.3 Conclusion Three

Adequate funding for a paid school garden coordinator and the support of a team of committed volunteers is essential in building and maintaining sustainable a school garden.

6.3.1 Implications for Policy

School food gardens must be adequately funded and be a part of a broader CFS strategy to fully harness the potential of school gardens to address issues of food insecurity. Several interviewees were very direct in saying that the coordinator's role (in this case my own role), in initiating and running garden activities was essential in the success of the garden. And I would maintain that I certainly did not do it alone, but rather with the support of volunteers over the years. While a volunteer coordinator such as myself may work well at a school where a suitable volunteer exists, on a provincial level it would exclude some schools from having a school garden – potentially those schools serving socially or economically disadvantaged populations where parents may have less time to volunteer.

If school gardens are to be used as educational tools to develop the knowledge, skills and values conducive of building long term CFS in Nova Scotia, provincial funding (that covers a paid coordinator and other program costs, including training/professional development opportunities for school garden coordinators), is crucial. Especially given criticisms in the literature that school greening initiatives may be inadequately reaching children and families in lower socioeconomic neighbourhoods because of challenges to participation and fundraising (116). Equal access between schools to funding would

equalize the experience of agency over food, maximize future participation in sustainable food systems and ensure participation is not socially or economically predetermined.

Government support for community gardening was identified as one key facilitator to the advancements made in building CFS in Cuba (56) in the 1990's. Currently, lack of support and leadership from provincial policies and school board administration are central barriers to school gardening in Canada (64).

Though funding may not directly ensure the existence of the teams of volunteers that are also key in maintaining a school garden, a paid coordinator might be able to build into their schedule time to recruit volunteers. Having a paid coordinator with an adequate budget would also alleviate negative effects on school staff, who indicated that their teaching or administrative workloads were already too high to sustain taking on coordinating a garden project.

6.3.2 Recommendations

- ◆ Joint funding through the Departments of Education, Health Promotion and Protection, and Agriculture, should be available to support school food gardens. This funding should be adequate to support a part time coordinator (at least 10 hours a week over the full calendar year) as well as basic program costs, including training.

6.4 Conclusion Four

*The social, health and ecological effects of school food garden at River Valley and their relationship to each other was **complex**, just as the construct of **CFS** is **complex**, and difficult to measure. **Further research is needed** to extricate if and*

how the observed immediate effects contribute to the indirect CFS building potential of school gardens suggested in this thesis, and further explore what factors at the micro-, meso-, exo-, macro-, and chronosystem levels contribute to this.

6.4.1 Implications for Research

This thesis was exploratory, and limited to a single case study design. The complexity of the findings in this thesis as well as the complexity of the CFS construct require more in depth study, over a longer period of time. In particular, two central knowledge gaps linking school gardens to building CFS were identified in this study.

- 1) *Do the observed effects, and suggested potential effects listed in the findings of this thesis indeed contribute to CFS in the long term?*
- 2) *What size of school food garden is sufficient to provide an optimal learning site for CFS while minimizing required resources (time, money, energy, etc.)?*

A longitudinal design following children involved the garden project over a minimum of six years would be necessary to measure whether and how the school's investment of resources in maintaining a school garden affects CFS, or other outcomes, in the long term. Their knowledge, skills and values around CFS constructs would need to be measured over this time using interviews and/or questionnaires. Using a quantitative, comparative study of multiple school gardens (minimum of five) with varying capacities could offer insight into the ideal size of a school garden for CFS learning.

This case study also has implications for the advancement of CFS research, which is limited by the difficulty in defining community, and a lack of agreed upon research

framework and method of measuring CFS. This case study contributes to methodological possibilities in the field of CFS research, by using a case study design that focussed in on one defined community (the school community), furthering our understanding of the role of this community (through the school food garden) in building CFS.

In addition, I hope to have advanced the application of an adapted model of Garret and Feenstra's model for a sustainable food system (16) (also used by DC) (9) by applying it in the school garden setting. Measuring CFS, however, remains problematic without agreed upon indicators. DC proposes the number of school gardens/gardeners as one indicator of CFS; however, the existence of school gardens themselves is not necessarily indicative of CFS. To adequately capture the school garden's contribution to CFS, some of the effects discussed in this thesis, such as learning about sustainability and sustainable food systems, developing a respect for actors (e.g., farmers) and factors (e.g., food miles) in the food system, and food and nutrition knowledge need to be assessed.

6.4.2 Recommendations

- ◆ A study needs to be funded that investigates research gaps identified in this thesis, including but not limited to:
 - *Do the observed effects, and suggested potential effects listed in the findings of this thesis indeed contribute to CFS in the long term?*
 - *What size of school food garden is sufficient to provide an optimal learning site for CFS while minimizing required resources (time, money, energy, etc.)?*
- ◆ This funding would cover 5 part time garden coordinators at 5 pilot schools and a full time research assistant who would work with a researcher seated at a partnering university, for a period of a minimum of six years.

- ♦ Research partners could include the Participatory Action Research and Training Centre for Food Security based at Mount Saint Vincent University, Evergreen Canada and the Health Promoting Schools Program in Nova Scotia.

Chapter 7: Critical Reflection

Given my own background in dietetics and interest in environmental issues, I expected to focus this thesis on the connection between the fruit and vegetables grown in the garden and food security. Instead, what this case study showed me was that there was a much more complex relationship between the school garden and how it related to food security. There were unexpected findings showing how the garden affected the social health of the school community, and had strong potential ties to community economic vitality. These unexpected outcomes were a welcome addition, and enriched my own understanding of the role of the garden in the school community.

I also learned a great deal from the process of this thesis research. As my first attempt at conducting qualitative research independently, this thesis taught me that drawing clear boundaries around a case study is difficult, and as a result, there is a tendency for the study to continually expand. The proposed size of the project, and time involved in collecting the data was perhaps ambitious for a master's thesis, and I found it difficult to adhere to the specifics set out in the methods. In some cases, I had planned to do more than was realistic given the time frame (e.g., the number of focus groups), and in

other cases, my data led me to want to change approaches (e.g., using creative exercises rather than interviews with children), which would have meant adding more data to the collection process. In addition, I found the change of writing style, from quantitative to qualitative, a major challenge to my progress. In retrospect, I feel I should have included only the first of my research questions, examining the health, social and ecological effects of school food gardens. Though the two research questions are inextricably linked, it would have allowed me to integrate systems level factors only if and where they were mentioned in the exploration of effects, providing fodder for future research examining central factors producing the effects found in this research. A smaller case study would have allowed me time to explore further into the effects of the school food garden. In the end, I was left feeling like I had only scratched the surface of finding the true effects of the garden, at once wanting to proceed directly to the next study of the garden and desperately needing a break from the subject. This feeling is exacerbated by the knowledge that garden and CFS related research is continually expanding, changing the relationship of this study to the body of research within which it is embedded, the outcomes, the conclusions that I might draw, and recommendations I might make.

My own intimate involvement in the initiation of this particular school garden project was a great asset to my data collection process, facilitating communication with the members of the school community and knowing background information that I would have otherwise had to spend more time investigating. However, this was also a source of bias that I had to continually monitor in the analysis process. My supervisor and committee played a strong role in ensuring that I questioned my own biases, and without their help I feel the critical perspective presented in this thesis would have been much

weaker, despite my own reflective journaling. That is not to say that the bias was eliminated, as my position remains subjective, but that it is balanced with a critical point of view wherever possible.

I feel privileged to have been a part of this garden project as a volunteer, thankful for being welcomed as a researcher, and look forward to continuing my involvement with the school garden at River Valley even after this case study is complete. Because of this, I feel that I am able to give back meaningfully to the community that shared with me their time and resources during the process of data collection. I am also able to continue with relationships that were formed or deepened during data collection, and avoid some of the problems of disengaging after prolonged engagement in a community that occur when a researcher completes a research project.

