

# SOUTH ISLAND DISTRICT HEALTH BOARDS

## EVALUATION OF EDIBLE GARDENS IN EDUCATION SETTINGS

FINAL REPORT

MAY 2011



*Health Outcomes International*

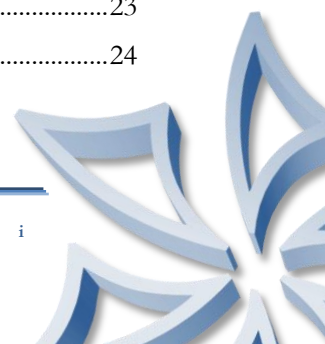
Suites 1 & 4, 51 Stephen Terrace, Kent Town SA 5069

Phone: 08 8363 3699  
Facsimile: 08 8363 9011  
Email: [info@hoi.com.au](mailto:info@hoi.com.au)  
ABN 80 081 950 692



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Thank you all!

**Nga mihi mahana ki a koutou katoa!**

Report prepared for the South Island District Health Boards by: Moss, M., Holmes, R., King, J., Boyd, S.,  
& Pipi, K., in association with Health Outcomes International.



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## EXECUTIVE SUMMARY

This document represents the culmination of a two and a half year impact evaluation of Edible Gardens in Education Settings– garden projects funded by the Healthy Eating Healthy Action (HEHA) Nutrition Fund across the South Island. This report draws together the overarching findings from a literature scan, eight case studies and an online survey, by outlining impacts and key project success factors.

### E.1 BACKGROUND

The 2006/2007 New Zealand Health Survey found that the majority of New Zealand children and adults have good health. However, it also identified that many do not follow guidelines in regard to eating well and engaging in physical activity. The Ministry of Health (MoH) suggests that two out of every five deaths in New Zealand are related to nutritional risk factors such as low intake of fruit and vegetables, being overweight and obesity. Correspondingly, these and other risk factors are associated with illnesses such as cancer, cardiovascular disease, heightened blood pressure and Type 2 diabetes.

Recent government initiatives such as HEHA and its associated campaigns target these health issues by promoting physical activity and healthy eating. As part of this initiative, the HEHA Nutrition Fund was made available between 2007 and 2009 for education settings (including primary schools, Kura Kaupapa and ECE services such as kindergartens, Kōhanga Reo and play-centres) to support promotion of healthy eating. Many education settings accessed this fund to establish edible gardens for this purpose.

### E.2 THE EVALUATION

The evaluation of Edible Gardens in Education Settings across the South Island assessed the impacts related to edible gardens as well as characteristics of successful and sustainable edible gardens in education settings. Importantly, the evaluation identified and assessed the various models of gardens that are operating, which has helped inform a standalone set of guidelines (Moss, M, Holmes R, Boyd, S and King, J (2011). *Guidelines, Tips and Suggestions to Ensure Sustainable Edible Gardens in Education Settings*. Prepared for the South Island District Health Boards) that will support sharing of critical enablers to successful gardens, thereby helping to ensure the success of future implementation and development of edible garden projects.

### E.3 METHODS

Mainly qualitative, the evaluation design involved:

- Initial phone interviews with school/ECE service representatives and HEHA district coordinators
- A literature scan
- Eight case studies conducted in two cycles (2009 and 2010) including individual and group interviews, or focus groups, with a range of stakeholders including students, teaching and non-teaching staff, parents and whānau, representatives from DHBs, other support agencies and related initiatives (e.g., National Heart Foundation, Fruit in Schools)
- An online survey, open to all education services in the South Island that received nutrition funding for their edible garden.

A total of 405 stakeholders (including adults and children) were formally consulted as part of the evaluation. In addition, informal discussions took place with stakeholders during the case study visits.

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## E.4 KEY FINDINGS

The scan of international and New Zealand literature suggests that edible gardens have the potential to be connected to a wide range of benefits. Not only do edible gardens provide the potential to improve access to and increase knowledge and consumption of healthy food (e.g., vegetables and fruit), they also tend to be community oriented. This allows the produce as well as behaviour, skills, attitudes and knowledge to filter through from children to their parents and whānau. Gardens have also been shown to:

- keep participants physically active
- promote students' motivation to learn
- enhance psychosocial development (e.g., responsibility, self esteem)
- improve cooperation with peers
- create a sense of pride in, and ownership of the education setting

All of these factors have been associated with positive long term health and educational outcomes.

Findings from this evaluation support these findings, as summarised in Table E.1 below.



**Table E.1: Key Findings**

| Key Evaluation Areas   | Key findings   |
|--|--|
| <p>Linkages between student learning experiences in edible garden projects to the school curriculum.</p> | <p>Edible gardens align well with the recently revised school curriculum as well as the ECE curriculum. They have been linked to:</p> <ul style="list-style-type: none"> <li>• The key competencies of the school curriculum (i.e., thinking, using language, symbols and texts, managing self, relating to others, participating and contributing); and</li> <li>• The strands and goals of the ECE curriculum (wellbeing, belonging, contribution, communication, and exploration).</li> </ul> <p>In addition, edible gardens have been linked to:</p> <ul style="list-style-type: none"> <li>• Whole-school year/term themes (e.g., ‘change’ by which students explored changes in the garden)</li> <li>• Specific learning areas (e.g., maths and statistics through counting seeds and measuring distances between plants)</li> <li>• Other relevant initiatives taking place at the school/ECE service (e.g., Enviroschools).</li> </ul> <p>Formal links between activities in the garden and the curriculum were considered easier to achieve in ECE settings (due to more flexibility around daily activities) than schools (where factors such as lack of time and wider interest from teachers contributed to making this task a challenge).</p> |
| <p>Increased vegetable consumption and physical activity.</p>  | <p>There is good evidence that edible gardens support changes in children’s knowledge and attitudes that in turn influence more positive eating behaviours. In particular, edible gardens support increased vegetable and fruit consumption through:</p> <ul style="list-style-type: none"> <li>• Increased access to vegetables and fruit</li> <li>• Creating excitement around the growth process and preparing the final product</li> <li>• Providing opportunities to try new vegetables and foods</li> <li>• Supporting positive peer influences to try new vegetables and foods</li> <li>• Generating a sense of ownership and pride</li> <li>• Helping contextualise and support healthy eating messages.</li> </ul> <p>Evidence of links between the garden and physical activity was more equivocal. However:</p> <ul style="list-style-type: none"> <li>• Physical aspects of gardening were recognised (e.g., digging, shovelling, wheelbarrowing)</li> <li>• Gardens were seen to support improved motor skills amongst young children and students with special needs</li> <li>• Around half of the school/ECE service representatives believed their edible garden had increased students’ physical activity levels.</li> </ul>              |



| Key Evaluation Areas  | Key findings  |
|---|---|
| Contribution to broader outcomes.                                     | <p>A range of broader outcomes that were directly linked to children’s participation in edible gardens was identified. In particular, it is highly evident to teachers and other stakeholders that edible gardens contribute to a sense of environmental responsibility among students, as well as enhancing students’ connectedness to, and pride in the school/ECE services, and opportunities for students to learn key competencies including:</p> <ul style="list-style-type: none"> <li>• Improved negotiation, collaboration and communication skills as well as ability to share and take turns</li> <li>• Sense of responsibility and ownership</li> <li>• Increased confidence and ability to work independently</li> <li>• Commitment, perseverance and resilience</li> <li>• Ability to problem solve and plan ahead.</li> </ul> <p>Students with special needs, or those who may otherwise struggle in the classroom setting, were seen to benefit from these outcomes in particular.</p>  |
| Ability of edible gardens to foster community and family involvement. | <p>Feedback gleaned throughout the evaluation suggests that edible gardens increase family/community involvement with the education setting by:</p> <ul style="list-style-type: none"> <li>• Providing opportunities for non-academic involvement (e.g., physical labour) attracting those who might not otherwise get involved</li> <li>• Attracting grandparents to share their expertise</li> <li>• Sparking interest amongst passersby and neighbours through its aesthetic presence</li> <li>• Drawing people in and providing a conversation starter</li> <li>• Providing opportunities to involve local businesses, organisations, etc.</li> </ul> <p>There is also good evidence that edible gardens in education settings motivate the establishment of gardens in the home. Many parents, students and teachers indicated that as a result of gardens in their school/ECE service setting:</p> <ul style="list-style-type: none"> <li>• New gardens had been developed at home</li> <li>• Children’s own gardens had been developed (even though family garden already existed)</li> <li>• Existing gardens had been expanded</li> <li>• Neglected gardens had been re-invigorated</li> <li>• Individual plants were being grown in pots</li> </ul> <p>Additional impacts on the home environment were also observed, including children being more involved and interested in cooking and gardening, promoting healthy eating and sharing knowledge and skills gained through garden related activities.</p> |



| Key Evaluation Areas  | Key findings   |
|---|--|
| <p>Ability of edible gardens to support the reduction of inequalities.</p>    | <p>Findings suggest that edible gardens are a potential means by which to support a reduction of inequalities. Key features of edible gardens that support the casual pathway towards a reduction in inequalities include them providing opportunities to:</p> <ul style="list-style-type: none"> <li>• Obtain instant access to vegetables and fruit</li> <li>• learn about the benefits of healthy eating</li> <li>• try new, and learn to enjoy healthy, food</li> <li>• learn how to prepare healthy food</li> <li>• be physically active</li> <li>• have a non-competitive alternative to sports.</li> </ul> <p>In addition, gardens:</p> <ul style="list-style-type: none"> <li>• Enable schools and ECE services to provide food for those students who arrive without lunch or having had breakfast</li> <li>• Can be inclusive of all children, as well as parents and whānau</li> <li>• Offer opportunities for families to receive free vegetables</li> <li>• Influence the home environment in terms of eating behaviours</li> <li>• Motivate the establishment of vegetable gardens in the home.</li> </ul> |
| <p>Factors that lead to the success and sustainability of edible gardens.</p> | <p>Findings suggest that edible gardens can be sustainable. Key factors that promote sustainability and success include:</p> <ul style="list-style-type: none"> <li>• Thorough planning and consultation in the initial stages of the project</li> <li>• Aligning the garden with school/ECE service strategic goals, planning and policies</li> <li>• Making the garden locally and culturally relevant</li> <li>• Incorporating the garden into the curriculum and within teaching and learning programmes</li> <li>• Applying a multifaceted approach</li> <li>• Involving the whole school/ECE service community</li> <li>• Ensuring capacity and resources are available</li> <li>• Having a health focused ethos and culture of the school/ECE service</li> </ul>  |



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## E.5 RECOMMENDATIONS

### E.5.1 MINISTRY LEVEL RECOMMENDATIONS

Findings suggest a need for national, long-term, intersectoral, strategic planning around edible garden initiatives in education settings. This may include combined Ministry of Health, Education and Social Development support to:

- Ensure there is funding for education settings to start up and/or maintain edible gardens. This could be targeted towards schools and ECE services in the most need (e.g., ECE services in areas of high deprivation and decile 1 and 2 schools)
- Enable all the relevant regional agencies and groups to work together to ensure communities benefit from edible gardens in education settings and that a continuum for sustainability of impacts is in place (see regional level recommendations below for the types of activities that may need support to achieve this).

### E.5.2 REGIONAL LEVEL RECOMMENDATIONS

The following recommendations are made for regional, intersectoral (e.g., Public Health Units/DHBs, local councils, Enviroschools, HPS, iwi, National Heart Foundation, Cancer Society, etc.) level activity to support successful and sustainable gardens:

- In light of the changed economic climate and the re-prioritisation of the HEHA Nutrition Fund, support education settings to access alternative funding avenues for establishing and running edible gardens. This may include providing ideas for where funds can be accessed or supporting them in completing grant applications.
- Support education settings to integrate gardens into school/ECE service life; i.e., provide advice/assistance for implementing whole-school approaches. The Guidelines established as part of this evaluation will be a useful resource to distribute to schools and ECE services for this purpose. In particular, support education settings to embed structures for:
  - Student leadership of the garden
  - Community involvement in the garden.
- Support education settings by providing/linking them with curriculum-based resources to ensure the wider benefits of the garden can be realised. To be most effective these resources need to:
  - Support centres to consider the “nature” of their engagement with the and how they might explicitly plan to create the opportunities to learn offered by the gardens;
  - Show school and ECE service staff how the resources link to other initiatives such as Enviroschools (e.g., resources could be developed in collaboration with other groups);
  - Make links to practices common in school settings such as inquiry learning;
  - Be provided in an easy-to-use and adapt format (such as a PDF file or a downloadable document on an existing website).
- Consider making links with local iwi, e.g., Ngāi Tahu Education Strategy covers ECE and schools and aims to “*imbue Ngāi Tahu stories, values, culture and history in educational curricula and engage with local and wider Ngāi Tahu forā*” (p.6)<sup>1</sup>. There may be interest within local iwi to use gardens as a forum for transmitting and developing tikanga and te reo.

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<sup>1</sup> NGĀI TAHU EDUCATION STRATEGY (Adopted January 2006). Accessed from: <http://www.ngaitahu.iwi.nz/Ngai-Tahu-Whanui/Ngai-Tahu-Education/EducationStrategy.pdf>

- 
- Support progressive learning, so students maintain and increase knowledge, skills, behaviour and attitudes as they move through the schooling system – thus increasing the likelihood of reducing inequalities in the long term.
    - This may include facilitating forums (e.g., youth forums) for students (and/or parents and whānau) themselves to influence new/other education settings to adopt healthy (eating) initiatives to achieve ongoing pathways for maintaining healthy behaviours over time.

## INTRODUCTION

West Coast District Health Board (WCDHB), on behalf of all South Island District Health Boards (DHBs), engaged Health Outcomes International Pty Ltd (HOI) to undertake an impact evaluation of Edible Gardens in Education Settings across the South Island. This document sets out the findings from this evaluation that took place over a period of two and a half years.

### 1.1 BACKGROUND AND CONTEXT

The 2006/2007 New Zealand Health Survey found that the majority of New Zealand children and adults have good health. However, it also identified that many do not follow guidelines in regard to eating well and engaging in physical activity. The Ministry of Health (MoH) suggests that two out of every five deaths in New Zealand are related to nutritional risk factors such as low intake of fruit and vegetables, being overweight and obesity. Correspondingly, these and other risk factors are associated with illnesses such as cancer, cardiovascular disease, heightened blood pressure and Type 2 diabetes.<sup>2,3</sup>

#### 1.1.1 THE HEALTHY EATING - HEALTHY ACTION (HEHA) STRATEGY

As is happening internationally, New Zealand is targeting policy to improve population health through increased physical activity and improved nutrition. The New Zealand Health Strategy (2000) objectives include:

- Supporting policies that ensure access to an adequate supply of nutritious food;
- Further developing Health Promoting Schools (HPS);
- Improving nutrition;
- Increasing levels of physical activity; and
- Reducing Obesity.<sup>4</sup>

Recent government initiatives such as Healthy Eating Healthy Action (HEHA) and its associated campaigns target these health issues by actively promoting physical activity and healthy eating. HEHA is an umbrella strategy aimed at increasing physical activity, improving nutrition and reducing obesity. One of the key messages from the HEHA approach is that New Zealanders should live in an environment and society where individuals and their family/whānau are supported to eat well and be active, thereby living healthier and happier lives. Although the target audience for the HEHA strategy is the entire population, priority targets include children, Māori and Pacific people and people on low incomes. The ultimate aim is to reduce inequalities in health outcomes.<sup>5</sup>

HEHA has yielded a number of successful initiatives aimed at realising this vision. These include:

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<sup>2</sup> See: <http://www.moh.govt.nz/moh.nsf/indexmh/portrait-of-health>

<sup>3</sup> See: <http://www.moh.govt.nz/moh.nsf/238fd5fb4fd051844c256669006aed57/dacf2bad5aa2d16bcc256f33000e1ddc?OpenDocument>

<sup>4</sup> Ministry of Health (2000). *Chapter 3: Fundamental Principles, Goals and Objectives*. The New Zealand Health Strategy. Wellington: Ministry of Health.

<sup>5</sup> See: <http://www.moh.govt.nz/healthyeatinghealthyaction>

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**The Mission-On campaign:** Launched in 2006, Mission-On aimed to help young people improve their understanding and skills related to healthy nutrition and being more physically active. This campaign was designed to reach its target group by using schools, media, the internet and the workplace as platforms from which to deliver its message and programmes.

**Fruit in Schools (FiS):** In its full form, FiS<sup>6</sup> aimed to support schools to use whole school models of health promotion to increase awareness and implementation of policies and practices that promote health and wellbeing and support students to make healthy choices, particularly in the areas of healthy eating, physical activity, sun protection and being smoke free. In addition, free fruit was provided to participating schools. Together with the New Zealand Council for Educational Research (NZCER), Health Outcomes International undertook an evaluation of the FiS initiative.<sup>7</sup> Findings showed that this school-based initiative effectively achieved its aims. Moreover, the initiative helped to build links within the community, such that inter-agency groups (e.g., SPARC, National Heart Foundation, Cancer Society, etc.) and local community groups worked with schools and individuals driving the programme to enable improved well-being for all. Since 2009, FiS has operated in its capacity of fruit provision only.

**The HEHA Nutrition Fund:** The HEHA Nutrition Fund was in operation between 2007 and 2009. As part of the HEHA programme, this fund was made available to assist schools and ECE services to promote healthy eating initiatives. The fund was managed by HEHA project managers and coordinated by HEHA district coordinators (or equivalent roles). Reflecting the intersectoral approach to the HEHA initiative, each DHB signed off and administered Nutrition Fund contracts/agreements with individual schools/services. Recommendations on how funds would be allocated were made by a sub-group of each DHB's HEHA steering group through approximately six-monthly funding rounds. This group generally included representation from agencies such as School Support Services (or equivalent), sports trusts, the Heart Foundation and Cancer Society.

In Marlborough, the Nutrition Fund did not exist as an independent entity but was distributed by the council alongside other related council funding such as the schools activity fund, a community nutrition fund, and the catalyst fund.

In 2009, the Nutrition Fund was discontinued as part of refocusing the HEHA strategy to achieve more of a balance between increasing physical activity and improving nutrition. This also involved a reprioritisation of the overall HEHA funding from the Government to DHBs, including a discontinuation of the HEHA district coordinator positions.

### 1.1.2 THE NUTRITION FUND AND EDIBLE GARDENS IN EDUCATION SETTINGS

Many South Island Schools and ECE services, such as kindergartens, Kōhanga Reo, Kura Kaupapa and play centres within the six South Island DHBs, (i.e., West Coast, Nelson Marlborough, Canterbury, South Canterbury, Otago and Southland) accessed the Nutrition Fund to establish edible garden projects. In Marlborough, where the fund was managed differently, gardens were funded through the council's Kids Edible Gardens (KEG) programme, a curriculum based programme which provides schools with a trained and paid (a few hours a week) garden facilitator.

Since establishment of edible gardens is usually undertaken by the school/ECE service itself, the projects varied in design and implementation. However, the common aim for these gardens was to support the goals of the HEHA strategy, i.e., improved nutrition and increased physical activity (and subsequently – reduced obesity and inequalities). Schools that received funding for edible garden projects were expected to report back to the DHBs on how their gardens were progressing (e.g., through six monthly progress reports) to ensure their objectives stated in their applications were being fulfilled.

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<sup>6</sup> Fruit in Schools is funded through the Cancer Control Action Plan and the HEHA Implementation Plan.

<sup>7</sup> Boyd S, Dingle R, Hodgen E, King J, Moss M (2009). The Changing Face of Fruit in Schools: 2009 Overview Report. *Final Healthy Futures Evaluation Report*. Prepared for the Ministry of Health

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In all South Island DHB districts<sup>8</sup>, support was provided by HEHA project managers and HEHA district coordinators for establishing and maintaining the gardens. Additional support was provided in all DHB districts by Health Promoting Schools (HPS) advisors<sup>9</sup> and FiS coordinators, particularly around embedding sustainable approaches to school gardens in the form of professional development. Schools in some districts also successfully tapped into support from community organisations (e.g., iwi-based or environmental). In some districts, the National Heart Foundation health promoters and DHB public health dieticians provided nutrition-related information and resources, and in others, links with Enviroschools facilitators was an additional support, as were public health nurses and Rural Education Activities Programme (REAP) (e.g., on the West Coast).

Between September 2007 and July 2009, approximately 314 education services received funding for edible gardens (or garden related) projects across the six DHBs. Due to the emergency response DHBs had to put in place after the 2011 Canterbury earthquake we were not able to collate sufficient financial data to make any analysis in terms of the cost effectiveness of this funding as part of this evaluation.

## 1.2 EVALUATION OBJECTIVES

The objectives of this evaluation were to:

- Establish whether edible gardens increase vegetable consumption and physical activity (and promote healthy weight);
- Establish whether edible gardens contribute to broader outcomes for students that are known to be connected to improved longer-term health and academic outcomes (e.g., engagement and connectedness to school);
- Identify what factors lead to the success and sustainability of edible gardens;
- Establish whether edible gardens have the ability to foster community and family involvement; and
- Assess whether or not edible gardens reduce health inequalities.

In addition, the evaluation informed a set of guidelines for education settings to establish successful and sustainable gardens. Once finalised, this document (Moss, M, Holmes R, Boyd, S and King, J (2011). *Guidelines, Tips and Suggestions to Ensure Sustainable Edible Gardens in Education Settings*. Prepared for the South Island District Health Boards) will be available from any South Island District Health Board.

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<sup>8</sup> At the time when this evaluation was commissioned, there were six DHBs on the South Island. Since 2010, Southland and Otago DHBs have merged bringing the total to five.

<sup>9</sup> The South Canterbury DHB HPS delivers its own framework and process known as WAVE (Wellbeing and Vitality in Education).



## METHODOLOGY

### 2.1 EVALUATION METHODOLOGY

The evaluation methodology was developed in consultation with the WCDHB (as the contract holder for this evaluation) and the Evaluation Reference Group.

This study used a largely qualitative, mixed-method design. A core part of the study was the use of case studies. A case study design is an effective way to build ideas about, and share, good practice, and is commonly used to explore change or innovations in educational settings, and the complexities of the unique contexts within which practice occurs.<sup>10</sup> The use of a case study approach enabled a rich and nuanced picture of the development of the edible gardens, the broad range of intended and unintended outcomes they supported, and the factors that might impact on their sustainability over time. Accessing this sort of information would have been difficult with solely quantitative methods. To ascertain the extent to which core changes and impacts were generalisable across educational settings, the case study approach was supplemented with other data collection methods including an online survey. The aim of the study was not to quantitatively measure the extent to which healthy eating or physical activity behaviours might have increased from previous patterns. A study design involving base line data and/or comparison groups would have been needed to for this purpose. Instead, this study was designed to broadly explore the full range of potential benefits stemming from the edible gardens and support the health and education sectors through the sharing of good practice developed in a New Zealand context.

The evaluation processes included:

- Initial phone interviews with schools/ECE services and HEHA district coordinators
- A literature scan
- Eight case studies conducted in two cycles (2009 and 2010) including individual and group interviews, or focus groups, with:
  - Students;
  - Teachers (including garden lead teachers);
  - Principals/Head teachers;
  - Parents and family/whānau;
  - Support persons/garden coordinators;
  - HEHA district coordinators; and
  - Regional support agency representatives (e.g., National Heart Foundation, local councils).
- An online survey, open to all schools and ECE services in the South Island that received nutrition funding for their edible garden.

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<sup>10</sup> Yin, R. (2003). *Case study research: Design and methods* (fifth edition). Thousand Oaks, CA: Sage Publications Inc.

In total, 405 stakeholders were formally consulted<sup>11</sup> as part of the evaluation, as detailed in Table 3.1. In addition many students and teachers were informally consulted during site visits through conversations in the teachers' room, in the playground, in the garden, etc.

**Table 2.1: Stakeholder Consultations over the course of the Evaluation**

| Stakeholder Group  | 2009 Initial phone interviews | 2009 Case Study | 2010 Case Study | 2010 Survey | Total      |
|--|-------------------------------|-----------------|-----------------|-------------|------------|
| Teachers/Garden Lead teachers  | N/A                           | 21              | 25              | 12          | 58         |
| (Deputy) Principals/Head Teachers/Senior Management                                  | 6                             | 9               | 7               | 53          | 75         |
| Support persons/Garden Coordinators/Other  | N/A                           | 1               | 1               | 22          | 25         |
| Parents and whānau   | N/A                           | 24              | 18              | N/A         | 42         |
| Students   | N/A                           | 122             | 59              | N/A         | 181        |
| HEHA district coordinators/Managers  | N/A                           | 5               | N/A             | N/A         | 11         |
| Regional support agency representatives (e.g., Heart Foundation, FiS, local council) | N/A                           | 13              | N/A             | N/A         | 13         |
| <b>Total</b>   | <b>12</b>                     | <b>195</b>      | <b>110</b>      | <b>87</b>   | <b>405</b> |

## 2.2 LITERATURE SCAN

Past reviews and evaluations of edible gardens in education settings as well as national and international literature on health initiatives in education settings were reviewed to provide a background to the evaluation. The primary purpose of this literature scan was to inform the development of the logic model, evaluation framework and research instruments. The second purpose was to access a literature base to support the interpretation of the findings. A summary of the findings from this review is included at Appendix A.

## 2.3 INITIAL PHONE INTERVIEWS

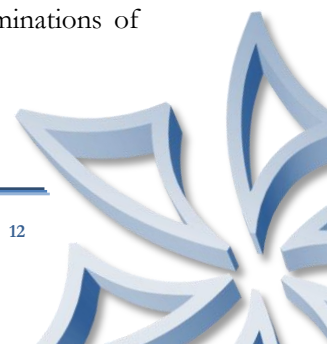
The purpose of the initial telephone interviews was to gain an overview of the status of education settings-based garden projects across the South Island and to identify key issues that would help inform the logic model and evaluation framework. Findings from these interviews were summarised and presented in the Evaluation Framework submitted to the WCDHB in 2009.

At the initial stage of the evaluation, the Evaluation Reference Group identified six HEHA district coordinators, as key stakeholders within the six South Island DHBs, who in turn nominated six suitable schools/ECE services for these interviews. In total 12 interviews were conducted.

## 2.4 CASE STUDIES

We used a purposive sampling approach to select the eight case study sites. At the outset of the evaluation in 2009, South Island based HEHA district coordinators provided the evaluators with nominations of

<sup>11</sup> Meaning organised individual or group interviews/discussions.



schools/ECE services to consider, based on criteria provided by the evaluators. Schools/ECE services were asked at the time of nomination whether they would be willing to participate in the evaluation if chosen as a case study site. In keeping with the evaluation objectives, the nominated schools/ECE services were to represent exemplars that could demonstrate the impacts of edible gardens where these were operating effectively, and suggest transferrable and sustainable features of good practice. In total, 23 nominations were received and considered by HOI.