References

1. Canadian Home Economics Association. Position of the Canadian Home Economics Association on food security. *Journal of the Canadian Home Economics Association*. 1999;49(1):5-9.
2. Biofuel [homepage on the Internet]. Wikipedia. 2009 [cited 06/2009]. Available from: <http://en.wikipedia.org/wiki/Biofuels>.
3. Kahn PHJ. Developmental psychology and the biophilia hypothesis: Children's affiliation with nature. *Developmental Review*. 1997;17:1-61.
4. American Community Gardening Association [homepage on the Internet]. 2007 [cited 12/2007]. Available from: <http://www.communitygarden.org/learn/>.
5. Rodale JI, editor. *Encyclopedia of organic gardening*. Emmaus, Penna: Rodale Books, Inc; 1999.
6. Capra F. *Ecoliteracy: The challenge for education in the next century* (lecture). Liverpool Schumacher Lectures. March 20, 1999.
7. Atlantic Health Promotion Research Centre, Nova Scotia Nutrition Council, collaborating Family Resource Centres/Projects. *Thought about food? Understanding the relationship between public policy and food security in Nova Scotia*. Halifax, Nova Scotia: Author; 2006.
8. Fairholm J. *Urban agriculture and food security initiatives in Canada: A survey of Canadian non-governmental organizations*. Ottawa, ON: Life Cycles Project Society and International Development Research Centre; 1998. Report No.: 25.

9. Slater J. Community food security: Position of Dietitians of Canada. Dietitians of Canada; 2007.
10. Hamm MW, Bellows AC. Community food security and nutrition educators. *J Nutr Educ Behav.* 2003;35(1):37-43.
11. Agriculture and Agri-Food Canada. Canada's action plan for food security. 2000 [cited May 12, 2008].
12. Wikipedia: Permaculture [homepage on the Internet]. 2007 [cited 12/2007]. Available from: <http://en.wikipedia.org/wiki/Permaculture>.
13. Praetorius P. A permaculture school garden. *Green Teacher.* 2006;78:6.
14. Evergreen [homepage on the Internet]. 2009 [cited 12/2009]. Available from: <http://www.evergreen.ca/en/registry/>.
15. Slow food Nova Scotia [homepage on the Internet]. 2009 [cited 12/2007]. Available from: <http://www.slowfoodns.ca/>.
16. Garrett S, Feenstra G. Growing a community food system. Washington State: Western Regional Extension; nd. Report No.: WREP0135.
17. Graham H, Zidenberg-Cherr S. California teachers perceive school gardens as an effective nutritional tool to promote healthful eating habits. *J Am Diet Assoc.* 2005;105(11):1797-800.
18. Morris JL, Zidenberg-Cherr S. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *J Am Diet Assoc.* 2002;102(1):91-3.

19. McAleese JD, Rankin LL. Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *J Am Diet Assoc.* 2007;107:662-5.
20. Bell AC, Dymont JE. *Grounds for action: Promoting physical activity through school ground greening in Canada.* Evergreen; 2006.
21. Dymont JE. *Gaining ground: The power and potential of school ground greening in the Toronto district school board* Evergreen; 2005.
22. Ozer EJ. The effects of school gardens on students and schools: Conceptualization and considerations for maximizing healthy development. *Health Educ Behav.* 2006 Jul 21.
23. Azuma,A., Horan,T., Gottlieb,R. *A place to grow and a place to learn. School gardens in the Los Angeles Unified School District: A survey, case studies, and policy recommendations.* 2001.
24. Raffan J, et. al. (Evergreen Learning Grounds). *Nature nurtures: Investigating the potential of school grounds.* Evergreen; 2000.
25. Parmer SM, Salisbury-Glennon J, Shannon D, Struempfer B. School gardens: An experiential learning approach for a nutrition education program to increase fruit and vegetable knowledge, preference, and consumption among second-grade students. *J Nutr Educ Behav.* 2009;41(3):212-7.
26. Rahm J. Emergent learning opportunities in an inner-city youth gardening program. *J Research in Science Teaching.* 2002;39:164-84.

27. Robinson CW, Zajicek JM. Growing minds: The effects of a one-year school garden program on six constructs of life skills of elementary school children. *HortTechnology*. 2005;15(3):453-7.
28. Somerset S, Ball R, Flett M, Geissman R. School based community gardens: Re-establishing healthy relationships with food. *Journal of the Home Economics Institute of Australia*. 2005;12(2).
29. Brynjegard S. School gardens: Raising environmental awareness in children. San Raphael, California: School of Education, Dominican University of California; 2001.
30. Hermann JR, Parker SP, Brown BJ, Siewe YJ, Denney BA, Walker SJ. After-school gardening improves children's reported vegetable intake and physical activity. *J Nutr Educ Behav*. 2006 May-Jun;38(3):201-2.
31. Bundschu-Mooney E. School garden investigation: Environmental awareness and education. San Raphael, CA: Dominican University of California; 2003. Report No.: ED480981.
32. Dymment JE, Bell AC. Grounds for movement: Green school grounds as sites for promoting physical activity. *Health Educ Res*. 2007.
33. Heffernan M. Horticulture rediscovered: The flowering of American schoolyards. Cleveland, Ohio: Cleveland Botanical Gardens; 1997.
34. Graham H, Beall DL, Lussier M, McLaughlin P, Zidenberg-Cherr S. Use of school gardens in academic instruction. *J Nutr Educ Behav*. 2005;37(3):147-51.

35. Murphy MJ. Education for sustainability: Findings from the evaluation study of the edible schoolyard. Centre for Ecoliteracy; 2003.
36. Smit N. My patch of earth: Using the school ground as a teaching and learning referent for an environmental ethic. Tasmania, Australia: Department of Education; 1997.
37. The Healthy Eating Action Group, Nova Scotia Alliance for Healthy Eating and Physical Activity. Healthy eating Nova Scotia. Halifax, NS: Nova Scotia Office of Health Promotion; 2005.
38. Power E. Combining social justice and sustainability for food security. In: Koc M, MacRae R, Mougeot L, Welsh J, editors. For Hunger-proof Cities: Sustainable Urban Food Systems. Ottawa: International Development Research Centre; 1999. p. 30-7.
39. Dayle, J., McIntyre, L., Raine-Travers, K. The dragnet of children's feeding programs in Atlantic Canada. *Social Science and Medicine*. 2000;51:1783-93.
40. Tarasuk V. A critical examination of community-based responses to household food insecurity in Canada. *Health Educ Behav*. 2001;28(4):487-99.
41. Anderson, M., Cook, J. Community food security: Practice in need of theory? *Agriculture and Human Values*. 1999;16(2):141-50.
42. Carlsson L, Williams PL. New approaches to the health promoting school: Participation in sustainable food systems. *Journal of Hunger and Environmental Nutrition*. 2008;3(4):1-18.

43. Williams PL, McIntyre L, Dayle J, Raine K. The wonderfulness of children's feeding programs. *Health Promotion International*. 2003;18(2):163-70.
44. Public Health Agency of Canada. The social determinants of health: An overview of the implications for policy and the role of the health sector. Ottawa, ON: Public Health Agency of Canada; nd.
45. Power E. Individual and household food insecurity in Canada: Position of Dietitians of Canada. Toronto, ON: Dietitians of Canada; 2005.
46. Boutlier M, Cleverly S, Labonte R. Community as a setting for health promotion. In: Poland B, Green L, Rootman I, editors. *Settings for health promotion: Linking theory and practice*. London: Sage; 2000.
47. Bandura A. Health promotion by social cognitive means. *Health Education & Behaviour*. 2004;31(2):143-64.
48. Annapolis Valley Regional School Board: Health promoting schools project [homepage on the Internet]. Nova Scotia: 2009 [cited 01/2008]. Available from: http://www.avrsb.ednet.ns.ca/main/index.php?pagecontentid=230&p_type=1.
49. Jensen BB, Simovska V. Involving students in learning and health promotion processes -- clarifying why? what? and how? *Promotion and Education*. 2005;12(3-4):150-6.
50. Ottawa Charter. Ottawa charter for health promotion. Ottawa: 1986.
51. McIntyre L. Food security: More than a determinant of health. *Policy Options*. 2003;March:46-51.