In accordance with agreed selection criteria, six case studies were chosen covering all DHB districts on the South Island and reflecting a range of different locations (e.g., rural/urban); types of educational service (e.g., school, ECE); ethnicities and socio-economic status of students (as shown in Table 2.2). In keeping with the idea of sharing good practice, the case study sites agreed to be named.

**Table 2.2: Characteristics of the case study schools\***

| Service Name            | Service Type   | DHB District       | Setting    | Decile | Roll size |
|-------------------------|----------------|--------------------|------------|--------|-----------|
| Riverton Primary School | Primary School | Southland          | Rural      | 5      | 167       |
| Waverley Kindergarten   | ECE            | Southland          | Urban      | N/A    | 80        |
| Highfield School        | Primary School | South Canterbury   | Urban      | 6      | 300       |
| Casa Nova Kindergarten  | ECE            | Otago              | Semi Urban | N/A    | 64        |
| Kumara School           | Primary School | West Coast         | Rural      | 5      | 32        |
| Ngatimoti School        | Primary School | Nelson Marlborough | Rural      | 6      | 120       |
| Mayfield School         | Primary School | Nelson Marlborough | Urban      | 2      | 150       |
| St James School         | Primary School | Canterbury         | Urban      | 1      | 108       |

\* These data are based on information from HEHA district coordinators, the case study sites and Ministry of Education roll return data from 2009. Changes in characteristics of the case study sites may have taken place over the course of the evaluation.

The evaluators did not receive any nominations for Kura Kaupapa or Kōhanga Reo and some of the nominated sites had a relatively low percentage of Māori. However, the selected case study sites included the three nominated schools with the highest percentage of Māori, i.e., 25%, 30% and 40% respectively. These are relatively high proportions for the South Island and were chosen to align with the priority target groups of the HEHA strategy.

Case study visits were organised to provide opportunities for engagement with teachers, students, parents and whānau, and in most cases, HEHA district coordinators and/or other regional support agency representatives.

Interviews were primarily conducted face-to-face with telephone contact as required (e.g., at times regional support agency representatives, or parents and whānau could not meet with the evaluators on the day of the visit).

The first case study visit focused principally on *activities and processes* related to the garden while the second visit concentrated mainly on *outcomes*. Having two visits also allowed for changes over time to be captured (e.g., expansion of gardens, gardens being put on hold, etc.). Where possible, students who were participating in garden related activities were informally observed during both visits.<sup>12</sup>

In addition to contracted consultations, the evaluators provided the case study schools and ECE services with a scrap book to document progress after the second case study visit. Four scrap books were sent back to the evaluation team and provided an additional data source for the case studies.

The final case studies are presented in full in Appendix B.

<sup>12</sup> Informed consent was obtained from students and their parents.

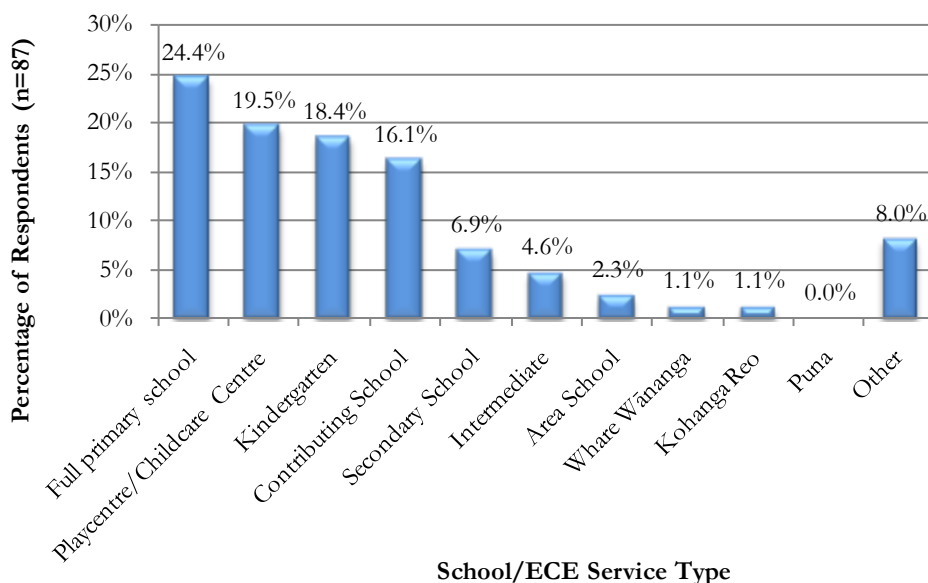


## 2.5 THE ONLINE SURVEY

314 schools/ECE services were invited to participate in the survey via email. Email addresses were provided to the evaluators by the HEHA district coordinators. Out of these invitations, a total number of 27 were undelivered (e.g., due to problems with the email address). 87 respondents completed the survey. This represents a response rate of 30%.

Figure 3.1 shows that most responses came from primary schools and ECE services. In the main, the survey was completed by Principals/Head teachers and garden lead teachers.

**Figure 3.1: School/ECE service type that responded to the survey**



The schools and ECEs that participated in the survey were mainly located in Canterbury and Otago/Southland DHBs (with 36 responses respectively). The largest number (9) was located in the Nelson/Marlborough district, 5 on the West Coast and 1 in South Canterbury. Almost 70% (n=85) of the schools and ECEs were in urban or semi-urban locations whereas just over 30% described themselves as rural. There was a relatively even spread of decile ratings (from 1-10) with decile 4 (20%) and 8 (19%) being most highly represented (n=54).

## FINDINGS

This section presents the findings from the evaluation and is structured around the evaluation objectives. In essence, this is a summary of findings from the case studies (presented in full Appendix B) and the survey. Section 3.1 provides an overview of the ways in which learning experiences in education settings-based edible gardens have been linked to the curriculum. This is followed by section 3.2 which outlines the impacts identified in relation to garden initiatives; and 3.3 which looks at the potential contribution gardens may provide for reducing inequalities. Finally, section 3.4 summarises important factors for success in the establishment and running of edible garden projects in schools/ECE services and discusses the sustainability of edible gardens in education settings and their outcomes.

### 3.1 LINKING LEARNING EXPERIENCES IN THE GARDEN TO THE CURRICULUM

There were ample examples of how the gardens had been linked to, and/or (sometimes unintentionally) supported curriculum based learning. In fact, school/ECE service-based edible gardens align well with the recently revised school curriculum<sup>13</sup> for the primary and secondary sector. This promotes active student involvement in learning and engagement with parents, whānau, and the wider community. The document also suggests learning themes such as sustainability, citizenship, and enterprise and that schools explore ways to develop values and five key competencies: thinking; using language, symbols and texts; managing self; relating to others; and participating and contributing.

The ways in which children learn in and around the garden align equally well with the ECE Curriculum (Te Whāriki), which emphasises children's wellbeing, belonging, contribution, communication, and exploration. Section 4.2.2 and Tables 4.2 and 4.3 illustrate how edible gardens at the case study sites have linked with or in other ways supported these goals as the broader outcomes of edible gardens are discussed.

In addition, schools/ECE services had linked their gardens to:

**Whole-school term/year themes:** Many schools had linked their garden to wider whole-school learning themes. For example, in one school a whole-school theme enabled students to choose different research topics, by asking: '*I wonder if...?*' In this science-based theme, juniors studied 'Wonders of the Garden', in the course of which the children conducted experiments and watched what was growing. In another school one yearly theme focused on how they could make their school a great place to be. In Term 2, students investigated what makes a great group and utilised the garden as a setting for exploring group roles and responsibilities.

**Specific learning (subject) areas:** All schools had to some degree linked their garden to specific learning areas, including:

- **Science and environmental studies:** through learning about: seed/plant growth and composting; weather, seasonal changes and growing cycles; and the beneficial and harmful effects of insects. Through testing soil pH levels, undertaking scientific experiments (e.g., using crushed egg shells to deter snails, examining seeds in tomatoes before planting them, painting stones red to mimic ripe berries and thereby deter birds, and experimenting with growing inside compared to the greenhouse).

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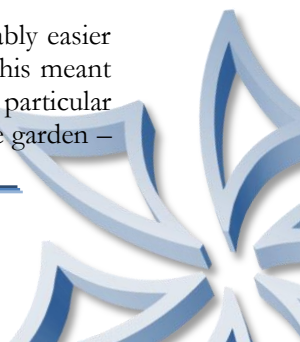
<sup>13</sup> Ministry of Education. 2007. *The New Zealand Curriculum*. Wellington, Learning Media

- **Mathematics and statistics:** through measuring garden perimeters, calculating the volume of soil needed to fill gardens, measuring cooking ingredients, looking at graphs of seasonal planting and using them to plan the garden, studying seed dispersal and the patterns of flowers, counting and weighing vegetables.
- **English and literacy:** through reading text and symbols (e.g., on seed packets, recipes, etc.), record-keeping (e.g., keeping a scrap book documenting progress), creative writing (e.g., writing poetry about the garden), writing articles and letters, doing ‘explanation writing’ (e.g., how to make a sandwich), and compiling recipe books by holding recipe competitions.
- **Tikanga and te reo Māori (and other languages and cultures relevant to the school/ECE service):** through learning the names of fruit and vegetables in a range of languages, celebrating culture specific events (such as Matariki), learning traditional gardening methods and foods, utilising growing calendars (e.g., maramataka); cooking food (e.g., sushi).
- **Social sciences:** through understanding the interaction between people and the environment; celebrating culturally-specific events; learning about different cultural meanings and practices associated with gardening and food preparation; and through engaging in enterprise projects and learning about buying and selling produce.
- **The arts:** through drawing and photography, sketching maps and plans, designing and illustrating garden signs, making sculptures, designing posters, recording cooking shows.
- **Health and Physical Education:** through understanding the factors that impact on personal wellbeing by discussing the nutritional value of vegetables and fruit and engaging in acts of health promotion to support community health through the development of the garden and the planning of celebration days that involve peers, parents, and whānau. Through developing positive attitudes towards the physical activity associated with gardening.
- **Technology:** through learning about food preparation (e.g., hygiene, safe handling of knives) and to cook healthy and nutritious food. Through building structures for the garden.
- **Religious studies:** through exploring biblical garden stories.

**Other relevant initiatives at the school:** All case study schools and ECE services were engaged in other national health and environmental initiatives such as Enviroschools, Fruit in Schools (FiS), Heart Foundation programmes (e.g., Healthy Heart Award), 5+ADay, and Health Promoting Schools (HPS). These initiatives were viewed as supporting and reinforcing each other. One common example was how gardens and orchards were used to provide additional fruit for FiS and offered contexts in which to discuss healthy eating. Another example was how, in one school, the garden had been started as a branch-out from Enviroschools. “Enviro” time (30 minutes a week) was specifically utilised for garden maintenance. Overall, staff considered Enviroschools resources to be particularly useful for garden projects. However, some teachers indicated that there is not sufficient coordination between many of these initiatives that ultimately aim for similar goals. Better support in terms of how they all interlink and how they can be integrated into curriculum learning was desired.

Despite these examples and the positive attitudes towards the potential learning opportunities gardens were seen to offer, it was apparent that gardens were not always *formally* linked to the curriculum – but rather these connections happened on an ad hoc basis. Case study schools in particular found making this link a challenge, related to a lack of teaching resources, time and wider interest from teachers as well as other learning priorities at the school (i.e., literacy, numeracy). These barriers reflect survey responses which suggest that the main challenge/barrier overall to edible gardens is teacher capacity (time) (78%). In addition, survey respondents indicated that maintaining teacher enthusiasm (51%) and access to teaching resources (32%) were a challenge/barrier.

Many principals/head teachers and teachers commented that they believed gardens were probably easier to link with the curriculum in ECE settings because day to day activities are less structured. This meant that the garden was seen more as a standalone project in some schools – which benefited a particular group (e.g., class or garden club). In schools where all teachers and students were involved in the garden –



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and where classroom time was specifically allocated, the integration with teaching and learning however was seen to come naturally...

*“It is easy to link the garden with teaching... its common sense, natural. It’s hands-on and outdoors, you go out and do things in the garden and then come back and write it up, or use it in maths. It’s a natural way to teach”* (Teacher).

## 3.2 IMPACTS

### 3.2.1 CHANGES TO HEALTHY BEHAVIOURS

One of the key objectives of the evaluation was to ascertain whether edible gardens in schools increase vegetable consumption and physical activity. This is discussed in the following two sections.

#### INCREASED VEGETABLE CONSUMPTION

Findings from the evaluation certainly suggest that edible gardens in education settings support increased consumption of vegetables and fruit<sup>14</sup> amongst students. In fact, parents, teachers and students across the eight case study sites attributed a notable change in attitude towards, and actual consumption of, vegetables and fruit to their gardens. This effect appears to span across all students, even those who would not previously eat vegetables...

*“My son has been more open to trying vegetables he wouldn’t have tried before or hadn’t liked before”* (Parent).

*“They never, ever before ate vegetables. Now they are learning from school and they are eating it”* (Parent).

In the first instance, increased vegetable consumption simply stems from students having increased access to vegetables on an ongoing basis. Without the garden, they would not be able to pick produce and consume it in school and ECE service settings. Across case study sites, teachers commented that children were often seen in the garden during their breaks – eating berries, peas and other produce. On a broader basis however, findings suggest that edible garden support changes in children’s knowledge and attitude that in turn affect their eating behaviours. The ways in which the gardens have supported these changes is exemplified throughout the case studies, and include:

- **Gardens create excitement around the growth process and preparing the final product**

It was widely reported by teachers and parents that the exercise of following the growth process of plants and waiting for the vegetables to be ready for harvest generated real excitement amongst students around tasting the produce. This excitement was reflected in students’ comments when asked what they liked best about their garden, as exemplified by one student... *“Harvesting is definitively the best part...to try everything we grow!”*

The process of preparing the produce they themselves have grown also generates excitement amongst students to eat the finished product. A sense of pride in their accomplishment appears to be a main contributor to this.

- **Gardens provide opportunities to try new vegetables/foods**

For many students, the gardens provide the opportunity to try vegetables they have not tried before, either because they are not common in the supermarket or because they are simply not eaten at home. In addition, the gardens facilitate opportunities to prepare the vegetables in ways in which children may not have eaten that particular vegetable before. For example, adding carrot and zucchini to chocolate cake. A One particular example that illustrates the impact of the garden is; one boy, who had immigrated to New Zealand from a Pacific Island, liked the pumpkin soup he had at kindergarten so much that he took a pumpkin home for his mother to cook. She did not know how to prepare the pumpkin so she made a connection with teachers. The boy reported back to his teachers that his family of seven now regularly enjoy pumpkin soup.

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<sup>14</sup> Some gardens included fruit trees/an orchard

- **Gardens support positive peer pressure to try vegetables/foods**

Many parents had noticed how their children had changed their attitudes towards trying new vegetables or foods simply by watching their peers give things a go. This positive peer pressure was observed as a main contributor to their children’s increased vegetable consumption.

*“Sometimes you might offer them things at home and be resisted. But then they realise that everyone at kindly liked it. So, they’ll give it a go”* (Parent).

- **Gardens generate a sense of ownership and pride**

Teachers and parents suggested that the sense of ownership and pride students felt in regards to what they achieved in and around their school gardens strongly influenced their motivation to eat vegetables and fruit. Some parents commented that their children felt stronger links with the school garden than the home garden as the latter was seen as the parent’s project and not theirs. In some isolated cases, parents indicated that their children would eat certain vegetables at school but not at home.

*“Kids enjoy so much that they have helped achieve something that they will have no problem with eating veg and fruit”* (Parent).

- **Gardens help contextualise and support healthy eating messages**

Information gleaned from the case studies suggest that gardens provide opportunities to contextualise/reinforce information about the benefits of eating vegetables provided through other healthy eating initiatives (e.g., FiS) that may be taking place in the school, or nationally (5+ a day). Knowing that eating vegetables and fruit is healthy motivates children to eat them – and having direct access means they can apply this enthusiasm directly in the garden.

Survey responses provide a strong indication that these impacts were also applicable across other schools and ECE services. As illustrated in Table 3.1, respondents indicated that their garden has increased motivation to eat, level of consumption of vegetables and fruit (90%); students’ understanding of the benefits of fruit and vegetable consumption (94%); and students’ understanding of options for preparing fruit and vegetables (71%).

**Table 3.1: Impacts of gardens on students (N=87)**

| The school/ECE service garden has...  | Agree or Strongly Agree | Disagree or Strongly Disagree | Neutral/Don't Know/Not Stated |
|---|-------------------------|-------------------------------|-------------------------------|
| ...increased students' motivation to eat, level of consumption of, fruit and vegetables | 90%                     | 1%                            | 9%                            |
| ...increased students' understanding of benefits of fruit and vegetable consumption     | 94%                     | 1%                            | 5%                            |
| ...increased students' understanding of fruit and vegetable preparation options         | 71%                     | 2%                            | 26%                           |

### INCREASED PHYSICAL ACTIVITY

The case study findings suggest weaker links between the gardens and physical activity. In fact, staff at the case study sites were unsure as to whether they considered their gardens having contributed to increased physical activity. However, it was recognised by a number of teachers and parents that there are many activities in the garden that are physically demanding including: digging, shovelling, pushing wheel barrows, hoeing/raking and carrying water.

In contrast to the case studies, a relatively high number of survey respondents strongly agreed or agreed (54%) with the statement; ‘The... garden has increased students physical activity levels’. 3 % disagreed, whereas 43% were not sure/did not state/were neutral. In the case studies, teachers and parents often referred to a benefit of gardening in that it got children ‘out of the classroom’.





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It is worth considering that if the alternative was for students to sit in classrooms then their physical activity has increased by being out in the garden.<sup>15</sup>

Teachers and parents also commented that the gardens were beneficial for students with a range of different needs. Many teachers commented that the physical aspects of gardening were often appreciated by boys in particular. They enjoyed getting their hands dirty and assisting with the heavier jobs. Often this involvement had a calming effect on boys who could sometimes be disruptive in a classroom setting. Some of the teachers who work with special needs students indicated that activities in the garden was particularly useful in terms of supporting development of muscle coordination and both gross and fine motor skills. In addition, some parents commented that for children who were not keen on sports, gardens provide a viable non-competitive alternative for physical activity.

### 3.2.2 CONTRIBUTION TOWARDS WIDER OUTCOMES

*“It [gardening] encourages a work ethic, participation, patience, persistence, self-esteem, independence and knowing they can make something happen. They learn that they can have a positive impact on others and the environment” (Parent).*

A key aim of the evaluation was to establish whether edible gardens contribute to broader outcomes. Findings from the case studies would suggest that in addition to increased vegetable consumption, a range of other positive outcomes are directly linked to the activities that take place in and around the garden. As reported by teachers, parents and students alike, these include opportunities to:

**Work as part of a team:** The gardens were seen to provide an excellent context for students to learn about the ins and outs of working alongside others, including discussing what needed doing in the garden, sharing resources (i.e., tools and equipment) and at times, operating together in a small space. As a result, improved **negotiation, collaboration and communication** skills as well as **ability to share** and take turns amongst students were reported.

*“Working together, sharing gardening tasks requires a lot of interaction...talking, negotiation and being aware of each others’ needs...they have to work out how to fill a wheelbarrow with soil without getting in each others’ way and throwing soil everywhere” (Teacher).*

*“We’ve learnt to share and take turns...we all together share the garden” (Student).*

**Be active participants:** In all the case study sites, students were encouraged to be actively involved in all aspects of the garden, ranging from planning and decision making to everyday maintenance. This inclusive approach has enabled students to contribute ideas and suggestions which in turn has led to a sense of **responsibility** and **ownership** of the garden, **belonging** and **connection to school** as well as self initiated **engagement in learning**.

*“We feel like the garden is our responsibility. Like when someone stabbed a pumpkin we felt really sad and annoyed. It was the biggest pumpkin” (Student).*

*“The garden encourages children to take responsibility for their own learning which aligns well with our philosophy” (Teacher).*

**Take on leadership roles:** In encouraging students’ involvement in the garden, many leadership opportunities have been created. This spanned from students in one primary school who have set up a structured gardening group in conjunction with the health team. Subgroups are responsible for certain tasks (e.g., income generation, garden maintenance), and who principally manages the whole garden project with support and oversight from the lead teacher, to young kindergarten children being given responsibility for certain isolated tasks on any given day. In some cases, children who were not natural leaders in the classroom setting were given the opportunity to take on leadership roles in the garden with great success. Overall, these opportunities were seen to have built **confidence**, enabled **independence** and **self management** and supported the development of **enterprise skills**.

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<sup>15</sup> Ministry of Health recognises gardening as a moderate level of physical activity

**Work on long term projects:** Gardening does not provide instant results. Therefore, students are provided the opportunity to participate in projects that are long term, requires planning and maintaining, monitoring of progress and which sometimes end with unsuccessful or unexpected results. This has developed *commitment, perseverance, resilience* and *problem solving* amongst students as well as an *ability to plan ahead*.

**Develop awareness of the living environment:** Being actively involved in the maintenance of the garden has provided opportunities to learn about the things plants need to grow, thrive and survive – including learning about the interconnectedness of different parts of the environment (e.g., insects, plants, climate). This had contributed to a sense of *environmental responsibility* and a *curious, inquisitive, caring* and *thoughtful attitude* towards living things (including peers). Having these opportunities had also shown students how the environment can support their own food production.

*“The garden provides a great opportunity to re-establish in kids the habits and skills of self-sufficiency from the past which have been lost, now that everything is in a packet. In this way children are learning that you can grow and make your own food and that you don’t have to buy it. It also tastes better!”*  
(Teacher).

Survey responses support the finding that broader outcomes are seen in the wider context of edible gardens, with most respondents indicating that they strongly agree/agree that their edible garden has increased: a sense of environmental responsibility amongst students (89%); students’ connectedness to, and pride in, school/ECE service (83%); and opportunities for students to learn key competencies (80%).

These findings suggest that edible gardens provide ample opportunities to develop a range of skills and key competencies that align with the expected outcomes of the school curriculum and Te Whāriki. Tables 3.2 and 3.3 below summarise these broader outcomes and illustrate how the development of edible gardens can support schools to realise the intent of the curriculum.

**Table 3.2: Links between gardens and expected outcomes of school curriculum**

| Key Competencies                         | School gardens have provided meaningful contexts for students to:  |
|--|--|
| <i>Thinking</i>                          | <ul style="list-style-type: none"> <li>➤ Explore and experiment in formal and informal ways</li> <li>➤ Plan and undertake processes and activities</li> <li>➤ Problem solve and improve tried processes</li> <li>➤ Conduct purposeful research</li> <li>➤ Develop own, or tested existing, working theories</li> </ul>   |
| <i>Using language, symbols and texts</i> | <ul style="list-style-type: none"> <li>➤ Learn vocabulary associated with gardening and related symbols and signs</li> <li>➤ Record activities, processes as well as progress and outcomes</li> <li>➤ Share knowledge and experiences through presentations</li> <li>➤ Read and write science related texts</li> <li>➤ Read and write fiction and non-fiction texts</li> <li>➤ Utilise ICT and other technology to support their gardening projects</li> </ul> |
| <i>Managing self</i>                     | <ul style="list-style-type: none"> <li>➤ Work independently</li> <li>➤ Act on guidance and direction from experts and/or teachers/adult volunteers</li> <li>➤ Set personal goals</li> <li>➤ Evaluate and reflect on processes and activities undertaken</li> </ul>   |
| <i>Relating to others</i>                | <ul style="list-style-type: none"> <li>➤ Work alongside others in the school (children and adults) to develop teamwork skills</li> <li>➤ Set common goals</li> <li>➤ Make contact with and work alongside the wider school community/outside school</li> <li>➤ Develop and maintain relationships with peers and people who support the garden</li> </ul>  |
| <i>Participating and contributing</i>    | <ul style="list-style-type: none"> <li>➤ Link in with parents and whānau and the wider community (e.g., through requests of support, celebrations, selling/gifting produce, etc.)</li> <li>➤ Contribute with ideas, expertise, physical labour, etc.</li> <li>➤ Assist and engage with/involve younger students</li> </ul>   |



**Table 3.3: Links between gardens and expected outcomes of Te Whāriki curriculum**

| Te Whāriki Strands                         | Goals  | Edible gardens have provided meaningful contexts for:  |
|--|--|--|
| <i>Well-being</i><br><i>Mana Atua</i>      | Children experience an environment where: <ol style="list-style-type: none"> <li>1. Health is promoted;</li> <li>2. Their emotional wellbeing is nurtured;</li> <li>3. They are kept safe from harm.</li> </ol>  | <ul style="list-style-type: none"> <li>➤ Discussing healthy eating</li> <li>➤ Learning how to safely handle tools and kitchen utensils</li> <li>➤ Developing and strengthen confidence and skills</li> <li>➤ Experiencing change and unexpected outcomes (e.g., watching plants grow, failed crops).</li> <li>➤ Preparing and tasting new foods.</li> </ul>  |
| <i>Belonging</i><br><i>Mana Whenua</i>     | Children and their families experience an environment where: <ol style="list-style-type: none"> <li>1. Connecting links with the family and the wider world are affirmed and extended;</li> <li>2. They know that they have a place;</li> <li>3. They feel comfortable with the routines customs, and regular events;</li> <li>4. They know the limits and boundaries of acceptable behaviour.</li> </ol>  | <ul style="list-style-type: none"> <li>➤ Bringing children, teachers and parents and whānau together (e.g., shared lunch)</li> <li>➤ Linking with the wider community (e.g., through requesting support and advice from experts, visiting other gardens and/or garden centres)</li> <li>➤ Making links with home gardens and cooking cultures</li> <li>➤ Developing a sense of belonging to their peer group and ece centre;</li> <li>➤ Taking responsibility and ownership;</li> <li>➤ Being part of setting values, rules and boundaries.</li> </ul>   |
| <i>Contribution</i><br><i>Mana Tangata</i> | Children experience an environment where: <ol style="list-style-type: none"> <li>1. There are equitable opportunities for learning, irrespective of gender, ability, age ethnicity, or background;</li> <li>2. They are affirmed as individuals;</li> <li>3. They are encouraged to learn with and alongside others.</li> </ol>  | <ul style="list-style-type: none"> <li>➤ Teachers to engage with children who don't speak English/and who are developing their oral communication skills</li> <li>➤ Building and strengthening children's abilities and interests in subject areas (e.g., maths, art)</li> <li>➤ All children to contribute</li> <li>➤ Discussing and exploring produce, practices and food from different cultures</li> <li>➤ Encouraging children to listen to and respect others' ideas and suggestions</li> <li>➤ Children to take a lead/part in planning and decision making (e.g., what and when to plant)</li> <li>➤ Sharing experiences and knowledge</li> <li>➤ Parents and whānau to contribute (e.g., skills, knowledge).</li> </ul> |
| <i>Communication</i><br><i>Mana Reo</i>    | Children experience an environment where: <ol style="list-style-type: none"> <li>1. They develop verbal and non-verbal communication skills for a range of purposes;</li> <li>2. They experience the stories and symbols of their own and other cultures;</li> <li>3. They discover and develop different ways to be creative and expressive.</li> </ol>   | <ul style="list-style-type: none"> <li>➤ Children to listen to, and follow, directions</li> <li>➤ Learning english, māori, and other languages, e.g., māori names for vegetables and fruit</li> <li>➤ Utilising and making symbols and signs</li> <li>➤ Exploring the mathematical system, it's symbols and concepts (e.g., counting and measurement).</li> <li>➤ Developing and strengthening communication and language skills</li> </ul>  |
| <i>Exploration</i><br><i>Mana Aoturoa</i>  | Children experience an environment where: <ol style="list-style-type: none"> <li>1. Their play is valued as meaningful learning and the importance of spontaneous play is recognised;</li> <li>2. They gain confidence in and control of their bodies;</li> <li>3. They learn strategies for active exploration, thinking and reasoning;</li> <li>4. They develop working theories for making sense of natural, social, physical and material worlds.</li> </ol> | <ul style="list-style-type: none"> <li>➤ Undertaking spontaneous and in-formal exploration</li> <li>➤ Undertaking formal exploration and experiments</li> <li>➤ Undertaking research</li> <li>➤ Undertaking physical activities that builds co-ordination and motor-skills</li> <li>➤ Utilising different types of equipment, tools and technology</li> <li>➤ Planning for specific outcomes and following/monitoring progress over short and long periods</li> <li>➤ Discussing, reflecting on, and making sense of, (un)expected outcomes.</li> </ul>  |



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Although these benefits were seen to span across all groups of students, findings from the case studies suggest that special needs students and students who struggle with academic learning draw particular benefits from edible gardens as they provide a means for them to achieve success. Teachers also reported that many students who displayed challenging behaviours in the classroom (e.g., rowdy, difficulties concentrating) worked particularly well in the garden, getting down to task, staying focused and working unsupervised.

### 3.2.3 FOSTERING PARENT, WHĀNAU AND COMMUNITY INVOLVEMENT

The case studies provide ample examples of how edible gardens have been used as a means to link in with, and attract involvement by, parents, whānau and the wider community. Although most case study schools and ECE services indicated that it is often a challenge to involve parents and whānau on a wider scale they all had managed to do so to some extent (just over half (53%) of survey respondents indicated this was a challenge also). In particular, edible gardens were seen to enable parents and whānau to get involved in non-academic ways (i.e., through physical labour) which was seen to attract some who might not normally get involved. The case studies also suggest that gardens attract interest from grandparents – who in some instances travelled some distance to get involved. In the survey, 64% of participants strongly agreed/agreed that their garden had increased family/community involvement at their education setting.

The ways in which parents and whānau had supported the gardens included:

- Volunteering as garden facilitators/helpers
- Helping out over holidays (i.e., general maintenance)
- Providing recipes for using the produce (sometimes culture specific)
- Contributing time to help with food preparation and cooking of produce
- Donating material, tools, jars for making jam or relish, seedlings/seeds, etc.
- Contributing with expertise (e.g., around composting, soil, planting)
- Volunteering labour (e.g., for building garden boxes)
- Taking visits from students to show their own garden.

In return for support, students generously shared their produce by sending surplus vegetables home to families. The support parents and whānau can provide over holiday periods appears particularly important as maintenance over holidays was considered the second biggest challenge/barrier overall to their gardens according to survey respondents.

Support was mainly requested through newsletters. However, it was noted that the mere presence of the garden “*drew people in*”, provided a focal point and a conversation starter/topic and that this support sometimes originated from a general chat about how the garden was going. One ECE service indicated that having the garden visible from the street had sparked interest from other community members also (i.e., neighbours, passersby). In one school, specific garden events had been arranged to involve family/whānau, including a ‘grandparent’s day’ at which the children showed them around the garden, and a ‘creative day workshop’ for parents and students where they made sculptures in and for the garden.

Apart from family/whānau, schools and ECE services had linked in with a number of local organisations to gain support for their garden initiatives, including: Rotary, nurseries, landscapers, Mitre 10, community trusts, colleges/polytechnics and other schools/ECE services. In one school in particular, students had been proactive in creating these links themselves by approaching the organisations/businesses and maintained ongoing relationships with them through keeping them updated on progress in the garden.

### 3.2.4 IMPACTS ON THE HOME ENVIRONMENT

One of the key objectives of the evaluation was to ascertain whether edible gardens in education settings encourage the establishment of gardens in the home. Findings suggest this is certainly the case with many students, parents and teachers reporting that as a direct result of the school garden:

- New gardens had been developed
- Children’s own gardens had been developed (even though family garden already existed)
- Existing gardens had been expanded
- Neglected gardens had been re-invented

*“Our garden was overgrown. Now we have a new one. We’re growing herbs and other things” (Student).*

- Individual plants were being grown in pots.

Similarly, survey findings suggest that 71% of participants strongly agreed/agreed with the statement that their school/ECE service garden had ‘motivated the establishment of edible gardens in the home’.

In addition, it appears that interest, knowledge, skills and attitudes derived from being part of edible garden projects in education settings (as detailed in the above sections), have had other impacts on the home environment. In particular, it was reported that:

- Children are more actively involved and interested in home gardens (including sharing knowledge gained in their school garden)
- Children are more interested in helping out with cooking – impressing parents with their food preparation skills (e.g., knife handling)

*“My son wants to come home and be a chef...he wants to cook everything he cooks at school at home...I let him to a certain extent! He does gardening as well” (Parent).*

- Children request they cook things they have eaten at school/ECE service at home
- Children insist they eat healthy food and suggest what vegetables to buy when at the supermarket
- Surplus produce from the school garden are being prepared in the home.

*“He [her son] is always looking out for different veggies to buy” (Parent).*

### 3.3 SUPPORTING REDUCTION OF INEQUALITIES

*“Being a lower socioeconomic area, children and families benefit from the availability of fresh, cheaper food. There is a big push again for growing food world-wide now because of the recession. The kindy provides an important counter-balance to our unhealthy food environment, including at home, as it exposes families to healthier food options and encourages healthy eating. It’s a really cool thing to promote” (Parent).*

In line with the ultimate aim of the HEHA strategy, from which the Nutrition Fund originates, one of the key objectives of the evaluation was to ascertain whether edible gardens in education settings support the reduction of inequalities. A particular focus was whether they are likely to promote healthy weight and therefore contribute to reducing obesity. Although these long term goals cannot be measured directly with the current study design, edible gardens in schools certainly align well with the causal pathway for achieving these goals. In particular, they support the HEHA vision that everyone should live in an environment and society where individuals and their family/whānau are supported to eat well and be active. There are a number of key features of edible school gardens that supports this and which may over the long term support healthy weights to be maintained. For example, edible gardens in schools provide children with:

- Access to vegetables and fruit which may not be easily afforded in the home environment improving nutritional intake
- Opportunities to learn about the benefits of healthy eating
- Opportunities to try new foods and to learn to enjoy healthy food (which they may not otherwise come across in the home environment)



- 
- Opportunities to learn to prepare healthy food
  - Opportunities to be physically active (and offers an alternative for physical activity for those who do not enjoy sports).

For many students, it is likely that the learning from these opportunities will be sustained as they grow older. As one mother emphasised...

*“It’s great to have the healthy living concept promoted at such an early age...if you start with three year olds then it’s already part of what they do when they go to school”.*

In addition, edible school gardens:

- Enable schools and ECE services to provide students who may come to school/kindergarten without breakfast or who need lunch with fruit, vegetables and/or food (e.g., some schools ask parents to supply bread and they will supply the filling with things from the garden) or morning tea and lunches on a regular basis
- Can be inclusive of all children – as well as family/whānau and the wider community
- Offer opportunities for families to receive free vegetables and fruit when there is a surplus
- Influence the home environment in terms of eating behaviours (i.e., children suggesting healthier options)
- Motivate the establishment of vegetable gardens in the home.

### 3.4 FACTORS FOR SUCCESS AND SUSTAINABILITY

A number of factors were identified throughout the evaluation that supported successful and sustainable edible gardens in school/ECE settings. In the first instance, these were derived from a scan of relevant literature on the subject. As part of the evaluation, Principals/Head teachers and lead teachers as well as survey respondents were given the opportunity to comment on the relative importance of each success factor based on their experience. They were also asked to advise of any additional factors they considered important.

A key finding from the evaluation was that school garden projects that are structured around whole-school approaches are believed to be most successful – and are most likely to be sustained over time. Whole-school approaches incorporate all elements of school life such as: school governance, pedagogical approaches, curriculum, resource management, school operations and grounds, with the aim to embed sustainable practices. Active participation and partnerships not only occur within the school (involving teachers, pupils and management/administration) but between the school and the community (organisations, business/industry and governments). In contrast, over-reliance on one lead teacher/garden facilitator to drive garden projects had stalled momentum in some cases, particularly in conjunction with turnover of staff and/or limited support from other school community members (e.g., other teachers, family members).

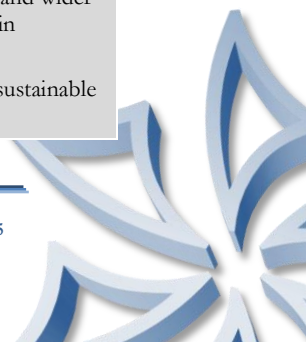
Concerns were raised by some case study sites about the cost of maintaining the garden in the future, once their HEHA money had been used up. This was particularly so for sites in low socioeconomic areas where fundraising was not an easy option. For some sites, some degree of ongoing funding had been allocated through the schools’/ECE services’ operational budgets, however this was not affordable for others. Access to (e.g., operational funding or grants) or support to access ongoing funding (e.g., ideas of where to apply for funding, support to complete grant applications) is therefore also an important factor for sustaining edible gardens over time. Almost all (98%) survey respondents indicated that the Nutrition Fund had been either ‘Very Important’ or ‘Important’ to enable the establishment of their garden. In addition, over half of survey respondents (54%) indicated that accessing external funding and support had been ‘Very Much’ or ‘Somewhat’ a challenge/barrier. 48% indicated the same for accessing internal funding and support.

Setting up a successful edible garden project from scratch in education settings, and developing it over the long term, therefore requires a systematic and comprehensive approach involving a broad range of people. The key factors for success identified in the evaluation are summarised in Table 3.4 – along with individual elements of success related to each success factor, and key impacts/benefits associated with these elements being implemented.

Table (3.5) illustrates the importance survey participants placed on the main individual elements of success. It shows that these success factors are applicable to a wide range of educational settings and does not only reflect the case studies or the information gleaned from the literature.

**Table 3.4: Key success factors for edible gardens in education settings**

| Key Success Factor  | Elements of Success   | Benefits/Key Impacts  |
|---|---|---|
| <i>Thorough planning and consultation in the initial stages of the project</i>                  | <ul style="list-style-type: none"> <li>• Consulting the whole school/ECE service community (including students, parents, staff) from the initial planning stage</li> <li>• Having short-term and long-term goals</li> <li>• Incorporating issues of sustainability (e.g., succession planning, ongoing funding) and capacity-building</li> </ul>  | <ul style="list-style-type: none"> <li>• Raises awareness and creates a better understanding of the needs and expectations of the community</li> <li>• Enables monitoring of progress over time</li> <li>• Adds to the long term viability of the garden</li> </ul>   |
| <i>Aligning the garden with school/ECE service strategic goals, planning and policies</i>       | <ul style="list-style-type: none"> <li>• Including the garden in the mission, charter and strategic/annual plans of the school/ECE service</li> <li>• Including the garden in school/ECE service policies</li> <li>• Including the garden in school/ECE service curriculum planning</li> </ul>  | <ul style="list-style-type: none"> <li>• The garden becomes an integrated part of school life and not a one-off initiative</li> <li>• Raises the profile of the garden</li> </ul>   |
| <i>Making the garden locally and culturally relevant</i>  | <ul style="list-style-type: none"> <li>• Structuring the garden around educational, health and cultural needs of the local community</li> <li>• Connecting with Māori and/or other cultural groups represented at the education centre</li> </ul>   | <ul style="list-style-type: none"> <li>• A meaningful garden</li> <li>• Increases knowledge of tikanga and te reo Māori</li> <li>• Broadens the potential benefits of the garden</li> <li>• Strengthens buy-in to the garden</li> </ul>   |
| <i>Incorporating the garden into the curriculum and within teaching and learning programmes</i> | <ul style="list-style-type: none"> <li>• Making the garden part of everyday teaching and utilising good teaching practice (e.g., experiential or project-based learning or inquiry approaches)</li> </ul>   | <ul style="list-style-type: none"> <li>• Enables educational benefits from the garden</li> </ul>  |
| <i>Applying a multifaceted approach</i>   | <ul style="list-style-type: none"> <li>• Linking the garden across a variety of curriculum areas</li> <li>• Linking the garden to other health, environmental and cultural initiatives</li> </ul>   | <ul style="list-style-type: none"> <li>• Broadens the educational benefits of the garden</li> <li>• Provides meaningful contexts for learning in turn improving learning outcomes</li> </ul>  |
| <i>Involving the whole school community</i>   | <ul style="list-style-type: none"> <li>• Actively engaging BoT/governance, management and staff</li> <li>• Involving students in decision-making related to the garden, educationally and operationally (planning, implementation and maintenance)</li> <li>• Securing active, ongoing engagement from family/whānau</li> <li>• Forming partnerships with local businesses and organisations</li> <li>• Teachers having access to, and making good use of, external support and guidance</li> </ul> | <ul style="list-style-type: none"> <li>• Fosters partnerships with the wider school/ECE service community</li> <li>• Support from all sectors of the school/service community (whole school enthusiasm)</li> <li>• Student ownership of the garden project</li> <li>• Two-way transfer of knowledge and skills between home and school</li> <li>• Increased family/whānau and wider community involvement in school/ECE</li> <li>• Facilitates successful and sustainable garden</li> </ul> |

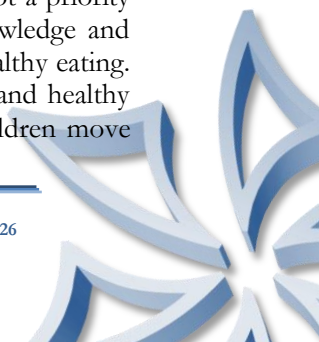


| Key Success Factor   | Elements of Success   | Benefits/Key Impacts   |
|--|---|--|
| <i>Ensuring capacity and resources are available</i>                       | <ul style="list-style-type: none"> <li>• Allowing sufficient teacher time for overseeing the garden project</li> <li>• Allowing time for students to engage in garden related activities (e.g., class room time)</li> <li>• Access to or support to access ongoing funding</li> <li>• Teachers accessing garden-related professional development and resources</li> </ul> | <ul style="list-style-type: none"> <li>• Supports integration of the garden into school life</li> <li>• Supports sustainability</li> <li>• Supports new and ongoing learning and teaching opportunities</li> </ul> |
| <i>Having a health focused ethos and culture of the school/ECE service</i> | <ul style="list-style-type: none"> <li>• Actively promoting ideas about healthy lifestyles (e.g., nutrition and physical activity)</li> </ul>   | <ul style="list-style-type: none"> <li>• Provides a natural context for the garden</li> <li>• Supports the aims of the garden</li> </ul>   |

**Table 3.5: Importance ratings of success factors (N=87)**

| How important do you think the following are for edible gardens to be successful in schools/ECE services? | Very Important or Important | Not important or Not very important | Not Sure/Not Stated |
|---|-----------------------------|-------------------------------------|---------------------|
| Having active engagement and support from management and staff  | 99%                         | 0%                                  | 1%                  |
| Actively promoting healthy lifestyles   | 98%                         | 0%                                  | 2%                  |
| Having short term and long term goals   | 98%                         | 0%                                  | 2%                  |
| Involving students in decision-making   | 97%                         | 0%                                  | 3%                  |
| Linking in with curriculum areas and other related initiatives  | 97%                         | 1%                                  | 2%                  |
| Incorporating sustainability and capacity-building in planning  | 95%                         | 0%                                  | 5%                  |
| Including the garden in school/ECE service long term vision (i.e., not a one-off initiative)              | 94%                         | 0%                                  | 6%                  |
| Linking the garden with everyday teaching/ good teaching practice (e.g., inquiry approach)                | 94%                         | 1%                                  | 5%                  |
| Having whole-school/ECE service enthusiasm and commitment   | 93%                         | 3%                                  | 3%                  |
| Having available, and teachers accessing, appropriate resources   | 92%                         | 1%                                  | 7%                  |
| Aligning the garden with policies and curriculum planning   | 90%                         | 0%                                  | 10%                 |
| Having active engagement by family/whānau   | 85%                         | 3%                                  | 11%                 |
| Having available, and teachers accessing, external support and guidance                                   | 84%                         | 1%                                  | 15%                 |
| Having available, and teachers accessing, appropriate professional development                            | 80%                         | 6%                                  | 14%                 |
| Catering to Māori and/or other ethnic populations in the community  | 72%                         | 3%                                  | 24%                 |
| Consulting the community as part of initial planning  | 70%                         | 13%                                 | 17%                 |
| Structuring the garden around local community needs   | 69%                         | 11%                                 | 20%                 |
| Forming partnerships with local businesses/ organisations   | 66%                         | 9%                                  | 25%                 |

In addition to the sustainability of the garden itself, it is worthwhile questioning the sustainability of the positive outcomes that have been outlined in the previous chapter. It was widely emphasised by teachers and parents at the case study sites that the positive impacts they were seeing were often realised immediately – or at least in the short term. It is clear that impacts around healthy behaviours (e.g., increased vegetable consumption) were being transferred to other contexts (e.g., to the home). However, some teachers expressed concern that as children grow older and move into new educational settings (e.g., from kindergarten to school) these impacts may not be sustained if these settings are not actively promoting healthy lifestyles also. This was a particular concern for children where this was not a priority in the home environment (e.g., due to lack of money to buy healthy food or lack of knowledge and interest in this area) or where the wider community environment lacked options for eating healthy eating. This highlights the importance of continued support for schools to promote healthy eating and healthy activity so that there is a continual reinforcement of the benefits of healthy lifestyles as children move





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through the education system. This way they are more likely to take this knowledge and these attitudes, skills and behaviours with them into adult life.



## CONCLUSION

The evaluation findings show that edible gardens have the potential to play an important role as an instructional tool in education settings. Gardens are flexible and multifaceted as they provide a backdrop for teaching within all learning areas, make available healthy food and provide opportunities for physical activity.

In particular, edible gardens appear to be an effective means by which to broaden students' education, as they provide 'authentic' learning experiences in a meaningful context. They enable hands-on exploration and experimentation, encourage students to be curious, and to inquire and question. In line with international studies,<sup>16,17,18</sup> the findings provide ample evidence that the benefits of using the garden as an educational tool are far-reaching with reports of students developing a range of competencies and life skills that will enable them to be active participants and contributors in society as they progress into adult life.

The findings also show that gardens support increased vegetable and fruit consumption and overall, a positive behaviour change in relation to healthy eating. This is particularly important for those children who may otherwise have limited access to healthy food – due to financial circumstances or engrained habits in the home environment. In addition, edible gardens are able to support increased physical activity – and to provide an alternative for physical activity for those children who may not enjoy the competitive nature of many sports.

In addition to the positive impacts mentioned above, edible garden in education settings foster parent, whānau and wider community involvement with these settings. It is an activity that people can contribute to in a variety of ways, including knowledge, skills, donations and/or labour. Gardens catch people's attention and interest through their mere aesthetic presence. Garden initiatives also hold the potential for positive impacts to transfer into the home environment as children act as promoters of healthy lifestyles, share their knowledge and skills and influence an inquisitive approach to life and problem solving.

Edible gardens in education settings certainly support the Ministry of Health's HEHA strategy vision of creating "*an environment and society where individuals, families and whānau, and communities are supported to eat well, live physically active lives, and attain and maintain a healthy body weight*".<sup>19</sup>

Whether this vision can be realised on a wider scale, and sustained in the long term, however is highly dependent on the future *national* and *regional* approaches towards supporting education settings to continue to promote initiatives that support improved attitudes and behaviours towards healthy lifestyles. If there is no ongoing and/or limited support for these young students to maintain their knowledge, attitudes and behaviours as they grow older, the likelihood of seeing a reduction to health inequalities in the medium to long term may be significantly reduced.

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<sup>16</sup> Ozer, E.J., (2007). The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development. *Health Education Behaviour*, 34(846).

<sup>17</sup> Blair, D (2009). The child in the Garden: An Evaluative Review of the Benefits of School Gardening. *The Journal of Environmental Education*, 40(2).

<sup>18</sup> Desmond, D., Grieshop, J., Subramaniam, A., (2004). Revisiting garden-based learning in basic education. International Institute for Educational Planning. Accessed on 10 April 2009 from <http://www.fao.org/sd/erp/revisiting.pdf>

<sup>19</sup> <http://www.moh.govt.nz/healthyeatinghealthyaction>

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The same applies for sustaining the overall impacts of edible gardens in schools and ECE services—including the positive influence they have on educational outcomes and increasing community involvement in education settings that support other Government priorities including:

- The Ministry of Education’s aim to “*address underachievement in our schools, and to drive improved educational performance right across the system to improve the education outcomes for all young New Zealanders*”;<sup>20</sup> and
- The Ministry of Social Development’s overall goal to help “*build successful individuals, and in turn building strong, healthy families and communities*”.<sup>21</sup>

The HEHA Nutrition Fund was a key instigator, motivator and enabler for gardens to be established in education settings and, along with other successful initiatives around the country (e.g., FiS, HPS), they help(ed) support these Government priorities be realised. With an increasingly challenging fiscal climate the potential benefits of school (and community) gardens for those families who are struggling are substantial. In fact, edible gardens in education settings provide tools for families and communities to help themselves – as they get to share ideas for cheaper and smarter ways to obtain healthy food.

In light of these findings, the following recommendations are made for consideration:

### **Ministry Level Recommendations**

Findings suggest a need for national, long-term, intersectoral, strategic planning around edible garden initiatives in education settings – as they have the ability to support the realisation of multiple Government priorities and to empower people to make better lives for themselves. This may include combined Ministry of Health, Education and Social development support to:

- Ensure there is funding for education settings to start up and/or maintain edible gardens. This could be targeted towards schools and ECE services in the most need (e.g., ECE services in areas of high deprivation and decile 1 and 2 schools)
- Enable all the relevant regional agencies and groups to work together (i.e., intersectoral collaboration) to ensure communities benefit from edible gardens in education settings and that a continuum for sustainability of impacts is in place (see regional level recommendations below for the types of activities that may need support to achieve this).

### **Regional Level Recommendations**

The evaluation concludes that the key for the positive impacts identified to benefit all students, and for enabling sustainable gardens, is to apply whole-school approaches to the implementation and running of the garden. This involves making formal connections between different parts of the school system. In line with the HPS framework these include school organisation and ethos, curriculum teaching and learning and community links and partnerships.<sup>22</sup> Although the Guidelines developed as part of this evaluation will help schools to achieve this, they will also need local support to embed these structures.

The following recommendations are made for regional, intersectoral (e.g., Public Health Units/DHBs, local councils, Enviroschools, HPS, iwi, National Heart Foundation, Cancer Society, etc.) level activity to support successful and sustainable gardens going forward:

- Greater coordination between existing initiatives that can work to support and reinforce each other (e.g., FiS, HPS and Enviroschools).
- In light of the changed economic climate and the re-prioritisation of the HEHA Nutrition Fund, support education settings to access alternative funding avenues for establishing and running edible gardens. This may include providing ideas for where funds can be accessed or supporting them in completing grant applications.

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<sup>20</sup> Ministry of Education (2010). *Statement of Intent. 2010-2015*. Ministry of Education: Wellington.

<sup>21</sup> See ‘About MSD’: <http://www.msd.govt.nz/about-msd-and-our-work/about-msd/index.html>

<sup>22</sup> Health Promoting Schools (2007). *Kia Piki Ake te Kete Hauora*. Ministry of Health & Team solutions. <http://www.hps.org.nz/>

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- Support education settings to integrate gardens into school/ECE service life; that is, provide advice/assistance for implementing whole-school approaches. The Guidelines established as part of this evaluation will be a useful resource to distribute to schools and ECE services for this purpose. In particular, support education settings to embed structures for:
    - Student leadership of the garden
    - Gaining community involvement in the garden.
  - Support education settings by providing/linking them with curriculum-based resources to ensure the wider benefits of the gardens can be realised. To be most effective these resources need to:
    - Support centres to consider the “nature” of their engagement with the garden (as suggested in international literature) and how they might explicitly plan to create the opportunities to learn offered by the gardens
    - Show school and ECE service staff how the resources link to other initiatives such as Enviroschools (e.g., resources could be developed in collaboration with other groups);
    - Make links to practices common in school settings such as inquiry learning
    - Be provided in an easy-to-use and adaptable format (such as a PDF file or a downloadable document on an existing website).
  - Consider making links with local iwi, e.g., Ngāi Tahu Education Strategy covers ECE and schools and aims to “*imbue Ngāi Tahu stories, values, culture and history in educational curricula and engage with local and wider Ngāi Tahu forā*” (p.6)<sup>23</sup>. There may be interest within local iwi to use gardens as a forum for transmitting and developing tikanga and te reo.
  - Support progressive learning, so students maintain and increase knowledge, skills, behaviour and attitudes as they move through the schooling system – thus increasing the likelihood of reducing inequalities in the long term:
    - This may include facilitating forums (e.g., youth forums) for students (and/or parents and whānau) themselves to influence new/other education settings to adopt healthy (eating) initiatives to achieve ongoing pathways for maintaining healthy behaviours over time.