52. Power E. Conceptualizing food security for aboriginal people in Canada. *Can J Public Health*. 2008;99(2):95-8.
53. Allen P, Guthman J. From “old school” to “farm-to-school”: Neoliberalization from the ground up. *Agriculture and Human Values*. 2006;23:401.
54. Allen P. Reweaving the food security safety net: Mediating entitlement and entrepreneurship. *Agriculture and Human Values*. 1999;16(2):117-29.
55. Canadian community health survey- nutrition (CCHS) [homepage on the Internet]. 2006 01/31. Available from: <http://www.statcan.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5049&lang=en&db=IMDB&dbgf&adm=8&dis=2>.
56. Moskow A. The contribution of urban agriculture to gardeners, their households, and the surrounding communities: The case of Havana, Cuba. In: Koc M, MacRae R, Mougeot LJA, Welsh J, editors. *For Hunger Proof Cities: Sustainable Urban Food Systems*. Ottawa: International Development Research Centre; 1999. p. 77-83.
57. Vozoris, N., Tarasuk, V. Prenatal and child nutrition programs in relation to food security. *Canadian Review of Social Policy*. 2003;51:67-86.
58. Pothukuchi K. Community food assessment: A first step in planning for community food security. *Journal of Planning Education and Research*. 2004 Summer;23(4):356.
59. Barbolet H, Cuddeford V, Jeffries F, Korstad H, Kurbis S, Mark S, et al. Vancouver food system assessment. Western Economic Diversification Canada; City of

Cultivating Food Security Carlsson

Vancouver Department of Social Planning; SFU's Centre for Sustainable Community Development; Environmental Youth Alliance; 2005.

60. McCullum C, Desjardins E, Kraak VI, Ladipo P, Costello H. Evidence-based strategies to build community food security. *Journal of the American Dietetic Association*. 2005;105(2):278.
61. Brown L, Carlsson L, Reimer DE, Williams PL. Redesigning Canada's food system: The role of the social economy in rebuilding community food security. *Making Waves*. 2008;19(3):13-7.
62. Montgomery A. Best practices in farm to school: Lessons from the United States, United Kingdom and Canada. 2006.
63. Vallianatos M. Healthy school food policies: A checklist. Occidental College, Los Angeles, CA: Center for Food and Justice, Urban and Environmental Policy Institute; 2005.
64. Evergreen. Growing healthy food on Canada's school grounds. Evergreen; 2006 March.
65. Personal communication with Cam Collyer, director of learning grounds, evergreen. January 31, 2008.
66. Health Canada. Canadian community health survey, cycle 2.2, nutrition (2004) - income-related household food security in Canada. Ottawa, ON: Office of Nutrition Policy and Promotion; 2007. Report No.: 4696.

Cultivating Food Security Carlsson

67. Nova Scotia Participatory Food Security Projects. Working together to build food security in Nova Scotia: Participatory food costing 2004/05. Halifax, NS: Atlantic Health Promotion Research Centre; 2007.
68. Atlantic Health Promotion Research Centre/Nova Scotia Nutrition Council. Building food security in Nova Scotia through participatory food costing: 2004/05 food costing update. Halifax, NS: Author; 2006.
69. Williams PL, Johnson CP, Kratzmann MLV, Johnson CSJ, Anderson BJ, Chenhall C. Can households earning minimum wage in Nova Scotia afford a nutritious diet? *Can J Public Health*. 2006;97(6):430-4.
70. Atlantic Health Promotion Research Centre, Family Resource Centres/Projects, Nova Scotia Nutrition Council. Participatory food security projects phase I and II report. Building food security in Nova Scotia: Using a participatory process to collect evidence and enhance the capacity of community groups to influence policy. Halifax, NS: Author; 2004.
71. Health Canada. Canadian community health survey cycle 2.2, nutrition (2004): Income related household food security in Canada. Ottawa: Office of Nutrition Policy and Promotion, Health Products and Food Branch; 2007.
72. McIntyre L, Glanville T, Raine K, Dayle J. Hungry mothers of barely fed children: A study of the diets and food experiences of low-income lone mothers in Atlantic Canada. Halifax: 2001 March.

73. McIntyre L, Connor S, Warren J. Child hunger in Canada: Results of the 1994 national longitudinal survey of children and youth. *Can Med Assoc J*. 2000;163(8):961-5.
74. National population health survey (NPHS) [homepage on the Internet]. 1998/99 [cited 02/2008]. Available from:
<http://www.statcan.ca/english/concepts/nphs/index.htm>.
75. Williams PL, MacAulay RB, Barro K, Johnson C, Anderson B, Gillis DE. In: Sharing stories of food insecurity: Strengthening evidence for influencing policy (poster). International congress of dietetics; May 2004; Chicago, Illinois.
76. Seiden C, Hellquist W, Swinemar D. Hunger in rural Canada: A backgrounder. Canadian Association of Food Banks; 2007.
77. Nova Scotia Participatory Food Security Projects. Cost and affordability of a nutritious diet in Nova Scotia: Report of 2007 food costing. Halifax, NS: Mount Saint Vincent University; 2008.
78. McIntyre L, Williams P, Glanville NT. Milk as metaphor: Low-income lone mothers' characterization of their challenges acquiring milk for their families. *Ecol Food Nutr*. 2007;46(3):263-79.
79. Green RJ, Williams PL, Johnson CS, Blum I. Can Canadian seniors on public pensions afford a nutritious diet? *Can J Aging*. 2008.
80. Glanville NT, McIntyre L. Diet quality of Atlantic families headed by single mothers. *Can J Diet Pract Res*. 2006;67(1):28-35.

81. McIntyre L, Glanville T, Officer S, Anderson B, Raine K, Dayle J. Food insecurity of low-income mothers and their children in Atlantic Canada. *Can J Public Health*. 2002;93(6):411-5.
82. Nova Scotia Department of Health. Canadian community health survey 3.1: Summary report to the district health authorities. Information Analysis and Reporting Section, Nova Scotia Department of Health; 2007.
83. Nova Scotia Participatory Food Security Projects. Cost and affordability of a nutritious diet in Nova Scotia: Report on 2008 participatory food costing. Halifax, NS: Mount Saint Vincent University; 2009.
84. The Healthy Eating Action Group of the Nova Scotia Alliance for Healthy Eating and Physical Activity, in partnership with the Office of Health Promotion. Healthy eating Nova Scotia. Halifax, Nova Scotia: Office of Health Promotion; March 2005.
85. Nova Scotia Department of Education, Nova Scotia Department of Health Promotion. Food and nutrition policy for Nova Scotia schools: A comprehensive food and nutrition policy for Nova Scotia public schools. 2005.
86. Secretariat for the Intersectoral Healthy Living Network. The integrated pan Canadian healthy living strategy. 2005.
87. Beaudry M, Delisle H. Public('s) nutrition. *Public Health Nutr*. 2005 Sep;8(6A):743-8.
88. Morris JL, Koumjian KL, Briggs M, Zidenberg-Cherr S. Nutrition to grow on: A garden-enhanced nutrition education curriculum for upper-elementary schoolchildren. *J Nutr Educ Behav*. 2002 May-Jun;34(3):175-6.

89. Somerset S, Markwell K. Impact of a school-based food garden on attitudes and identification skills regarding vegetables and fruit: A 12-month intervention trial. *Public Health Nutrition*. 2008;1-8.
90. Miller DL. The seeds of learning: Young children develop important skills through their gardening activities at a Midwestern early education program. *Applied Environmental Education and Communication*. 2007;6:49-66.
91. Lautenschlager L, Smith C. Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. *Agriculture and Human Values*. 2007;1-14.
92. Viola A. Evaluation of the outreach school garden project: Building the capacity of two indigenous remote school communities to integrate nutrition into the core school curriculum. *Health Promot J Austr*. 2006;17(3):233-9.
93. Langhout RD, Rappaport J, Simmons D. Integrating community into the classroom: Community gardening, community involvement, and project-based learning. *Urban Education*. 2002;37(3):323-49.
94. Dymont JE, Bell AC. 'Our garden is colour blind, inclusive and warm': Reflections on green school grounds and social inclusion. *International Journal of Inclusive Education*. 2008;12(2):169-83.
95. Sandler L, Vandergrift J, VerBruggen C. From dessert to garden: Reconnecting disconnected youth. *Educational Leadership*. 1995 May 1995:14-6.

96. Sullivan AF. Community gardening in rural regions: Enhancing food security and nutrition. Tufts University, Medford, MA 02155: Center on Hunger and Poverty; 1999.
97. Nanney MS, Johnson S, Elliot M, Haire-Joshu D. Frequency of eating homegrown produce is associated with higher intake among parents and their preschool-aged children in rural Missouri. *J Am Diet Assoc.* 2007;107:577-84.
98. Twiss J, Dickinson J, Duma S, Kleinman T, Paulsen H, Rilveria L. Community gardens: Lessons learned from California healthy cities and communities. *Am J Pub Health.* 2003;93(9):1435-8.
99. Skinner JD, Carruth BR, Bounds W, Ziegler PJ. Children's food preferences: A longitudinal analysis. *J Am Diet Assoc.* 2002;102:1638-47.
100. Benton D. Role of parents in the determination of the food preferences of children and the development of obesity. *International Journal of Obesity.* 2004;28:858-69.
101. Osborne K. Public schooling and citizenship education in Canada. *Canadian Ethnic Studies.* 2000;32(1):8.
102. Hayden-Smith R. Soldiers of the soil: The work of the United States school garden army during world war one. *Applied Environmental Education & Communication.* 2007;6(1):19-21.
103. National gardening association [homepage on the Internet]. . 2007 2009 [cited 12/2007]. Available from: <http://www.kidsgardening.com/School/register.asp>.

104. JoAnn Jaffe MG. Victual vicissitudes: Consumer deskilling and the (gendered) transformation of food systems. *Agriculture and Human Values*. 2006 June 2006;23(2):143 - 162.
105. Baker L. Tending cultural landscapes and food citizenship in Toronto's community gardens. *Geographical Review*. 2004;94:305-25.
106. Faber Taylor A, Kuo FE, Sullivan WC. Coping with ADD: The surprising connection to green play settings. *Environment and Behaviour*. 2001;33(1):54-77.
107. Spicer K. Values in search of a nation. In: Earle RL, Wirth JD, editors. *Identities in North America: The Search For Community*. Stanford: Stanford University Press; 1995. p. 13-28.
108. Cook I, Crang P, Thorpe M. Biographies and geographies: Consumer understandings of the origins of foods. *British Food Journal*. 1998;100(3):162-7.
109. Welsh J, MacRae R. Food citizenship and community food security: Lessons from Toronto, Canada. *Canadian Journal of Development Studies*. 1998;19(Special Issue):237-55.
110. Vallianatos M, Gottlieb R, Haase MA. Farm-to-school: Strategies for urban health, combating sprawl, and establishing a community food systems approach. *Journal of Planning Education and Research*. 2004;23:414-23.
111. The agonies of agflation rising food prices. *The Economist*. 2007 Aug 26, 2007:1-2.
112. The edible schoolyard, Berkeley, CA [homepage on the Internet]. [cited 12/2007]. Available from: <http://www.edibleschoolyard.org/>.

113. Cuthbert P. Fink's food crusade. Gremolata. 2007 [cited 12/2007]. Available from: <http://gremolata.com/fink.htm>.
114. Vozoris N, Tarasuk V. Prenatal and child nutrition programs in relation to food insecurity. *Canadian Review of Social Policy*. 2003;51:67-85.
115. Patel IC. Gardening's socioeconomic impacts. *J Extension*. 1991;29:7-8.
116. Dymment JE. 'There's only so much money hot dog sales can bring in': The intersection of green school grounds and socioeconomic status. *Children's Geographies*. 2005;3(3):307-23.
117. Food prices: Cheap no more. *The Economist* (opinion). 2007 Dec 6th, 2007:1-7.
118. Stroehla B, Malcoe L, Velie E. Dietary sources of nutrients among rural Native American and White children. *J Am Diet Assoc*. 2005;105:1908-16.
119. Personal communication with Janet Parker, community gardens CAC food and gardens, Madison, WI. February 11th, 2008.
120. Bronfenbrenner U. *The ecology of human development. experiments by nature and design*. Cambridge, MA: Harvard University Press; 1979.
121. Research support for kids' gardening [homepage on the Internet]. 2005 [cited 02/2007]. Available from: <http://www.kidsgardening.com/2005.kids.garden.news/research>.
122. Bronfenbrenner U. Ecological systems theory. In: JAI Press Inc; 1989. p. 187-249.
123. Yin RK. *Case study research: Design and methods*. 2nd ed. Thousand Oaks: Sage Publications; 1994.

124. Eisenhardt K. Building theory from case study research. *Academy of Management Review*. 1989;14(4):532-50.
125. Creswell JW, Millar DL. Determining validity in qualitative inquiry. *Theory Into Practice*. 2000;39(3):124-30.
126. Denzin NK, Lincoln YS, editors. *Handbook of qualitative research* Thousand Oaks, California: SAGE; 2000.
127. Bronfenbrenner U. Ecology of the family as a context for human development: Research perspectives. *Dev Psychol*. 1986;22(6):723-42.
128. Hall M, Lasby D, Gumulka G, Tryon C. *Caring Canadians, involved Canadians: Highlights from the 2004 Canada survey of giving, volunteering and participating*. Ottawa: Statistics Canada; 2006 June 2006.
129. Falls Brook Centre. *Food miles: Growing local food connections (grades K-8)*. New Brunswick: Falls Brook Centre; n/d [cited 04/2008]. Available from: <http://www.fallsbrookcentre.ca/foodmiles/docs/Food%20Miles%20Module.pdf>.
130. *Learning for life II: Brighter futures together* [homepage on the Internet]. . 2008 2008 [cited 11/2008]. Available from: <http://brighterfuturestogether.ednet.ns.ca/>.
131. *Instructional time* [homepage on the Internet]. Government of Nova Scotia. 2008 [cited 11/2008]. Available from: http://www.ednet.ns.ca/index.php?t=sub_pages&cat=741.
132. Anderson A, Piran N. Health promoting schools: Guiding principles of an international movement. *Orbit*. 2001;31(4):4.

133. World food situation [homepage on the Internet]. Food and Agriculture Organization. 2009 [cited 11/2008]. Available from:
<http://www.fao.org/worldfoodsituation/wfs-home/en/>.
134. Declaration of leaders meeting of major economies on energy security and climate change [homepage on the Internet]. Canada: Government of Canada. 2008/07/09 [cited 03/2009]. Available from: http://www.Canadainternational.gc.ca/g8/summit-sommet/2008/declaration_090708.aspx?lang=eng.
135. TransFair Canada: Fair trade towns campaign [homepage on the Internet]. Ottawa, ON: TransFair Canada. 2008 [cited 19/12/2008]. Available from:
<http://transfair.ca/en/fairtradetown>.
136. Food Secure Canada: Home [homepage on the Internet]. Ottawa: Food Secure Canada. 2009 [cited 11/2008]. Available from: <http://www.foodsecureCanada.org/>.
137. Carlsson L, Williams PL, Brown L, Millar N, Reimer DE, McKittrick A, et al. Mobilization around food security in the social economy research partnerships: A national scan. Social Economy and Sustainability Research Network; 2008.
138. Thorp L. The pull of the earth : Participatory ethnography in the school garden. Lanham: AltaMira Press; 2006.
139. Mitchell, A., Shillington, R.,Mohamoud, H. A new measure of poverty.
140. Kortright R. Edible backyards: Residential land use for food production in Toronto. Master's Thesis (Dept. of Geography, Collaborative Program in Environment and Health University of Toronto). 2007.