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<sup>23</sup> NGĀI TAHU EDUCATION STRATEGY (Adopted January 2006). Accessed from: <http://www.ngaitahu.iwi.nz/Ngai-Tahu-Whanui/Ngai-Tahu-Education/EducationStrategy.pdf>



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## APPENDIX A - SUMMARY OF LITERATURE SCAN

### THE THEORY BEHIND EDIBLE GARDENS IN EDUCATION SETTINGS

Edible gardens in education settings are defined as programmes geared for student participation in growing edible produce in conjunction with learning nutrition and other curricular subject. As a teaching tool edible gardens can be used for academic, health, behavioural, recreational, environmental, social and/or political purposes depending on the needs and context of the education setting and its community.<sup>1,2,3</sup>

Literature suggests that the utilisation of edible gardens as a teaching tool is prefaced on pedagogical ideas such as Kolb's experimental learning model and Gardner's theory of multiple intelligences. These theories suggest that: one learns from tangible experiences as they are likely to be followed by reflection, questioning and action, in turn creating new opportunities for concrete experiences; and that different avenues and ways in which individuals learn have to be recognised, whether it be by words and language, numbers and logic or through physical experiences.<sup>1,3,4</sup>

Education settings-based edible gardens are also based on theories of change. The social ecological-transactional perspective of human development suggests that children develop within, and alongside, the context in which they find themselves. Transactions occur as the child and the context reciprocally influence each other. Similarly, the ecological principle of interdependence suggests that, as parts of an eco-system change, it is likely that other components will be affected. Applied to edible gardens in schools and ECE services, this theory suggests that changes within the education setting service may contribute to changes taking place in the wider community (e.g., gardens grown at home) and that changes in one domain of student functioning may influence other areas of functioning (e.g., increased sense of bonding with the school through participation in school-based gardens may also lead to increased pride in the school).<sup>3</sup>

### THE FUNCTIONS OF EDIBLE GARDENS IN EDUCATION SETTINGS

According to the literature, edible gardens in education settings fulfil two main functions: 1) as a means to promote health; and 2) to widen the context in which education takes place.<sup>5</sup>

The school context offers a valuable setting in which to promote healthy lifestyles through policy measures, education and food provision as it provides the opportunity to reach a large segment of the population (e.g., young people, school staff, families and community members). In addition, it offers the opportunity to prevent unhealthy lifestyles by focusing on healthy food choices and increased physical activity at an early age when peer group influence in the development of food and lifestyle habits is very strong. It has been argued that the use of gardens in education can be particularly effective in improving children's nutritional knowledge, and increasing fruit and vegetable intake. As such, gardens in education settings are often prefaced on the ideas that: preference for food relates to increased intake of that food; and that one is more likely to like and eat, what oneself has produced.<sup>5,6,7,8,9</sup>

Education settings-based programmes are also useful in that they address inequalities of access to nutritious food such as the cost barriers to the purchase of fresh fruit and vegetables that exist for many low income families.<sup>10</sup>

From a pedagogical perspective, gardens in education settings fall under a wider umbrella of experiential education, where applied learning activities are integrated into subject matter and in which environment-based education initiatives are often employed. These programmes use a multidisciplinary approach and

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place teaching within natural and socio-cultural environments. As such, teaching often takes place outside the classroom, and emphasises life skills such as problem-solving and critical thinking.<sup>11,7</sup>

Research suggests that using the outdoors as a backdrop for learning, rather than limiting its use to interval and playtime, has the potential to contribute to students' development and education through cognitive and psychological pathways. This evidence is corroborated by many educators, particularly in science instruction, who have suggested that children are most receptive to learning through discovery-based and interactive learning and when environmental science topics are taught through outdoor school ground experiences rather than indoors in classrooms.<sup>12,13,14</sup>

Blair (2009) recognises the wider learning opportunities that edible gardens provide:

*The difference between a structured discrete experimental experience and a long-term involvement in a gardening process resides in the multitude of unstructured learning opportunities that are not in the lesson plan, happen spontaneously and non-hierarchically, and involve students and their adult mentors in multidirectional learning (p.20).<sup>15</sup>*

## IMPLEMENTATION OF EDIBLE GARDENS IN EDUCATION SETTINGS

International literature shows that the ways edible gardens are structured and implemented vary depending on the particular needs and circumstances of the education setting. Some settings rely heavily on donations of funding, technical assistance, labour and materials for the implementation and maintenance of their gardens. Funding streams can come from many different sources. However, a large proportion of education settings-based edible garden initiatives are likely to fall under a wider national, or local health or educational initiative, and examples of these approaches can be found around the globe.<sup>6,8,16,17,18</sup>

In New Zealand, edible gardens in education settings have recently been supported financially by the Healthy Eating Healthy Action (HEHA) programme and its related Nutrition Fund. Many NZ schools have a long-standing involvement with Health Promoting Schools (HPS), a conceptual framework that supports schools to promote health holistically within their communities. The HPS framework, which is discussed further below, is often applied through environmental or wellbeing initiatives such as Fruit in Schools (FIS). For some schools this has led to the development of vegetable gardens. The findings from the 2009 NZ Healthy Futures study indicated that increasingly, FIS schools are combining activities such as the development of edible gardens within their overall approaches to health and wellbeing – thus showing the synergy between different forms of health and wellbeing (e.g., environmental, physical, and social health and wellbeing).<sup>19,20</sup>

## DOCUMENTED OUTCOMES

Although there is theoretical support for garden activities to directly or indirectly influence students as well as the wider school community, there is little evidence-based research to validate their effectiveness. The literature that does exist on the effects of edible gardens in education settings ranges from individual accounts by teachers, students and parents, to more empirical assessments.<sup>1,8</sup> **Error! Bookmark not defined.**

### Health related outcomes

School gardens have been noted to influence students' awareness of different types of food, where it comes from, how it is grown, its nutritional value, as well as increased consumption of vegetables. Evidence also suggests that school children are more likely to try new and unusual foods due to their exposure to the practical aspects of gardening in combination with nutrition education.<sup>9,12,15,21</sup>

Few studies have focused on the effect of school gardens on physical activity. However, one study found that 79% of students who participated in an after school gardening programme reported being physically active every day compared with 51% prior to participation. Anecdotal accounts also indicate that edible gardens provide opportunities for physical activity through digging, weeding and watering. There is some evidence to suggest that school ground educational projects improve children's physical wellbeing through better quality play and increased motivation to exercise.<sup>12,22,23</sup>

Research also suggests that school gardens have potential to be associated with direct health improvements. For example, school gardens offer students opportunities to spend more time outdoors, which has been linked to students taking fewer sick days. In addition, anecdotal accounts from schemes

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that make free fruit and vegetables available to students have been associated with a decrease in school sores.<sup>12,20</sup>

Although there is no known direct research linking edible school gardens to reduced health and social inequalities, free fruit and vegetable schemes have shown to reduce differences in fruit and vegetable intake between socio-economic groups.<sup>24</sup>

### **Education related outcomes**

Studies indicate that garden programmes improve attitudes towards the education setting and increase motivation and enthusiasm for all related subject areas. This is supported by anecdotal claims that students feel more connected to their school, gain a sense of pride and belonging, as well as sense of connectedness to adults in the school setting, from participating in school garden activities. Research suggests that connectedness to school and family serves as a key process for positive socialisation. Students who become emotionally attached to their teachers and school are likely to also adopt the pro-social values that the school advocates.<sup>8,12,25</sup>

Observations made through qualitative studies of edible gardens in education settings suggest that gardens also: create a sense of comfort, security and belonging; influence positive remodelling of school culture; provide a space for wonder, pleasure and self expression; and foster understanding of natural interactions and appreciation for living things. This seems to be particularly so for students who do not fit in with the general school structure as the garden offers a sense of refuge.<sup>26,27</sup>

There are also reports of increased self-confidence amongst students who participate in the actual implementation and planning of school garden activities. This appears to come through opportunities to voice their opinions, to be heard and gain a sense of satisfaction through doing something for the school, as well as working alongside peers and adults.<sup>12</sup>

A number of studies, as well as anecdotal accounts, indicate a number of beneficial cognitive effects deriving from school ground projects (i.e., greening of school grounds with gardens, trees etc). They suggest that learning is more effective in an environment-based context compared to learning within a traditional educational framework (i.e., classroom based) with; educational outcomes such as improved student achievements in science, reading, writing, mathematics and social studies; wider academic outcomes such as reduced discipline and classroom management problems, increased engagement and enthusiasm for learning and greater pride and ownership in accomplishments. Research suggests that these sorts of impacts may be strongest for children who come from lower socioeconomic backgrounds.<sup>1,8,28,29</sup>

International literature indicates that parent involvement with the school may have positive impacts on student achievement. Anecdotal evidence suggests that gardens in education settings can increase involvement with the school by parents who may have felt uncomfortable contributing in a classroom setting (due to a lack of academic or language skills etc). For these parents, the school gardens offer opportunities to contribute through other types of skills and abilities, such as garden knowledge or physical strength.<sup>8</sup>

### **FACTORS THAT CONTRIBUTE TO SUCCESSFUL AND SUSTAINABLE GARDENS**

In reviewing international literature and local research, best practice for implementing successful and sustainable gardens (and similar health promotion initiatives) in education settings include:

**Strategic planning:** An initial planning phase is important for the long term viability of gardens and to ensure they meet the needs of community. It is suggested that considerations are made around: the ways in which the garden will fit in with the overall teaching and learning strategy of the education setting (e.g., what is the vision for the garden and how does it meet school community expectations?); how the garden will be funded; long term and short term goals; and how the garden may fit in with other relevant initiatives (e.g., health, cultural, environmental), as they can serve to support and enhance each other.<sup>1,15,20,25,30</sup>

**Community consultation and involvement:** Community engagement and consultation plays an important part in facilitating locally and culturally responsive approaches to edible gardens in education settings. It helps to foster understanding and support. As part of this, addressing aspects of culture, local

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relevance and inequalities should be considered so that garden initiatives are better geared to meet these needs. In New Zealand for example, Māori views on kai (food) and maara (gardens) can offer valuable insight into many traditional aspects of gardening and garden sustainability.<sup>1,21,30</sup>

Having ongoing community involvement is an important contributor to sustainability, as parents' assistance throughout the year and during school breaks helps maintain programme momentum. In addition, there is less likelihood of vandalism as ownership of gardens extends beyond teachers and students.<sup>5,7,8,9</sup>

**Existing health focus within the education setting:** Having a culture of actively promoting healthy lifestyles within the education setting has been recognised as an important success factor with research suggesting that broader school policies and practices can serve to “reinforce or undermine the work of the school garden” (p.853).<sup>8</sup> For example, existing school lunch and snack options send messages to students about what is deemed (un)acceptable to eat which in turn may affect the buy-in to eating and preparing produce from the garden.

**Alignment with the curriculum:** Research shows that edible gardens in education settings are most successful when they are integrated with the curriculum. It is important that schools determine: whether the garden will be integrated into all core subjects through thematic instruction, what *kind* of learning should be provided, and *how* garden activities can be used within the school's teaching and learning philosophy, so that there is a strategic and common approach to how the garden is utilised.<sup>8,9,11,12,25</sup>

*To be truly effective, garden-based learning programmes must be tied to a comprehensive and cohesive education plan/programme or garden curriculum that is implemented across grade levels and ideally is tied to local, state or national education standards or needs.<sup>1</sup>*

**Student led:** Research indicates that edible gardens are most effective when students are involved in all aspects of their planning, implementation and maintenance. This involvement should extend beyond standard gardening activities (e.g., planting, watering etc), and include planning and visualising at the beginning of a project and problem identification and solving as it progresses.<sup>1,39,31</sup>

**Wider institutional support:** International research suggests that projects such as edible gardens can only reach their full potential if they are supported by institutional and structural frameworks, and a wider political, social and economic vision within the relevant systems (e.g., education, health) to nurture these initiatives. Previous research in New Zealand also highlights the importance of sector collaboration when dealing with multifaceted programmes (e.g., FiS), as it supports a better understanding of resource and funding needs. In teacher training on how to link edible gardens with the curriculum is also important in the success of gardens, alongside preparatory and ongoing training of related skills.<sup>5,8,15,25,32</sup>

## UTILISING WHOLE-SCHOOL APPROACHES AS A FRAMEWORK FOR SUSTAINABILITY

Research indicates that edible gardens in education settings appear most sustainable when there is whole-school engagement in their implementation and maintenance. In fact, all the above mentioned factors that contribute to sustainable and successful gardens align well with whole-school approaches and growing body of evidence suggests that these approaches are particularly effective in addressing health concerns and promoting student health and wellbeing.<sup>5,8,11,12,15,33,34,35,36,37,38</sup>

Whole-school approaches incorporate all elements of school life such as: school governance, pedagogical approaches, curriculum, resource management, school operations and grounds, with the aim to embed sustainable practices. Whole-school approaches often implies links and/or partnerships with the local community. For example, active participation and partnerships for sustainability not only occur within the school (involving teachers, pupils and management/administration) but between the school and the community (whanau, organisations, business/industry and governments). In other words, whole school approaches consist of two key parts. One is a framework for conceptualising the different layers of a school. The other is a way of managing change via community development processes.<sup>33</sup>

Health Promoting Schools (as mentioned above) is a common New Zealand whole-school approach. The HPS framework suggests that schools focus on three interconnected components of the school system when designing approaches to health and wellbeing:

1. School organisation and ethos (i.e., policies and social/physical environment);



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2. Curriculum teaching and learning; and
  3. Community links and partnerships.

The first HPS component emphasises the importance of developing a healthy social environment as part of school culture. A pre-requisite for successfully integrating health-promoting initiatives with broader school policies is according to the HPS framework, to identify the structures needed to support the initiative. The second component refers to what is taught and learnt, and how this occurs. The HPS framework acknowledges the need for alignment between edible gardens and curriculum through recognition of the importance of staff resources, skills and training to undertake the integration. As illustrated in the third component, the HPS framework also recognises the importance of schools connecting with the community.<sup>19</sup>

HPS guidelines also encourage support for students to “plan and lead wellbeing-related activities which influence the school environment” (p.5).<sup>39</sup> In New Zealand, the newly revised school curriculum supports this notion as it emphasises the need to involve students in decision-making about their learning. For example, students do more than “learn about” an area, they also learn as they decide on real-life issues that are relevant to them and their wider community and as they “take action” to address their concerns. These ideas are part of the inquiry models that are now being commonly used in primary schools, and they are also discussed in some of the newer parts of the curriculum document such as the section on key competencies (pp.12-13), as well as within the sections on learning areas such as Health and PE.<sup>40</sup>

In fact, recent changes to the New Zealand curriculum that offer schools ample opportunities to fit edible gardens within their academic approach include a stronger focus on approaches to learning (i.e., the “how” of learning”), as well as an increased emphasis on structuring learning around the needs of the local school community. The new overview curriculum document also suggests that schools work to ensure that classroom learning and wider school practices are aligned. For example, it states that the Health and Physical Education learning area:

*...makes a significant contribution to the wellbeing of students beyond the classroom, particularly when it is supported by school policies and procedures and by the actions of all people in the school community (p.22).<sup>40</sup>*

This statement alludes to the use of whole-school approaches (e.g., HPS). As with theory behind development of edible gardens in education settings, one premise of whole-school approaches is that a school is a system with interacting parts. These parts can be aligned to support and strengthen each other, thus resulting in better outcomes.

## APPENDIX B - CASE STUDIES

### CASA NOVA KINDERGARTEN: INFLUENCING HEALTHY EATING IN THE COMMUNITY THROUGH THEIR GARDEN

#### INTRODUCING CASA NOVA KINDERGARTEN

Casa Nova Kindergarten is located in suburban Oamaru. The kindergarten has a roll of approximately 70 children from a lower socioeconomic, multicultural and predominantly state housing area, although a lot of young families are now buying houses in the community. There is a Pacific Island community in Oamaru due in part to employment opportunities at the nearby freezing works. Casa Nova draws from that community, as well as from Pākeha, Malaysian, Indian, German and South African families. It is situated next to a primary school, which became a Fruit in Schools (FiS) school in 2009, and 90% of the children move on to that school.

The kindergarten uses a socio-cultural approach to teaching, which is captured in the motto, 'Te Arahina' (defined as a '*combination of learning, guidance, togetherness, being one and whānau*'). Their aim is to provide a safe environment involving caring, life skills and strengthening relationships, through methods such as peer tutoring, with the goal of encouraging respect for other children and for possessions.

During our two visits to the kindergarten, we interviewed the head teacher, three teachers and five parents. In addition the head teacher led structured discussions with 10 children and the researchers held informal conversations with individual children. We also spoke to the manager of the Oamaru Free Kindergarten Association.

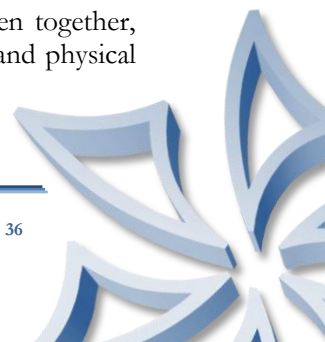
#### INTEGRATING HEALTH AND WELLBEING INTO EVERYDAY PRACTICE

Casa Nova's philosophy states that the kindergarten offers children '*a safe, fun and welcoming learning environment where their health and wellbeing is promoted*'. At the core of this holistic approach is a commitment to healthy eating. Although the kindergarten makes an effort to raise awareness amongst their families of the importance of providing healthy food, a major barrier is the unhealthy eating environment in the surrounding area, e.g., cost, availability of fresh produce in local corner stores is rare and it is predominantly junk food that is sold to children and schools.

When the head teacher started at Casa Nova in 2006, many parents sent morning tea with their children, which was mostly unhealthy, including ready-made snack packs with juice, crisps etc. Consequently a new policy was introduced to encourage healthier food, which has resulted in the kindergarten receiving a Healthy Heart Award from the Heart Foundation. The kindergarten staff make an effort to understand and work with different cultural beliefs in its community to facilitate an overall improvement in healthy food choices.

Morning tea is provided every day (timetabled early to ensure that children who may not have had adequate breakfast do not go hungry) and lunch is prepared on the premises four days a week (e.g., sandwiches/rolls/pitas, salads, chow mein, roast vege couscous, steamed vegetables), for which the garden is utilised. On Thursdays children bring their own lunch and parents are welcomed everyday to be involved in kai time.

The garden at Casa Nova fits well with their ethos of holistic wellbeing by bringing children together, creating a family feel and a catalyst for their hands-on approach to healthy eating, cooking, and physical activity.



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## GARDENING AT CASA NOVA

The “brainwave” to start a garden came to the kindergarten head teacher while attending a Mission-On<sup>24</sup> workshop. She made it her goal to feed children, get them to try different, healthier foods and to produce a cookbook of easy healthy recipes.

### ESTABLISHING THE GARDEN

At the same time as the Mission-On workshop, the Nutrition Fund became available. Because of the degree of enthusiasm for the idea, as well as the need to deal with unhealthy lunch boxes, hungry kids, and being surrounded by unhealthy fast food outlets, the head teacher believed they would have established a garden even without funding assistance, but believes it would have been smaller and taken longer to set up. The garden built to be an integral part of the kindergarten playground. A handyman helped build the garden, with help from teachers. The children were asked to design the garden beds, and their plans were incorporated in the overall design.

The Nutrition Fund enabled Casa Nova to purchase garden and kitchen equipment, including timber for the garden beds, tools, an oven, toast maker and cooking utensils. Additional funding was also sourced: the local Rotary Club funded outdoor tables and tools, and Ministry of Education Equity Funding provided a fridge-freezer.

### MAINTAINING THE GARDEN

Looking after the garden is part of the kindergarten’s everyday business, and responsibility for maintaining the garden lies with the children, who require minimal supervision from teachers. It is treated as the children’s garden: they decide what needs doing and what they would like to plant. This has meant that children are constantly and enthusiastically working in the garden: planting, weeding, watering and checking for pests. They use modified tools (e.g., shovels, rakes, trowels and brooms) so that even the smaller ones can be part of the maintenance. They also grow seeds inside to plant out in the garden, and visit the garden centre to choose new plants when required.

There is strong ongoing support from the Board (the garden was the largest single item of expenditure from their operational funding for some time).

## TEACHING AND LEARNING IN AND AROUND THE GARDEN

By linking the garden to all learning areas at Casa Nova, the garden is not seen as a stand-alone project, but as being at the heart of the kindergarten’s learning environment. Teachers regularly discuss with each other about how they can maximise use of the garden as a core element of the kindergarten’s everyday activities.

### LINKING THE GARDEN WITH THE ECE CURRICULUM

Casa Nova’s edible garden has offered children formal curriculum-based opportunities for learning that are many and varied. The ways in which children learn in and around the garden align well with the Early Childhood Curriculum (Te Whāriki) and its five learning strands: Wellbeing, Belonging, Contribution, Communication and Exploration. The ways in which the garden has been linked to these strands are further discussed below.

**Wellbeing:** Te Whāriki emphasises the importance of nurturing the health and wellbeing of children in both a physical, emotional and spiritual sense. As mentioned elsewhere, the garden has proven particularly useful for promoting healthy eating at the kindergarten. The garden (and the orchard) is utilised as a context in which children can grow, cook/prepare and eat the vegetables (and fruit) discussed at mat time using ‘flashcards’. The activities taking place in and around the garden (e.g., using knives, following recipes, measuring the height of plants and counting out/spacing seeds) are used for developing confidence and skills amongst the children.

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<sup>24</sup> Mission-On is an interagency campaign, aimed at improving nutritional intake and increase physical activity amongst young New Zealanders. It is co-ordinated by SPARC in partnership with the Ministry of Health and the Ministry of Education, and with support from the Ministry of Youth Development

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**Belonging:** In terms of this strand of the curriculum, the overarching goal is to ensure that children and their families feel a sense of belonging with the ECE service environment. At Casa Nova, the garden is used as a means to bring children, teachers and family/whānau together by making it something all can feel a part of, e.g., through allowing children to take responsibility and ownership; inviting family members to help cook the produce (and asking parents to cook things from their countries/cultures); sending produce and seedlings home; and requesting support and donations from the community. Excursions into the wider community have also been linked to the garden, including visiting the local garden centre in supervised groups and choosing suitable seedlings after asking advice from the garden centre staff.

**Contribution:** This part of the curriculum specifies ECE services responsibility in providing equitable learning opportunities and to value children's contribution. The Casa Nova garden has been utilised by teachers to: engage with children who don't speak English/and or who don't communicate effectively orally; offer children opportunities to take a lead/part in planning and decision making (e.g., what and when to plant and what method to use); encourage children to listen to and respect each others' ideas and suggestions; allow for older children to help younger ones; and encourage children to share experiences and knowledge.

**Communication:** In terms of the fourth strand of Te Whāriki, children are expected to develop verbal and non verbal communication skills, an appreciation for stories and symbols from their own and other cultures and to find ways to be creative and expressive. For this purpose, the garden has been used in literacy and art (e.g., reading information on the notice board and books about plants from the pre-school library; writing plant names on signs/labels and decorating them); te reo (e.g., learning names of food in Māori by talking about kai and using the Kai Pack 'He aha tēnei?'); and for exploring Māori traditions (e.g., celebrating and discussing Matariki). The garden is also used to encourage children to work collaboratively (e.g., taking turns, listening to each other).

**Exploration:** The last strand of the ECE curriculum specifies that children learn through exploration. The garden at Casa Nova is constantly utilised for exploration, through informal exploration of plants and insects, but also through scientific experiments (e.g., to avoid breaking punnets for planting seedlings when making drainage holes, they tested the theory of piercing it with a nail heated by a candle) and for developing working theories (e.g., in looking at the difference between growing seedlings inside and outside, children developed the theory that the inside plants would grow faster because it is warmer).

## IMPACTS

Casa Nova's edible garden has impacted in a range of ways on the kindergarten community. The following paragraphs illustrate this and indicate (in the sub-headings) where these impacts link with the expected outcomes of the ECE curriculum and the five learning strands discussed above.

### LEARNING GARDENING SKILLS AND RECOGNISING PLANTS (BELONGING, CONTRIBUTION, EXPLORATION)

Even at such a young age, there is evidence that children are receiving educational benefit from participating in activities in and around the garden. Thanks to their hands-on experience in the garden, children could describe the many practical gardening skills they had acquired, such as growing plants from seed; preparing the ground by digging, turning and raking the soil; transplanting (e.g., loosening the roots, putting the plant in the hole and carefully pushing soil around it); protecting plants from pests; composting (e.g., that it is intended for food scraps and grass clippings only); and harvesting (e.g., digging up root crops and picking other vegetables and fruit). They also indicated knowing what plants need to survive, such as "*water so they don't die*", and "*sun so that they grow*".

Parents confirmed that children had learnt a range of skills, such as how to prepare soil for planting; the benefits of compost and worms in improving soil quality; the importance of not over-watering; the amount of work involved in planting and harvesting; and how the garden can be an ideal source of food for pets like guinea pigs and rabbits.

Children are learning to recognise the vegetables and fruit they are growing, tending and harvesting. Consequently, they could identify over ten varieties of vegetables and herbs, and about six types of fruit. This is in contrast to the head teacher's memories of when "*many of the children had no idea what a carrot with the top still on looked like*".

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#### INCREASED AWARENESS OF THE BENEFITS OF HEALTHY EATING (WELLBEING, EXPLORATION)

Casa Nova children's awareness of the importance of eating fresh, healthy food is strongly influenced by their enjoyment in growing, picking, cooking and then eating their own produce. This is in turn reinforced on an everyday basis by adults modelling healthy eating practices and by discussions at 'mat time', so that a healthy eating culture is highly "*visible and everyone is made aware*" (Teacher).

Children were able to articulate how important it is to eat healthily with comments such as: "*milk makes you grow strong and tall like your mum and dad*"; "*vegetables are healthy for you*" and "*they help you grow*". Teachers reported that since the garden was established very few children refuse to try new food, which parents reiterated, adding that they now also eat more fruit and vegetables. As well as children's awareness of the nutritional benefits of fresh food, their awareness of the origins of food has also increased due to structured activities in and around the garden. Parents confirmed this, commenting that children now know that food doesn't just "*come from the freezer*".

#### IMPROVED COOKING AND FOOD PREPARATION SKILLS (WELLBEING, CONTRIBUTION)

Through active participation in the preparation and cooking of meals at the kindergarten, children have acquired practical knowledge and skills in this area too. They listed a range of foods they had made incorporating produce from the garden, such as sandwiches, burgers, roast potatoes, apple and pear muffins (using fruit from the kindergarten orchard); pudding (e.g., apple crumble); and juice (e.g., from pears).

Among the skills they have learnt in preparing food is the safe use of knives, a practice strengthened by children being given responsibility to use sharp knives so that they learn how to handle them carefully. They also demonstrated knowledge of hygiene and food safety.

*"Don't lick knives, and take care not to cut yourself by holding with both hands on top"* (Child).

*"We wash our hands before cooking and then we put sanitiser on"* (Child).

#### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES (COMMUNICATION, CONTRIBUTION, WELLBEING)

According to teachers, taking responsibility in the garden and developing 'working theories' about growing are contributing to children caring - for themselves and others, as well as for nature and the environment. This was also mentioned by one mother who commented that the garden offers opportunities for children to "*learn about life and death, growing, and caring for resources*".