141. Taylor JP, Evers S, McKenna M. Determinants of healthy eating in children and youth. *Can J Public Health*. 2005 Jul-Aug;96 Suppl 3:S20,6, S22-9.
142. Power E. Determinants of healthy eating among low-income Canadians. *Can J Public Health*. 2005;96(Supp 3):S37-42.
143. Raine K. Determinants of healthy eating in Canada: An overview and synthesis. *Canadian journal of public health*. 2005;96(Understanding the Forces That Influence Our Eating Habits...):8.
144. Yalnizyan A. The rich and the rest of us: The changing face of Canada's growing gap. *Reports and Studies*. Ottawa: Canadian Centre for Policy Alternatives; 2007.
145. Dymont JE, Bell AC. Active by design: Promoting physical activity through school ground greening. *Children's Geographies*. 2007;5(4):463-77.
146. Dahlberg K. What are food systems? local and regional food systems: A key to healthy cities. paper presented at the international healthy cities conference, December 1993.
147. Atlantic Health Promotion Research Centre, Family Resource Centres and Projects, Nova Scotia Nutrition Council. *Thought about food? A workbook on food security & influencing policy*. Halifax, Nova Scotia: ; 2005.
148. Health Canada. *Eating well with Canada's food guide*. Resource. Ottawa, Ontario: Health Canada; 2007. Report No.: 4651.
149. Bradley JC, Kohlleppl T, Waliczek TM, Zajicek JM. Factors affecting recruitment of horticultural students at major universities. *HortTechnology*. 2000;10:631-6.

150. Center for Ecoliteracy. Rethinking school lunch: New models of procurement. Berkley, CA .
151. Parcel GS, Kelder SH, Basen-Engquist K. The school as a setting for health promotion. In: Poland BD, Green LW, Rootman I, editors. Settings for Health Promotion: Linking Theory and Practice. Thousand Oaks, CA: Sage Publications; 2000. p. 86-127.
152. Williams PL, McIntyre L, Glanville NT. Milk insecurity: Accounts of a new food insecurity phenomenon. Health Care for Women International. submitted.
153. Corbett M. Learning to leave: The irony of schooling in a coastal community. Halifax, NS: Fernwood Publishing; 2007.
154. Select Nova Scotia: Buy local. Eat fresh.[homepage on the Internet]. Halifax: Government of Nova Scotia. 2009 [cited 11/2008]. Available from: <http://www.selectnovascotia.ca/>.
155. Ricciuto LE, Tarasuk VS. An examination of income-related disparities in the nutritional quality of food selections among Canadian households from 1986-2001. Soc Sci Med. 2007;64(186-198).
156. Los Angeles unified school district board of education: Resolutions [homepage on the Internet]. Los Angeles: Los Angeles Unified School District. 2009 [cited 2009/03/14]. Available from: <http://www.lausd.k12.ca.us/lausd/board/secretary/bd-mem-motions.html>.

157. Towards a comprehensive food policy for Canada [homepage on the Internet].
Ottawa, ON: Liberal Party of Canada. 2009 [cited 2009/03/15]. Available from:
<http://www.carolynbennett.ca/issuePosting.cfm?ID=93>.
158. Henry CJ, Allison DJ, Garcia AC. Child nutrition programs in Canada and the
United States: Comparisons and contrasts. *The Journal of School Health*.
2003;73(2, Research Library):83-5.

Appendix A
**Letter of Request to Superintendent of Schools for Permission to Carry Out
Research**

March 27th, 2008

Superintendent, Annapolis Valley Regional School Board

*RE: REQUEST FOR PERMISSION TO STUDY SCHOOL GARDENS AND FOOD SECURITY AT
GASPEREAU VALLEY ELEMENTARY SCHOOL*

Dear (*name of Superintendent of Schools removed*),

Under the supervision of Dr. Patty Williams, Canada Research Chair in Food Security and Policy Change at Mount Saint Vincent University (MSVU), I am proposing to study the value of school food gardens in building food security at the school level. The Nova Scotia Health Research Foundation, through a Graduate Research Award, is funding the research. I would like to base my study at (*school name removed*) Elementary School (ES), where I currently volunteer to coordinate school garden activities, with guidance from (*name removed*) (Principal), the staff and garden club members. I have already received verbal consent from (*Principal's name removed*) to approach (*name of School Board removed*) for approval for this study.

Food Security is identified as a priority in Healthy Eating Nova Scotia.¹³ Given the theoretical potential (backed by peer reviewed and anecdotal evidence) of school gardens in building *food security*, this research will aim to explore the value of school gardens in building food security at the school level. Using a case study research design, I propose to review key documents such as the cafeteria menu, school success plan and garden publicity documents, participate in spring and fall season garden activities at the school as both a volunteer organizer and observer, and conduct four to five focus groups and individual interviews. I aim to involve the whole school community (students, teachers, support staff, custodial staff, administrators, parents, and volunteers) on a voluntary basis in the interviews and focus groups.

This research is considered minimal risk, as the participants will not be put in any situations which they would not normally take part in; however, the research is currently undergoing ethical review by the MSVU Research Ethics Board. I will provide you with a certificate of ethical approval prior to starting the research. A written letter of permission with your approval is necessary to proceed with this research project at ES.

I have attached a summary of the background on my research topic, as well as a detailed description of my research questions, proposed methods, and ethical considerations, including risks and benefits for your information. If you have further questions, I am more than willing to meet to discuss the research proposal, or you can contact my thesis supervisor at 902-457-6394.

Thank you for your consideration.

Regards,

Liesel Carlsson

MScAHN Candidate, Department of Applied Human Nutrition, Mount Saint Vincent University

¹³The Healthy Eating Action Group of the Nova Scotia Alliance for Healthy Eating and Physical Activity, in partnership with the Office of Health Promotion. Healthy Eating Nova Scotia. Halifax, Nova Scotia: Office of Health Promotion; March 2005.

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Research Assistant, Social Economy and Sustainability Research Network, Research Cluster on Mobilization around Food Security and Community Economic Development.

Background: Food Security and School Gardens

Food security is recognized nationally and provincially as not only a key social determinant of public health, but a priority at the community and school level. It is defined as when an individual or a community has access to sufficient nutritious, safe, personally acceptable and culturally appropriate foods that are produced, procured and distributed in ways that are environmentally sound and socially just.¹⁴ In Nova Scotia, income related food insecurity is well documented, affecting almost 15% of the population, with even higher levels among low income families.¹⁵

School garden projects have shown promising success in contributing to children's physical and social health, as well as a healthy a school environment. There is also theoretical support for their role in tackling food insecurity; however, to date no research is available that explores in depth how school gardens themselves can play a role in building food security in the school community, or the costs associated with these potential benefits. As healthy public policy research, this study has the potential to impact the health of Nova Scotian school children and their families, by identifying what individual, school, community or other environmental factors are involved, if indeed school gardens contribute to healthy and food secure environments at schools.

The Research Question

Given the potential of school gardens in building food security, this research will aim to explore the value of school gardens in advancing food security at the school level. More specifically, it will seek to explore, from the perspective of the school community and public health practitioners: 1) any health, social and ecological effects of school food gardens; and 2) what factors contribute to producing these effects.