Independent activity had reportedly built perseverance and confidence for children to make decisions on their own, while working in groups has made them more aware of people around them and subsequently to share, help each other and take turns. Similarly, as well as fostering self-esteem, one mother expressed the belief that gardening has encouraged the development of a range of important personal traits in the children: participation, patience, persistence, independence and knowing "*they can make something happen*" through individual and collective effort. One teacher believed that as a result of the garden children are developing skills for life:

*"The garden provides a great opportunity to re-establish in kids the habits and skills of self-sufficiency from the past which have been lost, now that everything is in a packet. In this way children are learning that you can grow and make your own food and that you don't have to buy it. It also tastes better!"*

#### SENSE OF BELONGING TO, AND PRIDE IN, THE KINDERGARTEN (COMMUNICATION, BELONGING, WELLBEING)

By providing the opportunity to work together to realise the rewards of their labour, the garden has fostered a sense of pride and belonging in the children. According to the head teacher, "*it's theirs and they give heaps back*". The children now show "*more respect and love*" and "*are very proud and show this off excitedly*". Equally, cooking with food they've grown "*gives us [everyone at the kindergarten] a real sense of belonging and achievement*".

Other teachers as well as parents were equally enthusiastic about the positive influence of the garden. Teachers indicated that it has been a catalyst for new directions for the kindergarten, such as providing lunch. Parents commented how much their children talked about their love of the garden and that it was

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*“a creative part of the life of the kindy”*. One mother reported both her sons now like growing things and get excited about the garden, often saying to her, *“Look what we’ve done today”*. Two mothers indicated they made a deliberate choice to send their children to Casa Nova specifically because of the garden.

Parents commented that the kindy garden was a social gathering place, a focal point for the community (*“like a village”*), and reported that other ECE services visited the garden to see what had been accomplished. One of the teachers also reflected on this...

*“Our garden has become a popular discussion point and attraction to many whānau, community members and people come from afar to visit, to see what we do and how we do it”*.

#### IMPROVED RELATIONSHIPS WITH CHALLENGING STUDENTS

The garden at the Casa Nova was widely viewed as an effective way of engaging children who struggle to maintain attention in the classroom environment. According to one teacher, the garden is a useful *“behaviour management tool”*, and she has seen *“a huge shift in attitudes and behaviour”* thanks to the garden. One example was cited of one boy, who was particularly difficult to manage when he started at the kindergarten. He had a screaming tantrum for hours when told there was only fruit to eat but after some time, and him getting involved in the garden, he eats anything and shows own initiative to try new things. The dramatic change in his behaviour came about largely from the positive attention he got from working in the garden, as well as the pride in what he accomplished and the opportunities it allowed for him to share his knowledge: *“He’s becoming a leader. He’s a really nice kid now and loves the garden”* (Teacher).

#### COMMUNITY ENGAGEMENT IN CASA NOVA’S GARDEN

The kindergarten’s linkages with parents, whānau and the wider community as well as health and wellbeing have been greatly enhanced as a result of their having a garden. Examples of practices introduced (and which are reinforced by the garden include):

- Holding a ‘lunchbox discussion’ with parents every Thursday, where they give out certificates for healthy lunchboxes;
- Informal chats, e.g., asking parents what they consider healthy food within their culture (to understand why they send children with a particular food);
- Sending things home, such as surplus cooked food, and vegetables they have grown; and
- Making a cookbook and giving this to parents/families.

Examples of engagement from the community have included:

- Mothers contributing their time to help prepare food at the kindergarten using produce from the garden (one mother also made beetroot and carrot relish which children took home);
- Involvement in preparing ‘Cultural lunches’, featuring food from different families’ backgrounds. Sometimes food is provided by the parents: e.g., an American mum made baked pancakes, and a Malaysian mother has sent in dishes such as battered bananas and samosa;
- The retired next-door neighbour contributing to the development and maintenance of the garden (e.g., by giving plants, providing children with advice, watering the garden over summer, etc.);
- Parents accompanying the children on their visits to the garden centre;
- Parents giving garden/orchard related gifts when their children leave the centre;
- The local nursery giving discounts on plants and donating seedlings; and
- A local expert providing advice about establishing an orchard.

#### IMPACTS OF THE GARDEN ON THE HOME ENVIRONMENT

The kindergarten has actively sought to transfer the benefits of growing and eating healthy food into the home environment. The head teacher reported that although not all parents have changed, many have taken to heart the healthy eating message and made an effort to send their children to kindergarten with healthy food.

Teachers reported that parents often ask for recipes and express amazement at how many vegetables are served, and willingly eaten, by children. Parents reported now having fewer problems encouraging their children to eat vegetables at home, as well as being more aware of healthy food themselves.

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As a particularly poignant illustration of this, one teacher told the story of one boy who, after being involved in the garden, proudly took home a pumpkin grown at the kindergarten for his mother to make soup with. Having recently immigrated from the Pacific, pumpkin soup was not something the mother knew how to make and, although embarrassed, she eventually plucked up the courage to ask at the kindergarten what she should do. She was given the recipe and she subsequently made pumpkin soup once a week which the family of seven now loves.

Children reported that as a result of their excitement about gardening they have started persuading their parents to start vegetable gardens (including their own patches in some cases); contributing to maintaining existing gardens, by doing chores such as planting seeds and seedlings, raking, weeding, and harvesting; helping with preparing and cooking meals; accompanying parents to the garden centre and helping to choose plants; and asking parents to buy vegetables at the supermarket that they have grown at kindergarten.

## CHALLENGES

The most challenging aspect in relation to Casa Nova's edible garden was reportedly the difficulty the kindergarten faces in maintaining healthy attitudes and behaviours in children and their parents. Teachers pointed out that there is a lack of awareness in the local community about the importance of healthy eating and that it is hard for parents because food is often pre-packed – and healthy options are expensive. There was also concern that other education settings in the area did not appear to share the same commitment to healthy eating.

Challenges mentioned by staff in relation to practical aspects of the garden included:

- Limited space to increase the capacity of the garden;
- White butterflies and caterpillars; and
- Over-watering (adults cannot watch the children all the time to limit their enthusiasm for watering).

## SUSTAINABILITY AND FUTURE DIRECTIONS

Several success factors were identified in the approach Casa Nova Kindergarten is taking to ensure the long-term viability of its garden. The most important success factor for the garden was being part of their long-term strategic vision and not merely a one-off initiative. Others included:

- A recognition of both the health and educational benefits of the garden;
- Maintaining strong linkages and knowledge transfer between the kindergarten and the home;
- Access to external support and guidance, e.g., the neighbour, garden centre, and Rotary Club; and
- A 'succession plan' ensuring that if the head teacher, who is currently driving the project, were to leave there would be provision for someone else to take it over.

With the kindergarten redesigning its playground, they intend to take the opportunity to increase the impact of the garden on their community. For example, they plan to extend the garden; move the fruit trees from the side of the kindergarten into the main playground area; and install a glass house and planter boxes, to maximise space and the growing season. There are also plans to increase the cultural component of garden-related curriculum activities.

The head teacher believes that if Nutrition Funding were still available, taking the garden to a new level would be made easier, for example she would like to provide a healthy food course for parents, to give them ideas and show how easy it is to prepare. Nonetheless, it was evident that she will not give up her efforts to ensure the ongoing development and sustainability of the garden. One parent sums up the importance of the kindergarten garden in today's economic climate:

*"Being a lower socioeconomic area, children and families benefit from the availability of fresh, cheaper food. There is a big push again for growing food world-wide now because of the recession. The kindy provides an important counter-balance to our unhealthy food environment, including at home, as it exposes families to healthier food options and encourages healthy eating. It's a really cool thing to promote"*

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## EMBEDDING GARDENING INTO DAILY PRACTICE AT WAVERLEY KINDERGARTEN

### INTRODUCING WAVERLEY KINDERGARTEN

Waverley Kindergarten is located in suburban Invercargill. The kindergarten has a roll of approximately 65 students with a primarily Pākeha, middle class background. However, the diversity of the student population is increasing and the kindergarten now has a small number of children whose first language is not English. The kindergarten feeds into eight different schools in the area, with Decile ratings of 8 to 9. Recently Waverley Kindergarten changed to whole-day sessions to better suit working parents.

Waverley Kindergarten encourages experiential learning across all that they do, and prioritises student participation. As stated in their philosophy, the kindergarten's aim is "to teach children how to think, not what to think", through "supportive and empowering relationships" and a strategy of "co-construction where teachers and children negotiate the learning based on children's interests, ideas, theories and questions". This means that the centre follows a holistic approach to learning within meaningful contexts where children's interests and investigations guide learning. Teachers use their interactions with children to challenge children and extend their higher level thinking strategies. Staff also strongly encourage children to develop responsibility for themselves, their peers and their environment.

During our two visits to the kindergarten, we interviewed the head teacher, five teachers and four parents. In addition we had structured discussions with two groups of children (totalling 17), as well as informal conversations with other children.

### INTEGRATING HEALTH AND WELLBEING INTO EVERY DAY PRACTICE

Health and wellbeing has a high priority at Waverley Kindergarten. Nutrition is integrated into their everyday practice and is guided by the Southland Kindergarten Association's Food and Nutrition Policy. Included in the policy are: consultation with parents and whānau about the food brought in by the children; promotion of food that meets national food and nutrition guidelines; and opportunities for children and parents/whānau to learn about nutrition and food safety. Parents are informed of these guidelines as part of a written handout which is distributed when children start at the kindergarten. Within this context – and of the overall learning approach of the centre described above, Waverley's garden is considered a useful means to further enhance health and wellbeing amongst their children.

### GARDENING AT WAVERLEY KINDERGARTEN

#### ESTABLISHING THE GARDEN: UTILISING CHILDREN'S IDEAS AND LOCAL RESOURCES

Initial funding for the garden came about in 2008 through the HEHA Nutrition Fund. The timing was ideal for a number of reasons: there was an unused area in the playground considered suitable for a garden; the garden was seen as a way of supporting the kindergarten's focus on healthy eating; and teachers wished to extend the range of outdoor learning experiences offered to children. In line with the kindergarten's approach to children leading decision-making around their learning, the application process included brainstorming ideas with children. Their ideas, along with their drawings, were incorporated in the application, and these included: why they should have a garden in the first place; where they could put the garden; and what they could plant (e.g., they suggested orange trees, potatoes, broccoli and pumpkin). Some children also pointed out the importance of self-sufficiency and ongoing sustainability in growing your own produce in the application...

*"If we used [the money] to buy fruit it would be a waste, cause if six children eat six bananas there are no bananas left".*

Once funding had been initiated in September 2008, teachers and children started visiting gardens in the community. They also visited the local nursery, where staff explained to teachers and children what vegetables would be best to plant at that particular time of the year. Teachers felt this was a good way to see how others had set up their gardens.

The grant helped fund garden boxes and a green house, which the local nursery supplied and installed. Due to the age of the children, it was deemed unsafe for them to participate so these were built outside



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the kindergarten's hours of operation. However, the work was recorded and played back to the children as a slideshow so that they could see the building process. Nursery staff came back during kindergarten hours to put the dirt in so the children could participate and watch.

Reflecting Waverley's experiential approach, children were encouraged to plant what they wanted, and both seeds and seedlings were bought, so that teachers and children could explore what technique worked best. Teachers gathered a lot of information at this initial stage, particularly from the internet and library, because not all of them had previous experience with gardening.

### **MAINTAINING THE GARDEN: A COLLECTIVE EFFORT**

To ensure the garden is not seen as a stand-alone project, ongoing funding of the garden is now provided through the kindergarten's operations budget. To embed the garden within kindergarten practice, there is a collective approach to garden maintenance. Discussions about things that might be good to do in the garden are initiated by children or teachers when there is a need, question or interest. Children who are interested offer to help. The amount of time spent in the garden on a particular day depends on the teacher on outdoor duty, the weather and the season.

Although maintenance of the garden is largely teacher-initiated, staff noted that the responsibility for the garden lies with the children. Because the garden is situated right next to the playground, children come and go as they like, weed and water throughout the day.

Children also take part in the ongoing planning of the garden. For example, before things for the garden are purchased, they will discuss and draw what they want to buy. Over holidays, parents roster themselves on to water the garden, a system that appears to be working well.

### **TEACHING AND LEARNING IN AND AROUND THE GARDEN**

Parents indicated that their children are very enthusiastic about the garden, and that teachers are good at utilising the garden and directing activities towards things that each child is interested in. The holistic approach at Waverley ensures that learning taking place in and around the garden is seen as another area of the curriculum, and the garden is regarded as supporting context-based learning, where *“teaching opportunities are endless”* (Teacher).

### **LINKING THE GARDEN TO THE CURRICULUM**

Staff at Waverley have found many ways in which to link their garden to the five strands of the Early Childhood Curriculum (Te Whāriki), i.e.; Wellbeing, Belonging (where gardening is mentioned specifically), Contribution, Communication and Exploration. This is further detailed below.

**Wellbeing:** Te Whāriki emphasises the importance of nurturing the health and wellbeing of children in both a physical, emotional and spiritual sense. The garden at Waverley has been utilised for this purpose by providing a setting in which to: contextualise information about healthy eating (e.g., discussing benefits of growing own vegetables; and the nutritional benefits of eating fruit and vegetables); develop and strengthen confidence and skills in a range of areas (e.g., gardening; numeracy through counting vegetables as they sprout, calculating how many seeds or seedlings to plant to give them the produce that they need); take part in decision making (e.g., deciding what to plant); and to experience and deal with change (i.e., in the growing produce) and surprising outcomes (e.g., when things don't go as planned).

**Belonging:** In terms of this strand of the curriculum, the overarching goal is to ensure that children and their families feel a sense of belonging with the ECE service environment. This is being realised at Waverley through allowing children to take ownership and responsibility for the garden. The garden also provides a setting in which children can learn about boundaries and acceptable behaviour...

*“They know it's theirs and that they are responsible for it – from beginning to end. If someone pulls something out, others will tell them off”* (Teacher).

Additionally, the garden is utilised to link with the community by providing opportunities for families to contribute (e.g., through requests to donate seedlings) and as a conversation topic between children, families and teachers.

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**Contribution:** This part of the curriculum specifies ECE services responsibility in providing equitable learning opportunities and to value children's contribution. This is put in practice by encouraging all children to participate and do the things that interest them in relation to the garden...*"If kids want to know something they'll research the internet or books."* (Staff). Teachers also make a point of allowing for the children to take a lead in the planning of the garden and in solving challenging situations they come across (e.g., how to safely get up on a trailer to get its content of compost off). In addition they encourage children to listen to each others' ideas before collaboratively working out a plan for how to proceed with certain activities.

**Communication:** In terms of the fourth strand of Te Whāriki, children are expected to develop verbal and non verbal communication skills, an appreciation for stories and symbols from their own and other cultures and to find ways to be creative and expressive. The garden has been utilised for this purpose by getting children to write their names along with the plant name on signs for the garden; and drawing the particular vegetable on the signs; teaching the Māori names for vegetables and fruit; encouraging communication both in writing (e.g., to write about what they did in the garden) and orally (e.g., as mentioned above, through collaborative problem solving).

**Exploration:** The last strand of the ECE curriculum specifies that children learn through exploration. As mentioned elsewhere, the exploratory factor plays an important role in the ways in which teaching is carried out at Waverley and the garden is considered by staff to provide ample opportunities for this to occur. For example, staff encourages children to undertake scientific experiments (e.g., using crushed egg shells to deter snails, examining seeds in tomatoes before planting them, painting stones red to mimic ripe berries and thereby deter birds, and experimenting with growing inside compared to the greenhouse). Even when teachers know that the children's ideas are not going to work (e.g., planting orange seeds in the Southland climate), failure is considered an effective way to learn. Parents, too, appreciate the exploration opportunities the garden offers their children...

*"It's that whole thing about growth and change: just seeing life. The garden offers so many opportunities to explore things they don't know about".*

## IMPACTS

Through the activities listed above, staff and parents consider Waverley Kindergarten's edible garden has become an effective learning tool. Specific impacts related to the garden are detailed in the following sections. Many of these show direct linkages to the five learning strands of Te Whāriki – and the outcomes expected to come from these (as indicated in the sub-headings).

### LEARNING ABOUT GARDENING AND THE NATURAL WORLD (BELONGING, CONTRIBUTION, EXPLORATION)

From the many opportunities to discuss and participate in garden-related activities, it was noted by staff and parents, and observed through talking to children, that children had gained gardening knowledge and skills. Children have learnt how long it takes to grow certain plants, which ones might grow faster and why, and how to protect plants from pests. In the process, children are learning about the 'circle of life': the interrelationship between different parts of the environment (e.g., through waste management), including the importance of the natural environment on their own wellbeing. Learning was reinforced early on by an excursion to a large, established garden where children learnt about the different developmental stages of plants and were given the opportunity to experiment with manure.

In our discussions with children, they demonstrated extensive knowledge about gardening in general, and about plants requirements, particularly their need for sun and light, about how to plant, and the importance of watering, weeding and thinning plants. For example, one girl revealed her experience in this regard, pointing out: *"There's too many growing here...you have to pull some out so they can grow"*. Parents had also noticed their children were knowledgeable about gardening, for example, a mother reported being told by her son: *"When you plant, you press the soil around the plants and water them"*.

Children could name a range of vegetables that they were growing in the garden (e.g., radishes, peppers, silver beet, broccoli, lettuce and corn) and they were also able to identify vegetables from looking at pictures. In addition, some of the children mentioned what they had done with specific plants, e.g., peas had been watered and staked and corn had been planted in the greenhouse. A few students talked about the compost, and were eager to explain how it worked. In the words of one girl:

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*“This is the Little Rotter. We put scraps in here and it turns into black stuff when it rots. We put it in the garden so we can help the vegetables grow. You have to water them [the vegetables] every day ...but if you miss one day it’s ok”*

Teachers pointed out that the learning is not limited to the students; they too are gaining new knowledge and skills. For example, none of the staff had any previous experience with letting plants go to seed, but they have now learnt this is a sustainable way of keeping the garden going.

#### GREATER AWARENESS OF BENEFITS OF HEALTHY EATING AND THE ORIGINS OF FOOD (WELLBEING, EXPLORATION, BELONGING)

As well as the learning about recycling and sustainable use of the environment, the benefits of the garden reported by the Head Teacher and parents included that having a garden encourages healthy eating in the children. Children were able to articulate that vegetables “*keep you nice and healthy*”; are “*good for your brain*”; make you “*run faster and have more energy*”; and make you “*grow like a giant*”.

Teachers and parents noted that children were learning about the connection between eating and growing. Prior to having the garden some children thought vegetables came from the supermarket. Through planting and harvesting their own food, and after visiting fruit and vegetable shops and supermarkets (where children watched fruit and vegetables come in on the back in trucks), they are much more aware of where food comes from.

Parents and teachers also noted that, by growing their own food in the garden, then preparing and eating it, children are also encouraged to learn to like and try new foods. As one parent noted:

*“Sometimes you might offer them things at home and be resisted. But then they realise that everyone else at kindy liked it. So they’ll give it a go...”*

We also observed how the garden was encouraging a wider range of eating behaviours in children. On our first visit, one child declared that he didn’t like green stuff. He then ate three of the ‘Queens Park Pies’ the children had made. These bread-based quiches include greens such as broccoli, spinach and parsley. (The recipe and name was made up by the children and refers to Queens Park in Invercargill).

#### IMPROVED COOKING AND FOOD PREPARATION SKILLS (WELLBEING, CONTRIBUTION)

The garden has provided the kindergarten with increased opportunities for cooking, whereby children are learning about various aspects of food preparation. Children regularly check the garden to determine which produce is ready to harvest, and discuss what they can do with it. To capture this learning, a group of students made a ‘cooking show’, where a girl was filmed exploring the garden for ingredients to make a vegetable pizza, which she then prepared in front of the camera. The girl had herself initiated this idea.

Observations made while students were making the Queens Park Pies suggest that increased opportunities to cook support an increase in children’s awareness and practice of hygiene and food safety. This was demonstrated by children who came to help being reminded by their peers to wash their hands first. When asked about the correct ways of using knives, children articulated the importance of being careful, and not waving the knife around, “when cutting cheese and bread you have to try not to cut yourself...be careful”.

#### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES (COMMUNICATION, WELLBEING, CONTRIBUTION)

Teachers at Waverley confirmed that the garden reinforces the kindergarten’s philosophy of providing opportunities for meaningful learning and encouraging children to take responsibility for their own learning. They reported that it is “*good problem-solving and learning to give things a go*”, and that in the garden children are “*calm, hands-on and purposeful*”. They reported incidents where children have had to learn communication, cooperation and negotiation skills, e.g., sharing and listening to others’ ideas, and compromising. Furthermore, compared to all other activities, they are having to learn “*effort over time*”, i.e., children have to persevere, knowing that “*there is a reward at the end*”. Teachers also believe that, for children who are particularly interested, an awareness of and familiarity with gardening has been sparked, which they are sure will continue.

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Similarly, parents noted that participating in kindergarten-based garden activities was a good way of setting children up for sustainable healthy behaviours. Especially for the urban children it was seen as beneficial as they get to experience things they might not otherwise experience (e.g., pulling a carrot out of the ground and eating it)...

*“It’s great to have the healthy living concept promoted at such an early age. If you start with three year olds then it’s already part of what they do when they go to school”.*

#### INCREASED SENSE OF BELONGING AND PRIDE IN THE KINDERGARTEN (COMMUNICATION, WELLBEING)

Overall, children at the kindergarten appeared to be very excited about their garden. Teachers and parents reflected positively on the children’s pride, attributing this to the fact that the garden belongs to them. Parents commented: *“It’s that whole thing of ownership”*, and *“[my son] used to think it wasn’t cool to garden, but now he does”*. For teachers, too, the garden has allowed for a closer connection to the kindergarten, and for bonding with each other, because it offers a sense of belonging and pride.

#### THE KINDY GARDEN: A TOOL FOR LINKING WITH THE COMMUNITY?

The Early Childhood Curriculum (Te Whāriki) states (p. 42) that *“the wider world of family and community is an integral part of the early childhood curriculum”*. Teachers at Waverley Kindergarten indicated the garden has acted as a link with the home (i.e., parents and whānau) and the wider community, e.g., surplus plants are sent home and teachers discuss the garden and healthy food with parents when children are dropped off and picked up. They pointed out that the *“the garden grabs parents’ attention”* and the wider community is increasingly taking notice of the garden as they walk past.

Sharing is deemed important by the kindergarten, and families often contribute by bringing in seedlings. Ways of engaging parents in the garden have included them helping to prepare morning tea, and maintaining the garden over holidays (in return for picking what was ready). The kindergarten has also received advice and support from a local nursery, the HEHA district coordinator and the Heart Foundation health promoter.

#### TWO-WAY TRANSFER OF BENEFITS BETWEEN THE KINDERGARTEN AND HOME (CONTRIBUTION)

The parents we interviewed already had gardens at home. But they noted that, although their children had helped out in the garden in the past, they appear much more interested since working in the kindy garden, which they constantly talked about. Parents noted that this interest had led them to start new garden plots or grow additional vegetables in pots. Other benefits noted at home that have stemmed from the kindergarten include: parents getting gardening tips from children and hearing about the food children have prepared using garden produce; using recipes from kindy at home; and receiving excess produce and seedlings from the kindergarten.

Ideas and knowledge about gardening are also being transferred from home to the kindergarten. Because children are encouraged to share their home experiences related to gardening, teachers noted that students often enhance the learning of their peers through sharing what their parents and grandparents do in the garden, and the practical skills they have learnt, including trying certain things which then failed to work. One girl’s experience sparked the idea of setting up a tunnel house at kindergarten:

*“We need a tunnel house, it’s a good idea ‘cause you can grow lots of things. I have one at home, so I know what to do. I’m an expert. There is a wee hole at the top to let air inside”*

#### CHALLENGES

There were few challenges reported by Waverley staff. Those that were mentioned included lack of space to do all they want to do; the shady position of the glass house leading to problems with bugs and fungus; and a fruit tree dying from not being planted correctly.

#### SUSTAINABILITY AND FUTURE DIRECTIONS

At Waverley Kindergarten, the garden serves multiple purposes. It is seen as a tool for learning, it has allowed for bonding with each other, as well as with the kindergarten itself, and it has enabled the kindergarten to provide healthy food for their students. According to teachers, the best thing about the

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garden is that it provides them with fresh produce, particularly in summer “*when you can just go and harvest, wash and put stuff on the morning tea table*”.

In the future staff at Waverley Kindergarten would like to expand the garden so that food provision can be increased. Other plans to develop the garden include a re-design of one part of the playground, to make it into an interactive space with sensory plants, herbs, berries and vegetables; and to learn more about organic gardening. Staff will continue to involve the children in planning when possible, and explore opportunities for advice and guidance, for example, from the local Kindergarten Association as well as other experts in the community. They would also like to link with schools in the neighbourhood, in order to learn from their experiences.

In sum, Waverley Kindergarten’s commitment to child-centred learning, as well as health and wellbeing, has meant that their edible garden has been easily embedded in its philosophy and practice. Through dedicated ongoing funding, and support from all levels of the kindergarten (from students to management), the garden provides an environment in which context-based learning can take place and in which the expected outcomes of Te Whāriki can be realised. This fundamental commitment from the different parties involved has led to clear health and education benefits for the children, which has given staff at the kindergarten confidence that the garden will remain as a permanent part of their environment.

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## HIGHFIELD SCHOOL: A STUDENT-LED ENTREPRENEURIAL APPROACH TO GARDENING

### INTRODUCING HIGHFIELD PRIMARY SCHOOL

Highfield is a Full Primary School (Year 1 – 8) with a roll of approximately 280 students, most of whom are Pākeha. The Māori roll is approximately 10%. It has a Decile rating of 7, with a stable school community made up of families where generally both parents work in a wide range of employment situations: from professional/managerial to trades.

Staff reported that the parent community values education highly and actively supports the school – and that there is an equally strong culture of positive, pro-active attitudes to learning amongst students. The school promotes learning through ‘intrinsic’ motivation, e.g., for students to attribute their educational results to internal factors that they can control, through their own effort and setting effective goals for themselves. This philosophy is reflected in the school Vision “*To be the best we can – If it’s to be, it’s up to me*”; and its Charter, which includes nine characteristics to define Highfield Learners, i.e., resilient, curious, caring, motivated, proud, powerful communicators and honest. The school strives to listen to the ‘student voice’ which it facilitates through formal structures and processes, such as the school council and student health team, as well as providing opportunities for students to guide the school’s approach to teaching and learning (e.g., through consultation).