Proposed methods

This research project will follow a qualitative, exploratory, single case, embedded study design¹⁶ using the garden project at ES as the unit of analysis or case. I will conduct document review, focus groups and interviews, and observe and participate in school wide garden activities.

Involvement from the school community will be self selected. Invitations to participate in the research will be sent from the school principal and myself to the entire school community through the school newsletter and given to school staff personally. I will personally invite community and public health professionals from (*name of County removed*) to participate in interviews. It is anticipated that external participants could include: school community members of other schools who are currently participating in school garden initiatives, employees of the Health Promoting

¹⁴ Adapted from: *Fairholm J. Urban agriculture and food security initiatives: A survey of non governmental organizations in Canada. IDRC; 1998*, by the by the Food Security Projects in: *Atlantic Health Promotion Research Centre. Thought About Food? Understanding the Relationship Between Public Policy and Food Security in Nova Scotia. Halifax, Nova Scotia: Author, 2006.*

¹⁵ Health Canada. Canadian Community Health Survey Cycle 2.2, Nutrition (2004). Income-related household food security in Canada. Ottawa, ON: Office of Nutrition Policy and Promotion; 2007. Report No.: 4696.

¹⁶ Yin RK. Case study research: Design and methods. 2nd Edition ed. Thousand Oaks, CA: Sage Publications; 1994.

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Schools Project, members of the Food Security Network¹⁷, and members of a newly formed working group to support school garden initiatives.¹⁸

Four to five focus groups will be conducted with staff (teachers, educational assistants, etc.) students, parents and administrators (principal and administrative assistants), and supplemented with five to six semi-structured face-to-face interviews with identified key informants. One student focus group will be held with current grade fives together with current grade sixes (who were involved last year with the grade five garden activities described above). Another student focus group will be held with selected garden club members who were not reached in the grade five/six focus group. Student focus groups will happen at lunch time, and last approximately 20 minutes. Focus groups with adults will last up to one hour, take place on school property, and within school hours (at the discretion of the principal and teachers) or directly after school to minimize logistical issues around attendance, transportation and childcare. They will take place in June 2008, and September 2008. Interviews will be semi-structured by the research questions, and audio taped according to ethical procedures. A sample interview/focus group guide is provided below.

As a participant-observer, I will also be taking part in school garden and nutrition activities in May/June (planting) and September/October (harvesting) of 2008, making observations of activities, participants and leaders, context, and resources used.

Ethical Considerations

The school, and any individual participants in interviews or focus groups will be informed verbally about the nature of the research, and provided with a written summary in the form of an informed consent form. It will be observed in this research study that the students involved in the garden program are not of legal age to consent to being part of any research activities, and the consent of their legal guardians will be sought through informed consent form, sent home from school with the students. Only students who have legal guardian permission, and who specify verbally or in writing that they would like to take part, will be allowed to participate.

Confidentiality will be ensured in such a way that no names will be used in any publications or presentations based on the research, unless written permission is provided. However, there are few schools in Nova Scotia that have a garden, and as such, the names of people in some positions within the school (e.g.: the principal), may be easily deduced. In light of this, all efforts will be made to protect the identity of individuals sharing information unless their consent is obtained.

There is minimal risk involved in participating in this research. I am currently present with most garden activities occurring at the school, so my presence will not upset the natural flow of how children act in or react to garden activities. Focus groups and interviews will involve school community members who are familiar with me, and my role in the school. Participants will be fully informed about the existence of my dual relationship with them as garden volunteer coordinator and researcher in both the informed consent form and verbally and made aware that it will in no way affect their current or future participation in the garden activities.

¹⁷ The Food Security Network is a communication mechanism for all people in Nova Scotia interested in Food Security. It has representation from academia, government departments and agencies, producers, and consumers.

¹⁸ The working group to support school gardening initiatives is in the process of development. It was initiated by Judy Grant, Education Coordinator for the Department of Agriculture, in January 2008.

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The benefits to participating for the students will be participation in garden activities, which I will coordinate and take part in; for parents, staff and administration, a furthered understanding of the role the garden project plays in the school community; and for health professionals and other key informants, heightened awareness of school gardens, and an understanding of their role in health promotion and food security.

Results of the research will be provided to participants, in the form of a summary report through the school. If the school board would also like a copy, I would be more than happy to provide one.

No incentives, other than the provision of food for focus group participants will be used. Participants will be made aware, through the Informed Consent Form, which will be reviewed verbally at the start of the focus group, that they are going to be audio taped and are free to withdraw from the research at any time. I have provided copies of each of the draft student, adult and guardian consent forms for you to review.

Appendix B
Letter of Permission from Superintendent of Schools

Superintendent of Schools

March 28, 2008

via email: [REDACTED]

Dear Ms. Carlsson:

This letter is in response to your email request of March 26 seeking permission to do research at *(name of school removed)* Elementary School regarding the value of food gardens in building food security at the school level. Permission is granted to contact Principal *(name of Principal removed)* and I understand you have already done so. As the site manager, the principal of the school has final approval as to whether or not the school participates.

Please ensure that information collected is stored, accessed and disclosed only pursuant to the Freedom of Information Protection of Privacy Act and the Personal Information International Disclosure Protection Act.

Best wishes.

Yours in working for students,

(name removed)
SUPERINTENDENT OF SCHOOLS

nd/bfm

c: *(name of Principal and school removed)*

Appendix C
Statement of Permission from Principal to Carry Out Research

(letterhead removed)

April 2, 2008

Dear Ms. Carlsson:

I am looking forward to working with you on the Research Project: Cultivating Food Security in Nova Scotia Public Schools and have my permission to work with students, staff and parents of the *(school name removed)* Elementary School Community.

If you require more assistance with this endeavor please do not to hesitate to contact me.

Thank you,

(name removed)

Principal, GVES

Appendix D

Copy of University Research Ethics Board Certificate of Research Ethics Approval



University Research Ethics Board

UNIVERSITY RESEARCH ETHICS BOARD

Certificate of Research Ethics Approval

Title of project: *Cultivating Food Security in Nova Scotia Public Schools*

Researcher(s): Liesel Carlsson
Supervisor (if applicable): Patricia Williams
Co-Investigators: n/a

File #: 2007-091

The University Research Ethics Board (UREB) has reviewed the above named proposal and confirms that it respects the *Tri-Council Policy Statement* as outlined in the *MSVU Policies and Procedures: Ethics Review of Research Involving Humans* regarding the ethics of research involving human participants.

This certificate of approval is valid one year from the date of issue. A **final report is required within 30 days of expiry**. Researchers are reminded that any changes to approved protocol must be reviewed and approved by the UREB prior to their implementation.



Dr. Elizabeth Bowering, Chair
University Research Ethics Board (UREB)

May 6, 2008
Effective Date

[Expires: May 5, 2009]

Renewal is contingent upon submission to the UREB of a written request for renewal accompanied by a satisfactory annual ethics report thirty days prior to expiry.

Appendix E
Interview Guides

Sample Interview and Focus Group Guide

The following (italicized) questions are **my research questions**. The bulleted questions are my **interview** questions.

Structure: Focus group interviews will be semi-structured, using the following questions to generate discussion. Not all of the following questions will be asked, depending on responses.

Length: Interviews/focus groups with adults will aim to be approximately one hour in length, or whatever the person is willing to afford; the lunch hour will limit each focus group with children to approximately 15-20 minutes in length.