During our two visits to the school, we interviewed the Principal, the edible gardens lead teacher, four other teachers and six parents and whānau. We spoke to members of the student garden group, the wider student health team and other students – totalling 29. We also spoke informally to other teachers.

### INTEGRATING HEALTH AND WELLBEING INTO EVERYDAY PRACTICE

Highfield School is a Health Promoting School (HPS). In this region, HPS support is provided through a partnership between the local District Health Board (DHB) and Community and Public Health through the Wellbeing and Vitality in Education (WAVE) initiative.

The school’s main health and wellbeing focus is physical health. Examples of recreational activities provided by the school to encourage physical activity include offering team games and encouraging the use of skateboards and scooters. Support for promoting healthy eating has included the incorporation of ‘state of the art’ cooking facilities in the recently built hall and gymnasium, which complements their garden and orchard. The school recycles all its rubbish and composts organic waste.

Students’ emotional wellbeing is supported by the school’s commitment to restorative justice and conflict resolution through initiatives such as Kiwi Can<sup>25</sup>; Cool Schools (peer mediation); and Police programmes, e.g., Keeping Ourselves Safe (child abuse prevention education) and Drug Abuse Resistance Education (DARE).

### GARDENING AT HIGHFIELD SCHOOL

#### ESTABLISHING THE GARDEN

Nutrition Funding was granted for the establishment of the gardens in early 2008 which quickly gained momentum. Initially, Year 5 and 6 students were responsible for developing the garden, which was a converted flowerbed. Classes had one area each which they were responsible for. Over time however, responsibility for the garden evolved to the ‘Friday garden club’ as an elective activity, so that people responsible had a genuine interest in the garden and teachers who may not have been interested did not have to lead these activities. In 2009, responsibility for the garden changed again. This time the student

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<sup>25</sup> Kiwi Can is a Government run foundation programme for developing life skills and values. It is delivered in Primary and Intermediate schools.

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health team took on the role, but the high numbers of children interested in being part of the health team prompted the decision to divide the team into subgroups including a Garden Group.<sup>26</sup>

As the project grew, the Garden Group contacted the local Rotary Club to source extra funding to extend the garden. They gave a presentation to Rotary Club members, resulting in them securing funding. The garden Garden Group then contacted a local landscaping business to get quotes for soil (one student made the call with a speakerphone so everyone else could hear). So impressed were the staff with the children's approach that the company decided to donate the soil and compost.

A wide range of student-initiated activities were undertaken during the garden's developmental stages. The students visited parents' and grandparents' gardens, as well as the local nursery, to guide their decisions about what to grow. They shared their 'research' and successes via the newsletter and slide show presentations, and subsequently started an orchard which they fund-raised for, enabling them to purchase apple, nectarine, peach and feijoa trees.

#### STUDENT LED MAINTENANCE OF THE GARDEN

The Garden Group's purpose is *'to grow, to harvest, to prepare, to share'* and is very much student-led and highly structured in planning and implementing garden-related activities. The group is divided into sub groups with separate responsibilities, namely: garden maintenance; compost bin maintenance; reporters/publicity (which writes regular articles about the school's garden activities in the school's newsletter and in local media); researchers; and income generation (which includes making funding applications and getting quotes for materials). Students have attended annual focus days and workshops (e.g., 'Sow the Seeds') organised by WAVE.

Members of the Garden Group undertake the full range of tasks necessary to develop and maintain the garden through the seasons, from preparing the soil, planting, watering and weeding, through to harvesting the produce when ready. In the main, maintenance of the garden takes place during lunch time. Ongoing decisions about what to plant are made by the wider health team, who then organise buying the seedlings from the nursery. The new entrants class has also grown vegetables from seed which have been planted out in the garden (or taken home). Team members record their progress in a photographic diary.

High level oversight of the garden – and the Garden Group sits with the garden lead teacher. More hands on support however is provided by a Junior teacher and more recently, two parent volunteers (who also work as teacher aides). There has also been support from the community, in the form of watering and weeding during the summer holidays (the school offered parents who helped out access to the swimming pool).

According to the teachers and volunteers involved in the garden, students drive the garden in the direction they want it to go. They are reportedly driven and entrepreneurial and require very little staff input. As examples of their pro-active way of working, students have fundraised in a variety of ways, e.g., through selling produce and food made from the produce – activities which have involved marketing, budgeting, promoting, communicating, networking and business enterprise.

#### TEACHING AND LEARNING IN AND AROUND THE GARDEN

Recent developments in Highfield's teaching and learning approaches are providing opportunities to link with and enhance garden activities. They have introduced an inquiry learning approach and integrated whole-year themes at the school, which fit well with the importance placed by the school on contextual, purposeful and meaningful learning.

*"The garden offers a place where students can question, do, and see an outcome... learning is more meaningful if you can see an outcome"* (Staff).

The whole-year theme of sustainability in 2009 covered term topics such as environmental sustainability, electricity and water management. Linkages with the garden included students raising money for fruit trees

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<sup>26</sup> The student health team is divided into three sub-groups: an Executive group including chairpersons and secretaries; a Gardening Group, which is responsible for environmental issues around the school; and a Nutrition/ Physical Activity group, responsible for promoting nutrition and sports activities.

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and exploring how to get water to their new orchard; and harvesting and selling produce to support self-sufficiency of the project. As part of a term focus in 2010 on 'Kiwiana', students studied and talked about TV gardening programmes.

#### EXPLORATORY LEARNING

Highfield's edible garden has offered a number of opportunities for explorative learning. Examples include: observing the life cycle of plants; comparing how plants grow indoors in pots with plants in the garden; growing plants in yoghurt containers then planting them out into the garden; holding a competition to see who grew the tallest beanstalk; observing the benefits of companion planting, such as swan plants to attract monarch butterflies; and learning about new varieties of vegetables. In addition, class teachers take out groups of students to look at changes in the garden, and teacher-aides in the special needs unit routinely take 'nurture groups' into the garden to show them what vegetables are growing and ask for ideas about how to use them and what else to plant.

The fruit, vegetables and herbs which students reported growing included common varieties, such as carrots, silver beet, potatoes, lettuce, beetroot, mint, parsley, chives, strawberries, plus others less widely grown, e.g., garlic, rhubarb and a bay (laurel) tree, which they were either unfamiliar with or hadn't grown before.

According to students in the garden group, using the garden makes learning "*fun*" and "*hands-on*". Of all garden-related activities undertaken, students reported they most liked harvesting, preparing and eating the produce.

#### LINKING THE GARDEN TO PARTICULAR SUBJECT AREAS

The garden lead teacher has made good use of the garden for curricular activities – demonstrating how the garden can be linked to a range of subjects. Her and her students have used the garden for Maths by measuring the garden perimeter, calculating the volume of soil needed to fill it, and measuring cooking ingredients; and Language by writing poetry about the garden, maintaining a diary with photographs describing the cycle of the garden, writing recipes and gardening ideas for the newsletter, as well as thank-you letters.

In the special needs class, for which basing the curriculum around the needs of the students is especially important, the garden has provided a useful vehicle for purposeful learning tasks. Students have used magnifying glasses to study insects and have practised addition and subtraction while picking raspberries. Particular mention was made of individual special needs students using the garden as a learning tool, such as: one child sequentially arranged photos of herself picking, preparing and then cooking beans, and then writing captions for each; another was given the task of ringing a hardware store to order propagation kits, then he wrote to thank them.

Although the teaching staff interviewed at Highfield were of the opinion that the garden provides ample learning opportunities for students, they admitted it is not widely used for teaching across the school. This reflects the Principal and lead teacher's future aspirations for school-wide utilisation of the garden and better linkages between the garden and the classroom.

#### IMPACTS

##### LEARNING ABOUT GARDENING AND THE ENVIRONMENT

Students working in the garden have developed a range of skills and knowledge to suit the area's soil and climatic conditions. These include: ensuring plants survive in hard, clayey ground by adding compost to the soil and putting a layer of mulch on top to retain moisture; knowing the different conditions particular plants require, as well as the best time to plant them in relation to the seasons; and learning how to protect plants from wind and frost. They have also learnt about growing organically and choosing not to use poisonous sprays, as "*chemicals may spread into the soil*" (Student). To raise awareness of all students in the edible garden, and encourage wider student learning, the student health team organised a bean-growing competition between classes in 2009.

Knowledge of composting, e.g., its biodynamics, benefits and the importance of separating out things like meat and plastic, was also well articulated by students in the garden group:



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*“Composting scraps and putting it on the garden helps the garden grow, it decomposes and nutrients come out. This means veggies grow better, and it’s better than throwing it into the landfill”.*

Students reported having researched that the most suitable way for them to recycle green waste at the school was to use the bokashi method, initially letting scraps sit for two weeks in buckets before digging the mixture into the garden. They also use a worm farm built by a student’s grandfather. They have established ‘Compost Awards’ to encourage classes to compost only food scraps.

#### INCREASED AWARENESS OF THE BENEFITS OF HEALTHY EATING

As a result of students’ involvement in the school garden, from growing, preparing and eating their own food, their awareness of where food comes from, and the benefits of eating fresh fruit and vegetables, has increased. They reported that (apart from tasting better) the benefits of food they have grown themselves included: having more nutrients, such as vitamins and natural sugar (compared to processed or fast food, which contains *“saturated fats which take ages to work off”*). Consequently, they indicated collectively that these nutrients *“helps you grow”, “is good for your bones”, and “stimulates your brain and makes you concentrate”*. In addition, they noted that fresh fruit and vegetables *“get rid of germs”, and “help if you are sick”*. Compared to ‘junk food’ fresh fruit and vegetables *“give you more energy and keep you going” and “fill you up so you’re not hungry afterwards”*.

Parents reported the positive influence of the school garden on their children’s willingness to try new foods. One mother commented... *“My son has been more open to trying vegetables he wouldn’t have tried before or hadn’t liked before”*. Another expressed surprise at hearing her son enjoyed eating certain vegetables, e.g., zucchini (used in cakes and fritters).

#### INCREASED OPPORTUNITIES FOR PHYSICAL EXERCISE

Teachers’ reports suggest students enjoy being involved in the garden because it is a different learning environment to the class room, it gets them outdoors and provides opportunities for physical exercise, e.g., digging, pushing the wheelbarrow, shovelling compost and breaking up turf. It was seen to be of particular benefit to the special needs students, in that it aids their motor coordination.

#### DEVELOPMENT OF SKILLS AROUND FOOD PREPARATION AND DISTRIBUTION

Having the school garden has greatly increased the school’s focus on cooking, and the recently built kitchen was designed to involve groups of students in preparing and cooking food. Children have made a wide range of meals using produce from their garden (e.g., pumpkin soup, fritters, hash browns, rhubarb and apple crumble, zucchini cake, as well as fruit juice and preserves, and at a school hāngi they used carrots and pumpkin from the garden). Decisions about what to cook using produce from the garden, and what ingredients they need to buy, are made collectively by the students themselves, who prepare and cook the food, and then share what they have made, either by giving it away, or by selling it to staff and students.

Students indicated the enjoyment derived from the opportunity to create their own dishes by adding vegetables from their garden to a base recipe. They demonstrated knowledge of the importance of hygiene and food safety, as their comments verify... *“CLEAN – COOK – COVER – CHILL”, “Use different cutting boards for different foods”, “Hold knives the right way, pass with the blade down and don’t run around”*.

#### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES

The Principal believes it is vital that the overall aim of the garden should be to gain life skills and meaningful learning, and there is widespread evidence that the garden has achieved this. Students indicated they would take the knowledge and skills they had learnt with them into high school. They also expressed a desire to involve juniors in the Garden Group, to inspire them at an early age.

The lead teacher has seen the *“bigger picture development”*, commenting that children working together on gardening tasks requires a lot of interaction, such as being aware of each other’s needs, talking and negotiating. She illustrated this with the example of how they worked out how to fill a wheelbarrow with soil without getting in each other’s way. She has also observed the leadership opportunities offered by the garden, allowing less academically able students to become leaders.

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The experiences and benefits of the garden, as identified by the Garden Group, link well with the expected characteristics of Highfield learners (as detailed in the school's Charter referred to above). These students reported that the garden has taught them: patience and not to give up (resilience); to respect the environment and people they work with (caring); to give things a go (motivation); how to communicate with other students, parents, teachers and outside organisations (communication); integrity (honesty). In addition it has encouraged them to think about how things grow and what is needed for things to grow (curiosity); and to be proud of the effort they put in – even if it doesn't work out the first time (pride). Parents agreed, observing how the garden had encouraged children to be responsible and committed to seeing things through to a conclusion... *"It's adding responsibility, not just putting seeds in the ground"*.

The garden appears to provide an effective way for children to achieve success. Examples of the entrepreneurial skills gained include: students routinely ringing businesses to get quotes for equipment, and bargaining; and the special needs student carrying out a 'business plan' by purchasing propagation kits, choosing seedlings, planting, caring for then selling the vegetables, and using the money earned to pay for the cost of the kits.

#### SENSE OF BELONGING TO, AND PRIDE IN, THE SCHOOL

The significance of the garden in the overall life of the school is demonstrated by its inclusion in the Highfield School Charter. Their vegetable garden is mentioned (by students) as one of the features of *'What makes Highfield School special'*. Some staff believed that garden-related activities have contributed to students' sense of belonging to the school, particularly for students who may struggle in the classroom setting as the garden provides a place where they can contribute with different types of skills (e.g., physical strength).

#### THE SCHOOL GARDEN: A TOOL FOR LINKING WITH THE COMMUNITY

Garden Group members noted that the garden was a good way for the school to enlist community support. The main avenue for engaging with the parents and families is the regular school news letter in which students provide information about garden related activities and may request support. Parents have donated seedlings and jars for preserves, bought produce and volunteered to help maintain the garden. It was noted that two families not previously involved with the school has offered support. Having the garden has also sparked interest and involvement by grandparents. One grandfather travelled 40 kilometres from Geraldine to help out in the garden. A neighbour has also assisted with watering the orchard.

Apart from parents and family, the garden group has linked in with a number of organisations to support their garden initiative, including: WAVE, Rotary, a local nursery (knowledge), a local landscaper and Mitre 10. Students have often been proactive in creating these links themselves by approaching the businesses and service clubs.

#### PRACTICES, ATTITUDES AND KNOWLEDGE TRANSFERRED TO AND FROM THE HOME ENVIRONMENT

Of the students interviewed, all reported being more interested in gardening as a result of the school garden. In fact, all but one indicated they have gardens at home. Some of these had either been newly created or extended as a result of their newfound interest in gardening. In addition, a large number of students reported having started their *own* gardens at home – to give them independence from their parents' garden agendas. Students indicated that they have used their experiences at school to good effect in a range of ways (e.g., to cover new leaves of potatoes, not to water too much, to remove and discard the outer leaves). Many have suggested to parents what to grow, and also what to cook (including using recipes from school). Students' comments demonstrate how they have influenced home gardening and eating practices:

*"We started weeding our garden at home because it was overgrown. Now we're starting a veggie patch so we can have healthier food"*.

*"Now we bake more with fruit and vegetables instead of making chocolate cake"*.

Parents reported similar examples of their children's enthusiasm for, and knowledge about, gardening being transferred home:

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*“We have a potato tower at home. Without the [school] garden we probably wouldn’t have thought about that”.*

Conversely, there are many keen gardeners amongst families attached to the school, and their ideas have been shared with the school (e.g., growing potatoes in hay in a black plastic bag, using newspaper to suppress weeds). One father had two classes come to look at his garden. They discussed a variety of vegetables, how to grow things and he gave them different ideas of how to grow corn.

## **CHALLENGES**

A number of challenges relating to the development of the school garden have been encountered, both practical and infrastructural. Practical issues which the school has had to address include placement of the orchard away from the main area of the school (because of the risk of wasps), making it difficult to water; maintenance over the summer holidays (for which help is sought from the school community in return for produce from the garden and the use of the school swimming pool); and to a lesser degree vandalism.

Of greater concern however, is the time and effort required to oversee ongoing development of the garden and that this cannot rest on one teacher alone. It was highlighted that despite students taking charge, there needs to be wider adult involvement to support them. Solutions have included requesting funding from WAVE for teacher release time to encourage more input from staff; and requesting support from parents.

## **SUSTAINABILITY AND FUTURE DIRECTIONS**

The undoubted strength of the model at Highfield School lies with the involvement of students. In particular, the ongoing leadership and commitment of the wider student health team and garden group has ensured the garden has evolved in a way that meets their needs, and it has offered them many opportunities to develop knowledge and skills, both practical and entrepreneurial. The garden has also been used to great effect to enhance the learning of special needs children.

The Principal is passionate about the garden and supports its expansion. He believes that for the garden to reach its full potential and become sustainable over the long term, discussion about its future is needed. Both he and the lead teacher have identified the following processes related to the garden for consideration:

- To integrate the garden into school-wide activity, so that it is “owned” by parents, all staff and all children. Possible ways to promote the garden as an integral part of the school and bring more people on board are for the lead teacher to share the supervision role with other adults; to invite more students to help out in the garden and kitchen; and for the student health team to present to the Home and School group.
- To strengthen its prominence in the school’s philosophy/culture of promoting healthy eating, and its connection to ‘Highfield Learners’.
- To incorporate the garden more widely across the teaching curriculum, so that all students see it being integrated into their learning, and for teachers to understand how, and to be given the resources, to utilise the garden. To achieve this, each class could have its own garden, and cross-curricular topics could be linked to the garden...*“If it [the garden] is part of the curriculum it will be sustained over time. It gives it mandate and value”* (Staff).
- To implement a planned approach for using produce grown in the garden for cooking.
- To utilise external support (e.g., a funded garden facilitator such as in the Marlborough KEG<sup>27</sup> scheme).

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<sup>27</sup> See case study of Mayfield School in Blenheim

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## STUDENT-OWNED GARDENS AT KUMARA SCHOOL

### INTRODUCING KUMARA PRIMARY SCHOOL

Kumara School is Decile 5 full primary school on the West Coast of the South Island. It has a roll of about 30 students, many of whom travel to school by bus. The school has supportive parents and grandparents with a range of jobs, including farming, mining, stone-carving, and being employed by the Department of Conservation. Many commute to Hokitika or Greymouth to work. Students at the school are mostly Pākehā, 4% are Māori and there are a small number of Philipino students.

For a time the school was under statutory management. During this period Kumara School lost students to other schools in the area and was in danger of closing down. The size and isolation of the school are two of the challenges it faces. According to the teaching Principal, being a small school has benefits in that it allows for a family oriented approach and that staff know the children well. The school uses an informal inquiry (“*explorative*”) approach, which allows for a high degree of student-centred learning.

During our two visits to the school, we spoke to the principal, the garden lead teacher, two teachers and 34 students from both the junior and senior classes. In addition, six parents were interviewed.

### INTEGRATING HEALTH AND WELLBEING INTO THE SCHOOL’S EVERYDAY PRACTICE

Kumara School places high importance on health and wellbeing, physical education and environmental protection. The school has a particular focus on healthy eating and physical activity. Their healthy food policy states one of its purposes is to “*help children achieve their full academic potential, physical and mental growth and future health and well-being*”. The policy covers banning treat foods and fizzy drinks; encouragement for students to bring their own water bottles; supportive role-modelling by staff and parents; and their edible garden: “*children will be given opportunities to grow their own herbs, fruit and vegetables in the school garden*”.

For a period of time Nutrition Fund support enabled the school to provide fruit for two or three days a week. Students now bring their own fruit and eat it every morning after their daily fitness session. This is especially important for the children who travel by bus as they have a long day and the fruit helps to keep them going. As there is no food available to buy, students bring lunch with them to school, which they keep in their own fridge. All students record their food intake and physical activity levels as part of the school’s healthy eating programme, which is delivered in partnership with the community/public health dietician. The school also uses 5+ A Day resources. Other health-related programmes used at the school include Kia Kaha<sup>28</sup> – an anti-bullying programme led by a Police Youth Education officer.

### GARDENING AT KUMARA SCHOOL

#### THE HISTORY OF THE GARDEN

Kumara School has had edible gardens since 1996. The original garden was created by converting a swimming pool into a shade house. This garden was used by all students, while senior students were also given responsibility to establish and maintain an open garden across the road from the school. Teachers, parents and students were involved in establishing these gardens. They had working bees, at which they landscaped, levelled and dug over the ground, before a variety of vegetables was planted in spring. In planning the gardens, teachers wanted tidy planter boxes, while the Board of Trustees (BoT) chair wanted a ‘fairyland’ design. However when children were consulted, the school used their design ideas, which included the location and shapes of the gardens, and allowed the students to have full ownership of the process. This involved senior students drawing a diagram of what plants to grow and where, and helping to make the garden sign.

Nutrition funding was used mainly for kitchen equipment, but also for fencing, fruit trees and compost. The funding helped the school community feel motivated and supported, and gave them a cash flow for ongoing expenses related to the garden.

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<sup>28</sup> [www.nobully.org.nz/kiakaha.htm](http://www.nobully.org.nz/kiakaha.htm)

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In 2010, the seniors' garden was moved from across the road into the main area of the school. This change occurred because it was not working effectively: being large and some distance away meant it was too difficult to supervise, and there were ongoing problems with spillage from grey water.

#### MAINTAINING THE GARDEN: A STUDENT OWNED PROCESS

Students regularly work in the garden, both in class and in their own time. Between 2006 to 2009 the senior garden was looked after by a student gardening group, overseen by a volunteer who lived next door to the school. The garden group worked closely with the volunteer, who was a keen gardener with extensive knowledge. Parents and students acknowledged the important role she played in keeping the garden going – and in motivating the students and gaining their buy-in.

*“She got the garden off the ground, took the kids under her wing and won them over by giving them the freedom to explore what they wanted to grow and when... to do it their way”* (Parent).

*“When we were asked to help we thought why would we do that? But she turned it around and made it fun”* (Student).

After the volunteer left some of the motivation and drive was lost amongst the students. Recently, however, the garden group was reactivated by the students themselves, and they renamed themselves the ‘G-Group’. The group changed from working in individual, self-nominated, small groups to being open to all. According to parents and teachers, students are doing more on their own without adult supervision and are excited and passionate about the garden again. In the words of one parent... *“this is the crux of it... to have the right person to oversee the kids, but it is they who remain the leaders”* (Parent).

Additional changes since 2009 include the junior school teacher taking over as the garden lead teacher. She is mainly responsible for the junior helpers and the shade house. At various times throughout the life of the garden, it has been supported by a parent garden group, which used to meet weekly and supported students to plan activities in the garden, as well as individual parents and community members. If they come in during class time they ask the teacher for permission to take students out. Garden jobs that need to be done, as well as people's feedback, are recorded on a whiteboard. Requests are put through to the Principal if items need to be bought.

It is in the school's annual plan to keep the garden going and the BoT have been very supportive of the garden, allocating funding in 2009 and 2010. The principal manages the garden budget and, along with the BoT chairperson, buys things as needed.

#### LINKING THE GARDEN TO SCHOOL LIFE AND THE CURRICULUM

The garden is well integrated into the school playground, directly where children play. A large climbing tree and a sandpit are located right next to the garden. This enables all students, not just those with a particular interest in the garden, to be in close contact with it and see the changes taking place. Staff pointed out that it's *“a nice calming place for them to go”*.

The garden provides students with a range of learning opportunities – formal as well as informal or unplanned. It was highlighted by school staff that the garden offers a context in which students gain knowledge without being explicitly taught. They explained that sometimes they just *“drop everything and work in the garden”*, later talking in class about what they have achieved. Learning opportunities offered by the garden vary according to the season, and were seen to be more obvious when it's time to plant.

A number of curriculum areas have been linked with the garden, which has enhanced the opportunity for them to be part of students' explorative learning. For example, one of the whole-school themes in 2009, enabled students to choose different research topics, by asking: *‘I wonder if...?’* In this science-based theme, seniors studied ‘Wonders of the World’, while juniors did ‘Wonders of the Garden’, in the course of which the children conducted experiments and watched what was growing. They learnt about the difficulty of growing fruit such as melons in the cooler wetter West Coast climate and about growing beans on tepees and ‘in a cup’. One junior student wondered: *“Can you grow pizza and candy floss?”, so we discussed how this can be grown, but in different forms”* (Staff). Other inquiry topics inspired by the garden have included: insect management, herbal remedies, and the living world.

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Specific subject areas of the curriculum linked to the garden have been: Art, e.g., the garden was the venue for a ‘creative day workshop’ for parents and students creating artworks in limestone and clay; Maths, e.g., counting plants and measuring distances between plants; and Literacy (the current school-wide focus), e.g., junior students keeping a ‘bean diary’; and, combined with Art, entering (and winning) a West Coast Gardener of the Year competition, by creating a poster with a picture of their garden volunteer, and writing comments around her picture.

## IMPACTS

The following sections illustrate the broad range of impacts stemming from students’ involvement in the school garden and related learning experiences.

### GAINING PRACTICAL GARDENING KNOWLEDGE AND SKILLS

Through experimentation students have reportedly acquired a broad range of knowledge about effective gardening. Skills gained include: landscaping, e.g., making walls for the garden and constructing stone pathways, and digging and levelling the ground; planting from seed and transplanting; the benefits of compost and vermicast on soil; companion planting (e.g., radish and spring onion) to help deter bugs and conversely that some plants (e.g., tomatoes and peas) don’t grow well together; and how to care for plants. Experiencing failure has also been important for learning, as explained by one teaching staff: *“Give them guidelines but be willing to let them fail...if they get to experience it they’ll hold on to that knowledge”*. For example, students learnt that plants wilted and died while being transplanted without soil around the roots. They also realised that the size of the initial garden was unmanageable, so they contained it with borders.

Junior students talked about enjoying being around the garden: weeding, planting seeds, and feeding the compost with food scraps and weeds. One parent remarked on how advanced their gardening skills have become, and even the youngest students articulated the benefits of compost, enabling them *“to grow more things because it’s good for the soil”*. Comments from junior students reflect their enjoyment in the explorative opportunities for learning in the garden, such as:

*“I like doing experiments...we have plants and cloth so we can see how they grow”*.

*“I like to visit the garden every day so I can see which ones grow and which ones grow last”*.

Children identified over 24 different types of vegetables and fruit they have grown, including less common ones such as baby carrots, kumara, purple potatoes, peppers, melons, and bok choy; as well as chives for decoration and flowers to attract the bees.

### ENHANCING HEALTHY ATTITUDES AND BEHAVIOURS THROUGH INCREASED AWARENESS

Staff indicated that the garden contributed to children moving away from unhealthy activities and establishing good healthy eating habits. Linked to health-related programmes at the school, the garden was seen to assist children to learn about general health in a ‘real-life’ context, reinforcing messages taught. Parents reported their children now being more willing to try new foods, one parent attributing this to the school making it *“more acceptable”* to do so. Students listed a wide range of benefits of healthy eating on their health, such as:

*“[Vegetables] give lots of vitamins, particularly if they are fresh”*.