Appendix E
Interview Guides

Teachers

1. *Exploring any health, social and ecological effects of school food gardens.*
 - If the garden was not here, how would the school be different? [this could be reworded as: please describe the role of the garden in the school? How does it fit in with other school programs or strategies?
 - [For those who have] Describe an activity you have done with your class (with or without me) in the garden. How did the kids respond?
 - Can you comment on school gardens from a teaching/pedagogical perspective? [If this question is not well understood, it could be reworded as: Would you consider school gardens an education tool? Explain] Probes: can you describe the students that benefit most from this type of teaching? Tell me about your reasons for using or not using the garden as a teaching tool?
 - Who does the garden affect, and in what ways? Probe: Does this garden affect you as a teacher? If so, how? Give me an example.
 - Some research that I have read suggests that school gardens, when used as part of a nutrition unit, may encourage kids to eat fruits and vegetables. What do you think?
 - Can you describe anything that you have learned or thought about, through your involvement with the garden? In what ways does this influence your life outside of *School Name Removed*?
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Tell me a bit about the (*name of community removed*) community? How would you describe the food culture here? Please explain? [if “food culture” is not understood, I could ask: what are the most common foods? Are there any important community celebrations around food? Would you say that food is important here?]
 - Would you like to see the project continue? Expand? If so, how/why? What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Parents

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Tell me, in your opinion, why you think your school has a garden?
 - Who does the garden affect, and in what ways? [Probe: Does this garden affect you as a parent? If so, how? Give me an example. Does it affect your child?]
 - If the garden were not here, how would the school be different?
 - (for those who have) Describe an activity you have done (with or without me) in the garden.
 - Can you describe anything that you have learned or thought about through your involvement with the garden? In what ways does this influence your personal life?

2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Tell me a bit about the (*name of community removed*) community? How would you describe the food culture here? Please explain? [if “food culture” is not understood, I could ask: what are the most common foods? Are there any important community celebrations around food? Would you say that food is important here?]
 - Can you comment on how the garden (if at all) is connected with the (*name of community removed*) community? How? What is involved?
 - When, if you do, do you visit the school garden? What do you do there?
 - What are your thoughts on summer garden care?
 - In your experience, what contributes to the successes and/or failures of the school garden project?

Appendix E
Interview Guides

Parents – Revised

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Tell me, in your opinion, why you think your school has a garden?
 - Does this garden affect you as a parent? If so, how? Give me an example.
 - How does it affect your child?
 - What about the community?
 - If the garden were not here, how would the school be different?
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - How would you describe the food culture here? Please explain? [What are the most common foods? Are there any important community celebrations around food? Would you say that food is important here?]
 - What are your thoughts on summer garden care?
 - In your experience, what contributes to the successes of the school garden project?
 - What is missing?

Appendix E
Interview Guides

Students

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Tell me about one of your favourite activities that you have done with the garden club, or in class garden activities. What did you like about it?
 - Is there anything that you don't like about the garden?
 - Very few schools in Nova Scotia have school gardens. Tell me why you think your school has a garden? [could be reworded as: What would the school be like without a garden? Why?]
 - Maybe:
 - 1) I have been told that gardens give kids some power over how they learn, what do you think about that?
 - 2) Some say that school gardens help kids to like and eat healthy foods. What do you think? Do you choose what you eat?
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - When you think of food, what's the first thing you think of? [If kids are stumped by this, then perhaps: "if you made a list of the three most important things in your life, would food be one of them?"] Tell me about where your food comes from. Where did you learn this?
 - When do you come to the garden? With who? [Do you come with your family in the summer time to take care of the garden? To play in the garden?] Why/why not?
 - How do you imagine the perfect school garden? What would it look like? What would we do in it?

Appendix E
Interview Guides

Students – Revised

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Tell me about one of your favourite activities that you have done in the school garden. What did you like about it?
 - Have you ever tasted anything out of the garden? What? Was it good?
 - Have you ever gone to the garden with your class? What do you do there?
 - Do you go to the garden at recess and lunch? What do you do there?
 - Is there anything that you don't like about the garden?

2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - When you think of food, what's the first thing you think of?
 - [If kids are stumped by this, then perhaps: "if you made a list of the three most important things in your life, would food be one of them?"]
 - How do you imagine the perfect school garden? What would it look like? What would we do in it?

Appendix E
Interview Guides

Principal

Please describe your involvement with the garden at *(school name removed)*.

3. *Exploring any health, social and ecological effects of school food gardens.*
 - Please describe the role of the garden in the school? How does it fit in with other school and/or school board programs or strategies?
 - Tell me, from your perspective, why the school has a garden? If the garden were not here, how would the school be different?
 - If anyone, who do you feel is most effected by the garden project? How so?
 - In what ways does gardening at school provide learning opportunities? Please explain. Who is most affected? Please explain.
 - Are the things you talk about theoretical, or do you think what is learned is put to practice in daily life? E.g.: transfer to home, community, school.

4. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Tell me a bit about the *(name of community removed)* community? How would you describe the food culture here? Please explain?
 - You mentioned some positive effects of the garden (summarize from conversation). In your experience, what contributes these positive effects?
 - You mentioned some negative effects of the garden (summarize from conversation). In your experience, what contributes these negative effects?
 - Can you comment on how the garden (if at all) is connected with the school? The *(name of community removed)* community? How? What is involved?
 - Would you like to see the project continue? Expand? If so, how/why?
 - How do you envision the perfect school garden project/program? What is your wish list for how the garden might look in two years, ten years?
 - What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Health Professional (pilot)

Please describe your involvement in the garden at (*school name removed*).

1. *Exploring any health, social and ecological effects of school food gardens.*
 - From your perspective as a health professional, what is the role of a school garden in a school? What effects do you see of this school garden project? Who do you feel is most effected by the garden project? How so?
 - In your experience, does gardening at school provide learning opportunities? Please explain for whom, how and why? If so, how is this different from other learning opportunities?
 - Are the things you talk about theoretical, or do you think what is learned is put to practice in daily life? E.g.: transfer to home, community, school.
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Can you describe the food culture in this community? /Nova Scotia? Please explain?
 - In your experience, does this contribute to the successes and/or failures of the school garden project?
 - Can you comment on how the garden (if at all) is connected with the school? The (*name of community removed*) Community? How? What is involved?
 - Would you like to see the project continue? Expand? If so, how/why?
 - How do you envision the perfect school garden project/program? What is your wish list for how the garden might look in two years, ten years?
 - What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Health Professional

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Can you describe for me your involvement with the garden while you were doing your teaching practicum at (*school name removed*), or afterwards? (REMINDER: physical activity day, incorporated gardening activity).
 - If any, what effects did you see of this school garden project?
 - Who do you feel is most effected by the garden project? How so?
 - Are the things you talk about theoretical, or do you think what is learned is put to practice in daily life? E.g.: transfer to home, community, or school.
 - From your perspective as a health professional and an educator, what is the role of a school garden in a school?
 - How do or don't school gardens fit within provincial or board strategies/policies
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - How do you define *Health*? (If and when she says the word).
 - Can you describe the food culture in this community? /Nova Scotia? Please explain?
 - In your experience, does the food culture of this community effect how the school garden project would be accepted or integrated?
 - Can you comment on how the garden (if at all) is connected with the school? The (*name of community Removed*) Community? How so?
 - Would you like to see the project continue? Expand? If so, how/why?
 - How do you envision the perfect school garden project/program?
 - What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Health Professional

1. *Exploring any health, social and ecological effects of school food gardens.*
 - How do or don't school gardens fit within the Health Promoting Schools Program? Please explain?
 - In your experience, what health, social and/or ecological effects have you seen as a result of school gardens? What about the (*school name removed*) garden in particular?
 - Are the things you talk about theoretical, or is what is learned is put to practice in daily life? E.g.: transfer to home, community, or school.
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - How do you define *Health*? (If and when she says the word).
 - Can you describe the food culture within public schools in (*School Board name removed*)? Please explain?
 - Considering what you said about the food culture in schools here, does this effect how the school garden project would be accepted or integrated?
 - How do you envision the perfect school garden project/program?
 - What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Health Professional

1. *Exploring any health, social and ecological effects of school food gardens. Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Can you share with me your views on what role schools should play in child health? Would you say that your views are the norm?
 - How do or don't you see school gardens fitting within public school health? Please explain? Are there policies that support or hinder this?
 - How do or don't you see school gardens fitting food security at the school level? Please explain? Are there policies that support or hinder this?
 - Do you have any first hand experience with school gardens?
 - How do you define *Health*? (If and when she says the word).
 - In your experience, what health effects have you seen (or can you foresee) as a result of school gardens?
 - Social, ecological, economic, food security?
 - Can you describe the food culture in Nova Scotia/NS public schools? Please explain?
 - Considering what you said about the food culture in schools here, does this effect how the school garden project would be accepted or integrated?
 - How do you envision the perfect school garden project/program?
 - What resources are necessary to ensure a successful garden project/program?

Appendix E
Interview Guides

Custodian

Please describe your involvement in the garden at *(school name removed)*. [probe: in what ways do you contribute to the garden?]

1. *Exploring any health, social and ecological effects of school food gardens.*
 - Does this garden affect you? If so, how? Give me an example.
2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Can you comment on how the garden (if at all) is connected with the school? The *(name of community removed)* community? How? What is involved?
 - How do you envision the perfect school garden project/program?
 - What is your wish list for how the garden might look in two years, ten years?
 - What would you need to ensure a successful garden project/program?

Appendix E
Interview Guides

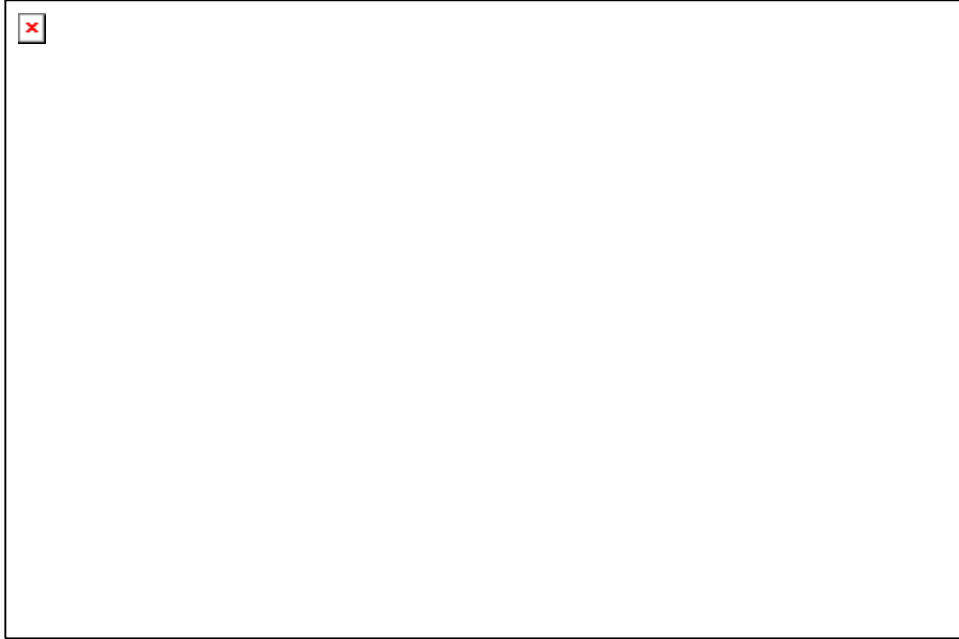
Cafeteria Mangers

Please describe your involvement in the garden at (*school name removed*).

1. *Exploring any health, social and ecological effects of school food gardens.*
 - How does this garden affect you? If so, how? Can you give me an example of both positive and negative effects?
 - In your opinion, what does a school garden offer the school?
 - How much food do you use from the garden? Please explain/comment. Could you use more?
 - Research shows that school gardens, when part of nutrition education, encourage kids to like and eat healthy foods. What do you think? Can you comment on this idea?

2. *Exploring what factors contribute to producing these (health, social and ecological) effects.*
 - Tell me a bit about your community? How would you describe the food culture here? Please explain? [if “food culture” is not understood, I could ask: what are the most common foods? Are there any important community celebrations around food? Would you say that food is important here?]
 - Can you comment on how the garden (if at all) is connected with the school? The (*name of community removed*) community? How? What is involved?
 - Would you like to see the project continue? Expand? If so, how/why?
 - How do you envision the perfect school garden project/program? What is your wish list for how the garden might look in two years, ten years?
 - What resources are necessary to ensure a successful garden project/program?

**Appendix F
Garden Book**



Our Garden

By The Garden Club

Cultivating Food Security Carlsson



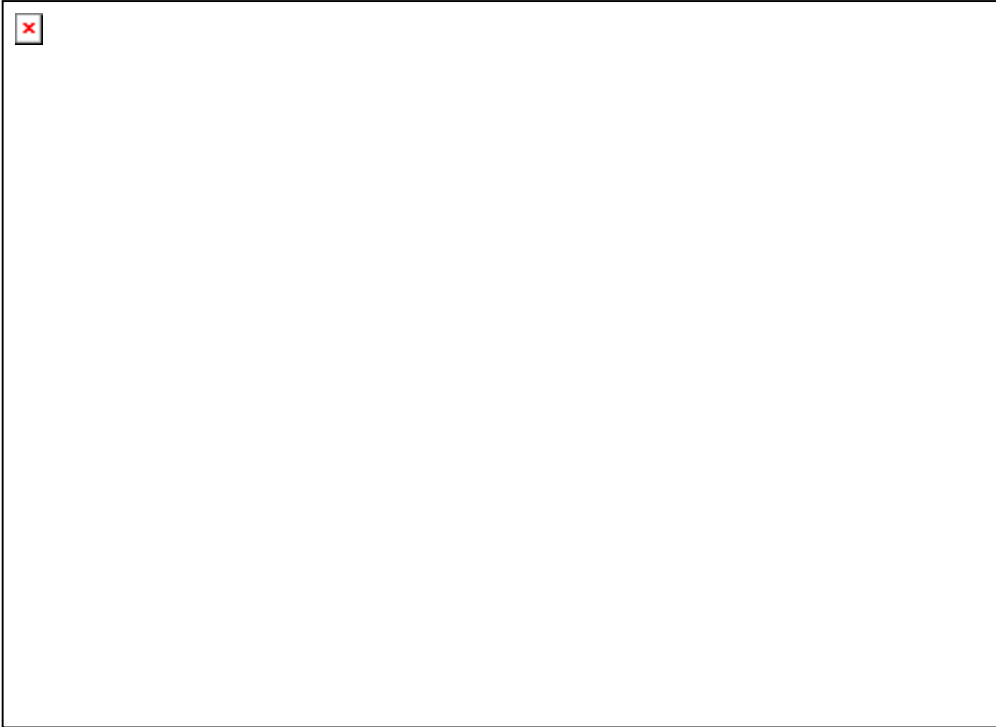
Written by
The Garden Club
(name of school and press removed)

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Dedicated to the whole world

Author's note: We wrote this book because we love our garden.



It is very special to us to have a garden.

Cultivating Food Security Carlsson



It gives us fresh food when it is all ripe!

Cultivating Food Security Carlsson



It is fun taking care of the garden.

Cultivating Food Security Carlsson



All I like to eat are the cucumbers, that's all I eat!



You can't see but we grow squash and pumpkins here!



We like to plant flowers.



We like eating blueberries when they are fresh.

We like to see everything ripening!



We like to pick things and eat them!



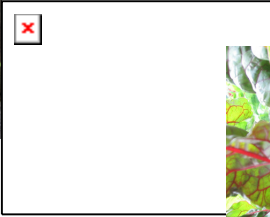
We can smell the mint!



We can hear the leaves blowing in the wind.



We can see: yellow, orange, pink, red, purple, white, green, blue and brown!





Gardens are really fun to have. We love gardens!



(name of press removed)

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