*“They [vegetables] are healthy and give you energy”*.

Staff confirmed that seeing things grow, and helping themselves to food from the garden, has increased students’ appreciation of fresh food. One reported hearing students say that what they grow tastes better than food from the supermarket. Similarly one parent commented on students’ increased respect for food and the environment through learning that growing vegetables takes *“time, patience, effort – it is not instant”*, and by caring for the soil and the whole ecosystem. Staff and parents believe the garden also contributes to other health benefits amongst students, e.g., that it *“goes hand in hand with our daily physical activity”* (Staff), and increased environmental awareness by motivating students to reduce rubbish and to gain respect for living things.

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Overall, parents interviewed were of the opinion that the school garden helped reinforce healthy attitudes and behaviours in their children, because “*they can see it’s normal, the way it is, not just their weird parents who expect them to do these things*” (Parent).

#### IMPROVED COOKING AND FOOD PREPARATION SKILLS

The benefits of having an edible garden extend into the kitchen as, according staff “*a lot of kids don’t know how to cook*”. Produce from the garden has provided regular opportunities for students to develop cooking and food preparation skills, through regular cooking sessions and one-off events such as a recent BBQ and swim night. Students have learnt to prepare a variety of meals, such as salads, roast vegetables, pumpkin bread and pumpkin pie. At the recent BBQ and swim night, students proudly demonstrated their ability to prepare and serve food grown themselves.

Having these cooking opportunities, children have gained knowledge of hygiene and safety in the kitchen, as demonstrated by some of the juniors...

*“You wash your hands because you might get sick...it takes the germs off”.*

*“You pass [knives] with the handle so they [the person receiving the knife] don’t touch the sharp bit”.*

#### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES

According staff, being given a degree of autonomy has led to children being more interested in gardening and more self-motivated, and it is helping build trust as students share their knowledge and work cooperatively in vertical groups. Likewise, it was noted how gardening encourages students to manage for themselves, think and experiment.

Students also commented on the how gardening in a group “*needs to be orderly*”, that it gives them a sense of self-management, responsibility and cooperation:

*“We’ve learnt to share and take turns”.*

*“We feel like the garden is our responsibility. Like when someone stabbed a pumpkin we felt really sad and annoyed. It was the biggest pumpkin”.*

Parents reflected the positive contribution the garden has made in terms of different ages working well together. They described how enthusiastically the students cooperate with each other “*in a whole different way*” compared to in the class setting, through interrelating both purposefully as well as creatively.

#### SENSE OF BELONGING TO, AND PRIDE IN, THE SCHOOL

The garden is viewed by students in a positive light. They considered the opportunities they have to take responsibility for the garden to have contributed to their sense of belonging to, and pride in, the school. Reflecting this, parents interviewed also reported their children feeling proud of the garden...

*“My children are really into it. It lets their creativity run loose ... The kids are always as proud as Punch”*  
(Parent).

Parents commented further that the garden actually offers children more in terms of pride and responsibility than the home garden, which in the words of one parent “*is more for production and is not seen as hers*”.

#### PROVIDING AN ALTERNATIVE SETTING FOR CERTAIN STUDENTS TO EXCEL

Some staff attributed a marked behavioural change in particular students to their enthusiasm for the garden, as it is seen as “*therapeutic – a positive place which creates respect and provides a physical outlet*”, such as digging, wheel-barrowing and spreading compost. It was believed the garden (along with these types of activities) can be an effective behaviour management tool with challenging students, through providing an opportunity to shine in an environment that is not academic or sport-related. It was reported that some kids who can be problematic in the classroom “*bloom*” in the garden. One staff member related how the garden helped build trust between herself and a difficult student, by being proudly able to share her knowledge.

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## THE SCHOOL GARDEN PROVIDING OPPORTUNITIES FOR LINKING WITH THE COMMUNITY

Community support is a notable feature of Kumara School's garden, which was referred to by one staff member as more of a community – than school - garden. The garden has provided the backdrop for a 'grandparent's day', at which the children showed them around the garden, and the 'creative day workshop' for parents and students mentioned above. Many parents have followed the progress of the garden first-hand as well as through regular stories in the school newsletter.

Examples of community support include helping to tidy the garden; donating seeds and plants; helping plant vegetables; and sharing knowledge about gardening and cooking. In return, surplus plants and produce from the school garden has gone home, including strawberry plants, and food for pets.

The wider community and local agencies also contribute to the garden. Support has been provided by the Friends of the School, the Kumara Community Society, the local Nutrition Advisor, the local council, a Public Health Nurse, the recycling coordinator from Hokitika, and the athlete Steve Gurney who is a local role model. The West Coast Community Trust has helped with funding for weed matting, hedging etc.

Local events the school garden has linked with include the West Coast Gardener of the Year poster competition mentioned above and a pumpkin growing competition. In addition, three students went to an Enviroschools workshop about garden calendars. Kumara School's garden has been recognised in local education networks, with other schools visiting to see how they manage the garden.

### PRACTICES, ATTITUDES AND KNOWLEDGE TRANSFERRED BETWEEN HOME AND SCHOOL

The link between the Kumara School garden and home is an important one. As well as many children sharing gardening skills learnt at home, students' overall sense of pride in the school garden, and their motivation for gardening at school, has also transferred into their life outside school. Most students interviewed said they have vegetable gardens at home, some as a result of the school garden. Almost all the children interviewed indicated that they have taught their parents about gardening from what they had learnt at school. For example, one junior student commented that he has taught his parents that "*If you grow wrong plants in the wrong places, it won't grow properly*".

Parents reported being encouraged by their children to plant vegetables, berries and fruit trees and that their children actively used the skills they learnt at school to help in their home gardens. Examples mentioned by parents and students included: watering, weeding, picking vegetables to feed animals, digging, planting, fertilising, protecting plants from frost and pest management (preventing sheep and goats from getting into the garden, as well as deterring bugs by using egg shells).

*"I make sure plants [at home] are covered...sometimes frost kills them"* (Student).

### CHALLENGES AND SOLUTIONS

The main challenge to the ongoing development of the garden is the issue of teachers' time and expertise. Losing the skill and enthusiasm of the volunteer who was the main driver of the garden group slowed momentum. In addition to finding other volunteers to supervise students, the school is considering seeking funding for a part-time garden coordinator

Other current challenges facing the school include: the need to involve more community members (and managing the risk of having too many different ideas about how to garden); deciding the best place to plant fruit trees; ongoing environmental challenges such as cold and damp weather conditions; and sourcing/funding adequate equipment for groups to be able to work in the garden.

The school has worked to overcome a number of practical challenges relating to the garden over time. These included: clayey, infertile ground (addressed by the addition of compost); managing weeds (addressed by using a weed-eater, weed mat, and pebble paths); and grey water hindering access to one of the gardens (solved by relocating the garden).

### SUSTAINABILITY AND FUTURE DIRECTIONS

The school's long term vision is to be able to supply sandwich fillings in summer and have sufficient vegetables in winter, with which they can cook lunches every second Friday. They would also like to



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extend the orchard so they can become self sufficient in fruit provision. It was recognised by staff that for the garden to be sustainable over the long term requires: a shared vision with motivated people to drive it; a focused, coordinated and planned approach; guidelines and support mechanisms; full integration into the curriculum; and closer linkages with healthy eating, physical and mental health initiatives.

Possible ways to nurture student leaders are being explored, including all students choosing one plant each year that they plant in spring; and setting up a student leadership team to create a club of keen students where Year 8 students train up younger ones. This latter idea was the students' own idea.

For a number of years, the edible garden has been a key facet of the character of Kumara School which offers a wide range of benefits for students' health and wellbeing and learning. Given this, students, parents, and staff are keen to find solutions to some of the current challenges they face so that the garden can continue to be an integral part of the school culture and learning programme.

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## MAYFIELD PRIMARY SCHOOL – GARDENING MADE POSSIBLE THROUGH EXTERNAL SUPPORT

### INTRODUCING MAYFIELD PRIMARY SCHOOL

Mayfield Primary School is a Decile 2 school in Blenheim with a roll of 93 students from a range of ethnicities and cultures: 46% are Māori, and there are also children from Tongan, Samoan and German backgrounds. Due to the low socio-economic status of many of the families the school has to subsidise many school related costs by fundraising and applying for grants (e.g., for school sports fees and class camps). There is widespread support amongst families for the school and students' learning, although the school often has to work hard to secure this.

The school has a large proportion of children with learning needs, and this is a high priority for the school. The school philosophy is that of hands-on teaching (e.g., “*showing and role modelling*”), with less of a theoretical approach.

During our two visits to the school, we spoke to the Principal, the garden lead teacher, the paid garden facilitator, five teachers, 21 students, as well as eight parents.

### INTEGRATING HEALTH AND WELLBEING INTO THE SCHOOL'S EVERYDAY PRACTICE

Mayfield Primary School has a strong commitment to promoting health and environmental awareness. It is part of Health Promoting Schools (HPS), Fruit in Schools (FiS) and Enviroschools and as such, applies a whole-school approach to wellbeing. Healthy eating is a priority focus in the school. They are addressing the issue of children not bringing lunch to school by making food available. At the same time, healthier lunch options have been gradually introduced, and now students order Subway lunches instead of fish and chips. Their efforts to provide a healthy food environment at the school is reflected in their achievement of a gold Heartbeat award from the National Heart Foundation.

*“We understand children need to be healthy – and not hungry – to learn, and we try to remove barriers to learning by focusing on healthy lunches and recipes”* (Staff).

As well as focusing on healthy eating, the school promotes physical activity, sun protection, and mental health. Other wellbeing-related initiatives they are involved in include: Cool Schools (peer support) and Social Workers in Schools. The school has a health team, which comprises parents, teachers and students and which meets once a term.

### GARDENING AT MAYFIELD SCHOOL

#### ESTABLISHING THE GARDEN – THE WHOLE COMMUNITY COMES ON BOARD

About ten years ago, a student at the school said: “*What if we had lettuce...*”. At the same time, two teachers who were into organics talked about planting trees and gardens for shade and food. In this way, and with the help of the district council's recycling coordinator, and other expertise from outside the school, Mayfield's edible garden started. The students helped design and plant the gardens: they decided on a millennium garden, planning it as a measurement exercise in maths classes, and planted flaxes and native trees. They then planned the vegetable garden with help from Polytech students, who built garden beds and a potting shed. The initial idea for a large garden was not considered feasible, so they used existing garden beds located next to the car park at the entrance to the school.

The whole community then got involved. After going on a garden bed course, the former lead teacher rallied external support. In just one day, leadership course students from Marlborough Boys High School laid carpet to suppress weeds and installed drainage, parents edged the garden beds with second-hand orchard posts donated from local orchards, while students filled the beds with donated soil and planted seedlings supplied by the Council.

#### MAINTAINING THE GARDEN – OUTSIDE EXPERTISE IS THE DRIVING FORCE

A distinctive feature of edible gardens in education settings in Marlborough is the longstanding support and leadership shown by the district council. In 2005 they started a pilot programme to support schools and ECE services throughout the province called Kids Edible Gardens (KEG), adapted from a similar project in Canterbury. Mayfield was one of the original pilot schools in the programme. KEG provides

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participating schools with resources and trained, paid garden facilitators, who work in a cluster of schools. Having a garden facilitator has been crucial to the success of Mayfield School's edible garden... "*We couldn't have done it without outside expertise*" (Staff).

Rather than working with a garden group of selected students, the facilitator works with groups of six students from different classes in half hour sessions, as well as taking whole classes out for ten minutes to check progress. Seniors help her plan what to grow and where.

The garden facilitator is paid for two hours per week but often volunteers up to an additional five hours a week.

## TEACHING AND LEARNING IN AND AROUND THE GARDEN

### EXPERIENTIAL LEARNING

The current garden facilitator is both a trained teacher and a keen gardener. This combined expertise enables her to broaden the experience of the children she works with. She uses a questioning model and structures the sessions in the garden around what is important to the children – and pointed out that the garden in itself encourages students to ask questions and be inquisitive without any input from teachers.

In their half-hour gardening sessions each group spends the first ten minutes just exploring. Each session has a particular focus, and students are involved in planning these. They are allocated tasks, such as planting, watering, weeding, turning compost, and transplanting vegetables. At the end of the session they discuss what they have accomplished and observed in the session, which they then fill out in a scrapbook, drawing pictures on a plan of the garden to show the changes that have taken place. In this way there is a graphic progression of what has changed in the garden, which students can take home to show families.

The garden facilitator's routine in the gardening sessions gives students the freedom to explore and the opportunity to experience firsthand the things they are learning about. This 'learning by doing' approach was considered by the lead teacher as a very effective way for children to learn: "*It affects all the senses...you get the visual, touching, sight, smell, rubbing things between your fingers.*" An example of structured experimentation undertaken by student groups, the 'Aztec Trilogy' project, involved planting three types of vegetables together (pumpkin, corn and climbing beans). Students discussed the history of this approach, how differently each plant would grow, and the efficiency and effectiveness of planting them together and then observed the growing process.

Often, students present to the rest of the class about their experiences in the garden. It is hoped this will lead to more discussion and make the garden more meaningful for all students.

### LINKING THE GARDEN TO THE CURRICULUM – A CHALLENGE

Staff indicated that the edible garden had not yet been widely integrated across the curriculum - despite KEG providing them with resources for this particular purpose. Reportedly the major barrier to this occurring is insufficient teacher time and other priorities (e.g., focus on literacy). Staff were of the view that it is too great a burden on teachers to deliver garden-related teaching programmes, or to be actively involved in the garden. Rather it is up to the garden facilitator, and the lead teacher, to give students the opportunity to benefit from the garden. One way the facilitator has been able to do this is as a relief teacher using accumulated teacher release time, enabling her to spend one day a month incorporating the garden in her classroom teaching.

Ways in which the garden facilitator and the lead teacher has incorporated garden related activities into specific curriculum areas include: Literacy: reading seed packets, doing 'explanation writing' (e.g., how to make a sandwich), and compiling recipe books by holding recipe competitions; Science: learning about beneficial and harmful effects of insects; Maths: looking at graphs of seasonal planting and using them to plan the garden, studying seed dispersal and the patterns of flowers, counting and weighing vegetables, and Art: making clay pots, which they planted seeds in and sent home as presents. In addition, some teachers reported making use of learning opportunities when students bring ideas or things from the garden, such as, looking at bugs and talking about what they've learnt. A classroom activity observed during the evaluators' visit involved junior students identifying, colouring in and discussing vegetables grown at school with their senior 'buddies'. Garden-related learning has also occurred with individual students incorporating the garden in a study topic, e.g., in studying 'minibeings' (insects) the garden was utilised.

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## IMPACTS

### GAINING GARDENING SKILLS AND LEARNING ABOUT THE PHYSICAL WORLD

Students interviewed could readily identify a range of things they had grown in the school garden: fruit such as strawberries, boysenberries and grapes; over ten different types of vegetables, including garlic, watercress, cucumber, bok choy and puha; and herbs e.g., chives, parsley and mint.

As well as students getting to know a wide range of vegetables by working in the school garden and observing plants growing and going to seed, many examples were cited by staff and students of knowledge and skills acquired about gardening and the wider environment. This includes learning about planting according to the season; discovering when vegetables are ready to eat and when they are past their best; about how to improve soil quality through adding compost; pollination; pest control; and waste recycling. A number of practical skill-learning opportunities provided by the garden were listed by the students: planting (e.g., raking soil over trenches when planting seeds in rows); spacing seedlings; watering; thinning; weeding (including learning what are weeds and what are not); composting; and harvesting at the right time and without damaging the plant). Some of this learning is exemplified in their comments...

*“I like thinning the vegetables so they don’t grow all funny! If heaps of carrots grow together you have to thin them”*

*“Carrots should be as big as your finger... [to pull them out you] grab them in a strong spot so they don’t break”.*

Parents noted how children were developing “*enthusiasm and curiosity*” from watching how plants change as they grow, and the different rate at which they grow, at the same time as they were learning about preparing the ground, choosing what to grow in the space available, companion planting, and adequate spacing for plants. As one parent points out...

*“[Gardening]...it’s such an awesome skill to learn from the beginning. A lot of people don’t know how to garden. Even if they move into a flat they can grow potatoes in a bucket. Kids are one step ahead if they have those foundations”.*

### INCREASED AWARENESS OF HEALTHY EATING AND IMPROVED EATING BEHAVIOURS

Exposure to growing their own vegetables, in combination with initiatives such as FiS and HPS was considered amongst parents and staff to have had a substantial impact on children’s awareness of the nutritional benefits of fruit and vegetables and attitudes towards healthy eating overall.

*“I tried to put chocolate cake in my son’s lunch box – he pulled it out and said he wanted healthy lunch like Joe. They don’t like you putting things in there that aren’t healthy. They say: “We’re not allowed that” (Mother).*

In fact, improved attitudes and behaviour through having a garden were widely reported in children. With enough food prepared at school for every student to try, generally only a handful of children don’t like what is cooked. Through their experiences in preparing and cooking food they have grown (they mentioned making salad, removing bugs and dirt, peeling and topping carrots, and cooking using recipes), teachers have noticed that more and more children are keen to try new foods. Some students indicated now eating vegetables such as pumpkin, silver beet and cabbage, which they used not to like. These changes were also noted by parents.

*“They [her children] never, ever before ate vegetables. Now they are learning from school and are eating them” (Parent).*

All students interviewed demonstrated knowledge of a range of benefits from eating what they had grown themselves, including: knowing the origins of food; the importance of being fresh and chemical-free; that they contain vitamins and minerals; that they “*make you grow really fast*”; and that they “*taste nicer and fill you up*”.

### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES

According to the lead teacher, apart from learning practical knowledge and skills in the garden, children are gaining important life skills including teamwork, communication and problem-solving. Working in pairs and on their own in the garden has taught children to take individual responsibility as well as to problem-solve collectively, for example: working out how to fill a bucket of compost using two shovels

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without getting in the way of each other, and sharing the task of carrying heavy buckets of water to the garden when the watering system broke down. Likewise parents have observed the development of attributes in the children from the hands-on nature of working in the garden with others. As well as teaching them to be resourceful, they are gaining a sense of responsibility and patience, considered important skills to take with them into adulthood. One parent pointed out that a lot of the learning students get through the garden probably takes places on a sub-conscious level...

*“There’d be lots of different learning that you don’t know about. Like...they probably don’t know they’re learning team work and that their learning about sharing with that veggie stall...”* (Parent).

#### SENSE OF BELONGING TO, AND PRIDE IN, THE SCHOOL

Amongst the students there is a great deal of enthusiasm and interest in the garden. Teachers have overheard them proudly telling their parents that the vegetables they take home they have grown themselves. Moreover, the garden facilitator believed that students’ sense of ownership of the garden was a strong factor in reduced vandalism in the school. Other staff, as well as parents, also remarked on the positive effect the garden is having on the children, reporting they were proud of what they have achieved in the garden:

*“I think my daughter is proud. She asks me to come and look at the garden once a week”* (Parent).

#### THE GARDEN – A POSITIVE SETTING FOR PARTICULAR STUDENTS

Because the school takes in a number of special needs children, managing student behaviour can pose a problem for teachers. The garden facilitator indicated, however, that in the garden and when she applies learning from the garden in class, there are no behaviour problems. Although they still have to be reminded about what behaviour is expected, and can be easily distracted, the practical nature of gardening makes the experience positive for her and the students.

*“They [the students] are on task, it is something new, and they are applying [learning] in a different way”.*

The facilitator also reported that some boys in particular, who are quite challenging in the classroom, are getting right into the garden. She noted the enthusiasm of these boys in wanting to get it right and making progress in the garden much faster than what was at times needed. One grandmother similarly reflected that working in the garden had helped her grand-daughter’s socialisation with others. She sees the garden as a great environment to support this development...

*“It’s totally relaxed: she doesn’t have to think of the right answer, and it’s lifting her self-esteem”.*

#### THE SCHOOL GARDEN PROVIDING OPPORTUNITIES FOR LINKING WITH THE COMMUNITY

School families are kept aware of the school garden through word of mouth (e.g., students telling parents about the garden), articles in the school newsletter (including gardening tips), and observing children working in the garden. In addition, the school has held consultation hui with parents incorporating food from the garden. Although support from parents and families has not been wide-spread, despite a suggestion box and requests for support via the school newsletter, there has been some involvement in garden-related activities. Some have donated plants, others help to weed, trim and water, or with preparing meals.

As indicated above however, Mayfield School benefits from wider community support, which they have successfully tapped into, e.g., through donations, fundraising and practical assistance. In return, the garden has provided an opportunity for the school to give something back. One of their initiatives is the donation of food to John’s Kitchen, a Blenheim charity providing meals to people in need, which allows the school garden to make a meaningful contribution. Families also get surplus produce at the school gate or brought home by children. These are both student initiated initiatives as they’d rather *give* than charge for their produce.

#### TAKING HOME HEALTHY PRACTICES, ATTITUDES AND KNOWLEDGE

Many children have taken gardening and cooking skills learnt at school into the home environment. Many of the students interviewed indicated they had taught their parents and families about gardening from

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what they'd learnt at school, through the garden facilitator sharing her expertise and ideas with them. Parents have appreciated the impact the school garden has had on their children...

*"They don't see it [gardening] as a chore".*

*"It's good because not everyone's got time to teach them at home if you are holding down two jobs...and you've got sports etc".*

Most students said they have their own garden, and it was indicated by many that the school garden had been a precursor for this. Some of the students explained that they had started their gardens because *"It's better than buying the vegetables"* and *"I heard we need more oxygen"*. Parents confirmed the impact the school garden had had on setting up home gardens, with one detailing how her child had helped set it up and choose the plants. All students interviewed reported helping out at home with chores such as watering, weeding and pest control, which parents verified.

Some students and parents also indicated they also use cooking skills learnt at school. Others ask parents to buy new vegetables which they have seen at school, such as butter beans and capsicum.

### **CHALLENGES**

In addition to the difficulty facing the school in attracting wide engagement amongst parents and families, and encouraging more teachers to be involved and/or to incorporate the garden in classroom teaching, a number of other challenges have been encountered, including: pressure on the school's budget, with its priority being on special needs; the garden's proximity to the car park posing a safety issue, making it vulnerable to theft and vandalism, and not encouraging individual activity; its location in a dry shady area which cannot easily be extended; and difficulty in managing the large amount of compost being generated.

### **SUSTAINABILITY AND FUTURE DIRECTIONS**

The new Principal appointed in 2010, who was involved in setting up gardens at two former schools, has indicated strong support for further development of the garden. To sustain the garden into the future, he along with the garden facilitator and lead teacher sees it as important to embed the following processes:

- Ensuring ongoing, stable, curriculum-based learning by integrating the garden into long-term planning processes: i.e., annual and strategic plans; and linking it to EnviroSchools
- Involving students in every aspect of the garden, which could include setting up a dedicated student garden team and/or each class having their own gardens
- Maintaining the funded garden facilitator position and supporting her linkages with the curriculum through focused time in class
- Greater community involvement
- Stronger drive of the garden from within the school (rather than relying on the external drive).

Ideas for improving learning experiences for the students included sequential learning – starting at junior level, and building on skills until the final year. Other potential developments for the garden include: relocating it to the main part of the school and increasing its size, so that more children will be exposed to it and everyone will be reminded of its importance; and planting fruit trees.

According to some whānau and teachers interviewed, the garden has given the children a sense of wonderment. It was suggested however, that familiarity with the garden has now led to a degree of complacency: where students (and teachers) used to make a detour to look at the garden, people have stopped reflecting on it being there... *"you start off with a roar, then it becomes familiar and it's just there"* (Teacher). For this reason, it was suggested that the school now needs to *"recreate the myth of the garden"* to reignite and/or strengthen enthusiasm and engagement by all parties.

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## NGATIMOTI SCHOOL: A WHOLE-SCHOOL APPROACH TO GARDENING

### INTRODUCING NGATIMOTI PRIMARY SCHOOL

Ngatimoti is a Decile 4 full primary school in rural Nelson, serving a supportive community characterised by a mix of conservative farmers and alternative lifestylers. The school has a growing roll of just over 100 students, which is twice as many as three years ago due to recent movement of families into the area and families having more children. Over half of the students at the school weren't born in NZ, and 11% are Māori. The recent roll growth poses quite a challenge for Ngatimoti School, as they need additional classrooms.

The school's values are captured in the acronym, RIVER (**R**espect, **I**nnovative, **P**osit**IV**e, **E**xcellence, **R**esponsible) and are reflected in their current curriculum focuses: care for oneself, care for others and care for the environment. Community involvement is also highly valued. The school does not like to categorise themselves in terms of teaching practices but follows learning approaches such as inquiry, action learning and experiential learning and take from these what is appropriate and suitable for the task.

During our two visits to the school, we spoke to the Principal and lead teacher/garden coordinator (a parent who is paid through teacher aide hours), 11 other teachers, 35 students (including members from the garden group and the Envirogroup), as well as seven parents.

### INTEGRATING HEALTH AND WELLBEING INTO THE SCHOOL'S EVERYDAY PRACTICE

Ngatimoti School has a holistic approach to health. The school is a Health Promoting School (HPS) and its strong focus on health and wellbeing is actively supported by the HPS Advisor. Additional support to promote wellbeing comes from Nelson Marlborough DHB's Nutrition and Physical Activity (NPA) *Healthy As* programme;<sup>29</sup> the Life Education Trust (mobile health promotion/education);<sup>30</sup> Education for Sustainability (EfS);<sup>31</sup> and teacher professional development from the University of Canterbury (UC) Education Plus.<sup>32</sup>

Although not part of the Fruit in Schools (FiS) initiative, the school has replicated aspects of this approach by providing its own fruit for the last few years. Children also bring their own fruit to share. Recently, they have planted a small orchard with feijoa, apricot, citrus and apple trees.

The garden is an integral component of Ngatimoti's commitment to wellbeing. It is supported by all levels of the school (Board of Trustees, senior management, teachers, students and community). Staff noted that it is not a stand-alone project, nor are its benefits restricted to just a few interested students; rather it is fully integrated into the life of the school. In addition, all staff are expected to be involved in and support the garden.

*"No one questions it. It's embedded and is something the whole school does, not just one class...time in regular staff meetings is allotted to the garden and it's just part of the school routine...it's just normal"* (Principal).

The garden has linked particularly well to the Enviroschools programme, which plays an important role at Ngatimoti school. All students engage in environmental education for 45 minutes each week, doing activities such as growing vegetables in their own class plots, monitoring the health of local streams, and maintaining the Pā Harakeke (flax museum). The school adheres to the practice of 'reduce, reuse and recycle'. Waste paper and food scraps are composted and turned into valuable mulch for their garden, they have a worm farm and a 'no glad-wrap' lunch policy.

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<sup>29</sup> <http://www.healthyas.org.nz>

<sup>30</sup> <http://www.lifeeducation.org.nz>

<sup>31</sup> <http://www.tki.org.nz>

<sup>32</sup> <http://www.edplus.canterbury.ac.nz>

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## GARDENING AT NGATIMOTI SCHOOL

### THE HISTORY OF THE GARDEN

Gardening at Ngatimoti school is not an entirely new initiative. About a decade before the Nutrition Fund was initiated, an edible garden was established by some keen parents. Although the garden proceeded well initially, it did not continue beyond two seasons. There was little support from the BoT and teachers at that point and parents suggested that the timing was not right.

In 2007, the school consulted students about their environment. Some wanted edible gardens whereas others wanted seating in the playground. With no money to support these projects, they applied for funding from the Nutrition Fund to build small garden beds (one for each class) with seating around them. This funding, in addition to some community donations, enabled three garden beds to be built. This money was also used for establishing a small fruit orchard and installing a drinking fountain. The drinking fountain serves dual purposes, to provide water for the children and the fruit trees that were planted.

### ESTABLISHING THE GARDEN: INVOLVING STUDENTS IN DECISION-MAKING

Student involvement in decision-making was a key feature of the establishment of Ngatimoti's garden. After visiting other schools and local gardeners, and completing questionnaires about what to plant, students voted where to place the garden beds. Students designed the beds to incorporate seating so that it would be a 'healthy area' for learning and socialising. Seniors helped the care taker to build the garden beds, determining their size by taking into account the maximum distance they could reach to easily garden, while juniors observed the process. Soil was purchased for the garden beds and brought in. Once the gardens were established, they were opened by the mayor and blessed by a local minister. Students also decided to plant the fruit orchard at a distance, knowing fallen fruit attracts wasps. They sought advice from the local nursery about which fruit trees would best grow in the location they had chosen.

### MAINTAINING THE GARDEN: SHARING THE RESPONSIBILITIES

The main responsibility of the garden lies with the garden coordinator, who is a parent paid through teacher aide hours, and the school's caretaker. Together they discuss what is needed and liaise with the Principal about what to buy. Students' ideas and suggestions are taken into account in decision-making. The avenue for student involvement in these processes is a student garden group, a branch out from Enviroschools, which offers experiences for those with a special interest. The group's purpose is to work with the garden coordinator in planning what to plant and maintenance requirements. The group includes a representative from each class, either picked by teachers or voted in by their peers. Once a week they meet for an hour, and discuss things like: the chores that need doing; what needs to be bought; and how plants can be eaten.

In addition, each class garden plot is maintained by the students' (and teacher) of that class. As indicated elsewhere, 45 minutes a week is allocated to activities such as gardening through the Enviroschools programme. Teachers may also take their students out into their gardens during other class times, depending on what needs doing and the possibilities of linking activities with the curriculum.

Students are also spending time in the garden during their breaks. Teachers noted they often see them pulling weed out and undertaking "*human pest control*" by picking bugs out of the garden to play with elsewhere on the school grounds. This is enabled by having the garden located in the middle of the playground rather than out of sight. This ensures students have regular contact with the garden and, as the garden coordinator reported, "*it is nice to see that the kids have 'normalised' its exposure*".

During holidays parents and teachers assist to maintain the garden. Ongoing support is also provided by the BoT through allocation of operational funding.

### TEACHING AND LEARNING IN AND AROUND THE GARDEN

The school garden provides students with many learning experiences. This occurs informally, e.g., through children observing changes in the garden, carrying out chores, or simply sitting around the garden during breaks.



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As well as being integrated into the school's physical environment as a peaceful refuge for students, the garden is an integral part of the teaching and learning programme of all teachers. They expressed strong support for the garden and the teaching opportunities it provides.

*"It is easy to link the garden with teaching... its common sense, natural. It's hands-on and outdoors, you go out and do things in the garden and then come back and write it up, or use it in maths. It's a natural way to teach"*  
(Teacher).

#### LINKING THE GARDEN TO THE CURRICULUM

At Ngatimoti school, staff use the new curriculum to look at broad topics which they can link the garden into. Whole-school learning themes that have incorporated the garden so far have included: The Year of the Potato, in which students learnt about different ways that potatoes can grow (e.g., in a bucket, through a bale of straw, etc.) and be cooked; Festivals, where they explored dance, languages and foods from different cultures/countries, in which garden produce was used for cooking.

In 2010, the 'enviro time' that is set aside each week for Enviroschools focused on a range of different topics, some of which was linked directly to the garden (e.g., soil and compost, making a movie about the garden, planting). Individual teachers led these 'practical sessions' and students were divided into vertical groups which rotated every five weeks, allowing all students at the school to take part in all the topics.

#### LINKING THE GARDEN TO SPECIFIC SUBJECT AREAS

The garden is also linked to a range of learning areas including: Literacy, e.g., through reading instructions on seed packets, searching for and reading recipes, and following instructions; Maths, e.g., through measuring the height of plants, measuring changes, recording data and presenting to class; Arts, e.g., through making clay figures to go in the garden; Science, e.g., through learning about composting. Health and wellbeing has also been linked to the garden.

#### LINKING THE GARDEN TO THE CULTURAL BACKGROUNDS OF THE COMMUNITY

The garden has been a useful tool for facilitating learning around cultural aspects of the school community. For example, they link the Māori concept of hauora (wellbeing) into food; they have visited a local marae for a 'no waste day'; celebrated Matariki by planting garlic; linked Māori myths with the garden; and grown Māori vegetables, such as watercress, kumara, and Māori potatoes. The garden also reflects the multicultural nature of the community by students bringing in or making food from places around the world. According to the Principal, "*kids love this and can relate to it because of their backgrounds*".

#### IMPACTS

As a result of the activities carried out by students in and around the garden, a number of impacts have been observed, which are summarised below.

##### INCREASED GARDENING KNOWLEDGE AND ENVIRONMENTAL AWARENESS

Through students' formal and informal connections to the garden, their awareness and practical knowledge of gardening and the natural world have reportedly increased. Teachers indicated that as part of the environmental education programme and the garden, students learn about life cycles; managing pests, how to attract birds and beneficial insects; companion planting; and enriching soil with compost. Growing and harvesting their own food is also contributing to students being more aware and respectful of the environment. One teacher reported that children have changed their attitudes about waste, wanting everything to be put in the compost or worm farm.

Parents considered the school garden to offer children a wider range of learning opportunities than they get at home, including a focus on the scientific/technological aspects of gardening, waste management and composting. Parents had noticed that their children's gardening knowledge had increased as they suggest things to do in the home garden.

Students themselves reported having learnt about: how to plant (the space and depth needed for plants and seedlings), and when to plant (in relation to the seasons); weeding, watering and other ways to care for plants; and when and how to harvest. They had also developed a good understanding of composting....

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*“It breaks down fruit and vegetables and it turns into mulch and when you put it in the garden seeds grow better”*  
(Student).

#### INCREASED AWARENESS OF THE BENEFITS OF HEALTHY EATING AND THE ORIGINS OF FOOD

The garden provides a practical, ‘real-life’ context to reinforce the messages promoted at school about healthy eating. Assisted by hands-on experience in the garden, students demonstrated an understanding of the nutritional contents of vegetables and fruit and how eating them improves their health.

*“Kale has iron. It makes me grow”* (Student).

*“It’s healthy... you’ll be all tired if you don’t eat them [vegetables and fruit]”* (Student).

*“It [eating vegetables] reduces the risk of getting cancer”* (Student).

Students suggested there were many benefits linked with growing their own produce, whether it be at home or at school, including the vegetables being fresher and cheaper than in the supermarket and knowing what’s in them (e.g., that they haven’t been sprayed). Parents noted an increased respect for food in children and greater awareness of the origins of food. One mother reported that when she goes shopping with her children, they comment on the high prices of vegetables... *“they are chocked and can’t understand why because they think it’s so cheap and easy to grow your own”*.

#### IMPROVED HEALTHY EATING ATTITUDES AND BEHAVIOUR

Both teachers and parents we spoke to reported changes in children’s behaviour and attitudes towards healthy eating, as demonstrated through the following comments...

*“By growing themselves they have a different relationship with food. They value food now”* (Teacher).

*They [the children] eat things they’ve never tried before, such as broad beans, celery with peanut butter and parsley in handfuls!* (Parent).

*“My son is more interested in eating what has been grown. He is now into experimenting with eating new food, like celery which he never liked before”* (Parent).

Overall, parents reported increased consumption of fruit and vegetables. They also indicated that their children asked them to put healthy food in their lunch boxes; were more inclined to try new foods, including vegetables they previously didn’t want to eat. These changes were attributed to students’ enthusiasm about growing vegetables themselves and a subsequent interest in trying the things they had grown. It was also suggested that the garden provided a context for positive peer pressure, e.g., students see other students give things a go and are more willing to do so themselves.

#### IMPROVED COOKING AND FOOD PREPARATION SKILLS

Students’ experiential learning extends beyond the garden into the school kitchen. The dishes they have made incorporating vegetables from the school garden included: vegetable fritters, frittatas, quiche, carrot cake, and zucchini cake. They have learnt to cook potatoes in a variety of ways and made all sorts of things with pumpkin (e.g., bread, pie, biscuits, and soup). In addition, they have made jam, tomato sauce and preserved tomatoes. Through partaking in these cooking sessions, students reported having learnt important food preparation skills including: providing different options for those with food allergies; keeping hands and surfaces clean; and being careful with knives.

*“You have to be careful so you don’t hurt yourself. Blunt knives can hurt more than sharp knives because you need more force”* (Student).

#### DEVELOPMENT OF LIFE SKILLS AND KEY COMPETENCIES

All teachers and parents believed that the garden encourages self-sufficiency, life skills and key competencies in students.

*“Gardening is a life skill...it’s much more than just the nutritional value you get out of eating lettuce”*.

*“The garden enhances students’ key competencies by allowing them to communicate. It is developing the whole person and encourages them to manage themselves”* (Teacher).

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Parents and teachers suggested that *all* children can participate in garden activities. Because all can do it, being tactile, active and non-academic, and because there is a “*tangible outcome*”, garden-related learning was seen to be especially rewarding for students. Leadership and cooperative learning skills have been gained through working in vertical groups. In the process, children are learning about responsibility, trust and self-reliance. Teachers and parents agree that “*the garden encourages students to share*” and exposes children to more experiences to work together as a “*team that isn’t sport*”. For example, older children help the younger ones; they learn to allocate tasks and think ahead: “*This comes naturally in the right environment*” (Parent); they help each other with labour-intensive tasks such as digging, barrowing compost, pulling out corn, and carrying tools to and from the garden. The garden also provides the opportunity for students to gain problem-solving skills, such as coping with frost, staking taller plants and managing pests.

#### SENSE OF BELONGING TO, AND PRIDE IN, THE SCHOOL

Because it is an integral part of school life, the garden appears to give students the sense that they belong and can feel proud of being part of their school. According to the Principal, it is the students’ garden. Teachers and parents reinforced this view of student ownership of the garden and the pride it brings...

*“By being able to show they know something and becoming an expert in the school garden, students have developed pride in themselves and in the school” (Teacher).*

Students confirmed this by saying they are proud of the garden and more motivated at school through growing their own food (“*we’re better at school because we’ve grown things*”). Staff, too, reported having more pride in their school due to using the garden in their teaching, because it is inspirational and adds to their skill set.

#### IMPROVED RELATIONSHIPS WITH STUDENTS WHO STRUGGLE IN THE CLASSROOM

The alternative setting and the physical nature of gardening activities is reportedly having a positive influence on students who face challenges in the classroom setting. Teachers and parents reported this provides the opportunity to stand out in other ways. One teacher told of one girl with problems in class who blossoms in the garden and eagerly shares her knowledge with others. One boy, “*with attitude and who mucks around in class*” is reportedly keen to help out in the garden. Parents indicated that the garden had helped students “*come out of their shells*” and that it appeared to have a therapeutic, calming effect on them.

#### THE SCHOOL GARDEN PROVIDING OPPORTUNITIES FOR LINKING WITH THE COMMUNITY

Ngatimoti School’s garden has been an ideal vehicle for incorporating their strong focus on community participation and linkages. The school asks for community support if needed, and members of the wider community willingly contribute in a number of ways: e.g., by looking after the garden in the holidays; donating seeds and seedlings; providing cooking suggestions and assisting with cooking; and fundraising using food from the garden. In return, produce grown in the school garden has been shared with families, and the community uses the school garden to socialise together. Having parents regularly visiting the school (there is an ‘open door’ policy which welcomes the parent/caregiver community into the staffroom), encourages their close involvement with the school garden. They are kept informed of the garden’s progress in a number of ways: through the school website and online newsletter; through the parent group; and the Ngatimoti School Festival Fundraiser.

The school has entered produce in the local A&P show and other events, and they have sold home-made lemonade and hazelnuts picked from a neighbour’s garden at their own annual festival, which in 2009 attracted 5,000 visitors.

Although the school is not dependent on support from local businesses (“*We have our budget and expertise in-house ... and share that rather than looking elsewhere*” – Principal), they have had plants donated by a local nursery and material from Mitre 10.

#### HOME TO SCHOOL: A TWO-WAY TRANSFER OF KNOWLEDGE AND SKILLS

As stated above, most families in the Ngatimoti community have a well established history of gardening. Parents have a wealth of knowledge and experience about the climate and what edible plants grow best in the area. Because of this, garden-related learning at the school is very much a two-way process. Parents

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contribute with their expertise, and students who have been involved with gardening at home share their knowledge with their peers and teachers.

Conversely, the school garden has influenced gardening at home. Children indicated that they had taught their parents about good garden practices learnt at school, including not to water in the sun “*because it can burn the leaves*”; to put net around strawberries “*so the birds don’t eat them*”; and “*not to pick vegetables before they are ready, and that ‘snails are bad’*”. Parents reported their children have asked them to grow vegetables they themselves would not have thought of, and that they turn to their children for advice (“*I always pick her brains*”). Parents aiming for self-sufficiency in their own food production commented how useful it was to have these skills reinforced at school. Almost all the students interviewed said they have home gardens and help out in them. Several parents reported starting a home garden because of the one at school, with help from their children.

Thanks to their experiences at school, parents also reported that their children show more interest in cooking at home. In addition, the range of food now cooked and eaten at home has expanded as children provide suggestions based on what they have cooked at school.

### **CHALLENGES**

According to staff, challenges for Ngatimoti School’s garden have mainly centred on the size of their garden not catering sufficiently for a recent and consistent increase in the number of students. It has meant that the time spent in the garden has had to be cut down to allow for all to partake. The issue of size versus number of students was also reflected on by students who indicated that “*it worked better before with less people*”. To cater for the extra classes, the school was planning to add two new garden beds.

Students who were part of the garden group also expressed concern about fluctuations between the overabundance and insufficient supply of garden produce – a typical challenge for most gardeners. As two boys explained... “*At times, there are not enough vegetables for all of us to eat and sometimes we have 20 lettuces but nothing to go with the salad*”.

Although parents generally help out over holidays, some parents indicated that it can be challenging to get consistency around this type of support.

### **SUSTAINABILITY AND FUTURE DIRECTIONS**

The long term goal for Ngatimoti School is for the garden and orchard to support the school to be self-sufficient in its food provision. Plans for the future include creating more gardens; adding a sundial and weather station; children doing more garden related activities (e.g., having home garden competitions, and creating a cook book using garden produce); and expanding their orchard. Ngatimoti School’s garden has been “*really good right from the opening event*” and is “*it is quietly growing*” (teacher). To ensure that the garden is sustainable into the future, the school has created ‘vision maps’ with timelines and milestones to aim for. The garden is also in the schools strategic plan and features strongly in the BoT business plan.

One parent sums up the general attitude amongst those interviewed towards the benefits of the garden for students...

*“The learning by doing experience offered at the school at an early age provides a good base for later in life... a connection to the land, oneself, friends, the community and other living things”.*

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## RIVERTON PRIMARY SCHOOL: PART OF AN ‘EDUCATION COMMUNITY’ GARDEN

### INTRODUCING RIVERTON PRIMARY SCHOOL

Riverton Primary School is located in the small seaside town of Riverton/Aparima about 40 kilometres west of Invercargill. Formerly it was a Decile 2 school but is now classified as Decile 5 due to an influx of dairy farms, resulting in a drop in funding while remaining a school with many lower socioeconomic students. It has quite a diverse range of families (involved in farming, the environmental movement and the freezing works, as well as ‘alternative lifestylers’ and artists). 30-40% of families identify as Māori. It is regarded as a supportive community.

During our two visits, we interviewed the Principal, the garden lead Teacher and eight students from Riverton Primary School. In addition we spoke to staff at the other three education settings in Riverton also involved in the garden project: a previous teacher from **Aparima College** (who is heavily involved in organic gardening, is a leading member of the South Coast Environmental Society and who contributes articles to national gardening magazines); the Acting Head Teacher and Head Teacher from **Riverton Kindergarten**; as well as a teacher and Manager at **Riverton Playcentre**.

### INTEGRATING HEALTH AND WELLBEING INTO EVERYDAY PRACTICE

Riverton Primary School is committed to a whole-school, holistic wellbeing approach to teaching and learning, with the belief that students learn better if they are physically and emotionally well. This is strengthened by being part of Health Promoting Schools (HPS) and Fruit in Schools (FiS) – initiatives that are considered to have supported education as well as health outcomes. The school is also an Enviroschool with an environmental group involving students across all year groups. The edible garden is seen as both complementing and strengthening Enviroschools in many ways, e.g., both inspire students’ interest in growing; both focus on nurturing the environment; and Enviroschools teaching resources support garden-related learning.

The school’s strong focus on student wellbeing extends to behaviour management, which now follows a Restorative Practice approach. This approach involves family group conferences and encourages students to take responsibility for their behaviour and to put right any wrongdoing.<sup>33</sup>

### GARDENING AT RIVERTON PRIMARY SCHOOL

#### THE RIVERTON ‘COMMUNITY’ GARDEN – A JOINTLY MANAGED INITIATIVE

Unlike at other schools and ECE services, where the garden is situated within the school/ECE service grounds, the garden at Riverton is located in the surrounding community. The idea of establishing the garden originated when the playcentre manager saw an opportunity to utilise a neighbouring empty half hectare paddock formerly grazed by horses. Close connections between the education settings enabled the establishment of a five-person committee to jointly plan an edible garden in the paddock. The committee approached the local Council to lease the land and were eventually granted a Licence to Occupy for just \$1 per annum.

At Riverton Primary School, an edible garden had previously operated successfully by a former teacher and smaller class plots were still being used. The Board of Trustees (BoT) was supportive, and parents were already involved in planting and fundraising so the idea of the community garden was a natural extension of what they were doing. Amongst staff in the other settings, existing practices and policies, and the opportunity for children and adults to learn about sustainable living prompted interest to participate in the community garden.

The committee met several times to plan the garden and, in late 2008, an application was made to the Nutrition Fund. The funding has been used to purchase a garden shed, gardening equipment and vegetable seedlings.

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<sup>33</sup> This programme is based on Marg Thorsborne and David Vinegrad’s Restorative Practices in Schools: Rethinking Behaviour Management.

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There were differing views amongst committee members about how the garden should be prepared. These views ranged from using an organic approach versus spraying; applying a long term vision for sustainability versus getting stuck in straight away to enable quick results; and using raised garden beds and boxes versus utilising the natural layout of the land. Eventually they agreed on a long term, organic approach. They mowed and then ploughed the paddock, before sowing winter fodder greens to enrich the sandy soil with nitrogen, and to attract beneficial insects. They then sectioned the paddock into four areas, and planted black currants to divide the paddock in two. The college agreed to look after half of the plot and the other three institutions each had a sixth to develop and maintain.

Primary school classes were involved in the set-up phase in a range of ways: some helped design their plot; others decided what to grow and bought seeds from a garden centre, then raised seedlings in their existing class plots and sprouted seed potatoes before planting them out in the larger garden. Some students planted fruit trees and other planned to help construct garden boxes for the kindergarten.

#### LOSING MOMENTUM AND A SUBSEQUENT CHANGE OF APPROACH

During the first year of the Riverton community garden, a number of problems were encountered within the cluster – some relating to its size and location as well as the multiple custodians involved. These included:

- Problems related to keeping plants watered over the first summer due to the sandy soil and absence of an on-site water supply. This was rectified in spring 2010 by tapping into the play centre's water supply;
- Distance from the kindergarten posing an issue in regard to supervision of the children (e.g., to walk across the road to the garden parent support is needed), limiting the time they can spend tending their plot;
- Crop failure;
- Staff turnover; and
- Different needs and aspirations for the garden amongst participants compromising an agreed and common approach.

In the first instance, these practical challenges meant that momentum for maintaining and continuing to develop the garden died off. Without buy-in to a common approach amongst the different parties involved, the cluster model also lost momentum with committee meetings taking place less often. For the Primary School for example, it was important that they could see progress and results fairly quickly to keep students (and teachers) engaged. Although the benefits of a long term approach were appreciated, it did not meet this particular need. Over time, a more individualised model developed within the cluster, with each party applying their desired approach to ensure progress in their part of the garden.

#### STARTING OVER AND CONTINUED MAINTENANCE OF THE GARDEN

After the problems experienced during this initial period, the primary school Principal met with her student leadership team to discuss reasons for the crop failure, and they came up with a winter project plan to build up the soil. In 2010, with the return to the primary school of a staff member with an interest in assuming the role of garden lead teacher, the school managed to get the garden back on track. By then, the school caretaker had been allocated dedicated time each week to help with the garden and the Principal's own involvement was stronger.

Helped by the caretaker, an outside contractor removed all weeds, before levelling and mowing the site, and creating a bank with native trees to shelter the garden. Carpet was laid around the native plants and fruit trees planted inside the shelter bank. The funded garden shed was erected, enabling equipment to be stored on site, and 14 garden beds were constructed out of macrocarpa, which vertical groups of eight to ten students maintain.

Student garden groups are self-managing, with minimal teacher supervision, and the older students mentor the younger ones. Each garden is organised differently, e.g., some are sectioned with string, and each group decides what to plant and how. As well as working in 'Golden Time' (recreation) on Friday afternoons, some students work during breaks. Students mentioned that, to make the garden groups sustainable, Year 5 members will become next year's leaders.

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Progress in the ECE settings also increased in 2010, with four of the garden beds allocated for the playcentre and kindergarten to maintain. The ‘vegetative matter’ in the college plot was left undisturbed, thus ensuring the ongoing improvement of the soil quality, with the beneficial perennials covering the soil and the wind being largely tamed by lupins.

## TEACHING AND LEARNING IN AND AROUND THE GARDEN

The garden project aligns well with Riverton Primary School’s inquiry approach to learning, which focuses on locally relevant needs and purposeful learning with authentic outcomes. Each year a learning theme is developed and taught across the curriculum and ways of incorporating the garden into these are considered. For example, in 2010 the overall theme focused on how they can make their school a great place to be. In Term 2, students investigated what makes a great group and utilised the garden as a setting for exploring group roles and responsibilities. In Term 3 the focus was on the environment, with Māori myths and early settlements being investigated. As part of this theme, students learning traditional Māori knowledge and skills, by growing rīwai (potatoes) in buckets as well as the main garden and the flora and fauna of the area through field work led by local iwi leaders.

Staff also indicated that the garden fits well with the key competencies from the new curriculum (e.g., Values, Thinking, Language, Managing Self, Relating to Others, Participating and Contributing), which are embedded in the above mentioned yearly cross-curricular learning themes.

With the recent acceleration of garden activities, and particularly as these are led by the students themselves, learning opportunities were considered to be increasing. Examples include: organising filling the beds with soil and compost – and then having to deal with convolvulus brought in with donated horse manure; Year 6 leaders being asked to talk about the garden in assembly and recruiting new members; and choosing what they want to plant from the seeds supplied by teachers.

In the other settings, early opportunities for students to learn from gardening were also identified. These included:

- Junior College students learning about garden-related topics in science and geography classes, e.g., that some plants such as asparagus can thrive on sea water; incorporating traditional Māori ways of growing (e.g., learning about using digging sticks and foraging for food), and investigating ‘rīwai’ (Māori potatoes) through a science project.
- Asking kindergarten children open-ended questions about plant growth (e.g., ‘*What will happen if...?*’) and teaching about the “circle of life”, learning plant names in both English and te reo, trying out traditional Māori recipes and learning about kaitiakitanga (caring for the environment).
- Playcentre children weeding their garden beds; using seed starter packs to plant seeds, e.g., squash, cucumber, sprouts; discussing at mat time about what they wanted to grow, before a small group chose seedlings at the hardware store.

## IMPACTS

Although the community cluster garden has not had a long time to become fully operational, some early impacts have been observed. These are detailed in the following sections.

### STUDENTS BECOMING INTERESTED IN GARDENING

At the Primary School, an increased interest in becoming involved in the garden has been observed by staff. At ‘Golden Time’ (when students opt for various recreational activities) many are now choosing gardening over playing. In terms of wider student learning, the original groups (comprising those most interested in gardening), have been multiplied as more and more students want to be part of a gardening group. As the number of student groups is expanding, more beds are built to cater for them.

### LEARNING ABOUT GARDENING

Through their involvement in preparing for and setting up their own garden plots, significant learning has occurred amongst the Primary School children according to staff. They have reportedly learnt to grow vegetables from seed and to care for the plants (e.g., through watering, weeding, fertilising, and keeping pests away), about pruning fruit trees and netting peas. They have also been made aware of the benefits of planting a winter crop to prepare the soil. Primary School students themselves reported growing a wide

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range of vegetables (e.g., peas, carrots, lettuce, silver beet, potatoes, pumpkin) as well as sunflowers and strawberries.

Playcentre children have learnt at mat time what plants need to grow (e.g., sun, water, soil); and in small groups they learnt to plant vegetables out in sections (e.g., broccoflower, silver beet, lettuces) by digging holes with spades, watering the holes, then planting seedlings gently and covering them with soil. Meanwhile kindergarten children have learnt about soil; observed the time it takes vegetables to sprout and grow; and the importance of food storage as part of crisis preparation.

#### IMPROVING HEALTHY EATING PRACTICES

Primary school staff believed that it was hugely important for students to learn to be healthy, indicating that this was not always a priority at home, and that the garden was an effective means to encourage this. They had noticed that students were keen to eat the food they grew themselves, and that some students now chose to vegetables they had not eaten before. Moreover, they were interested in growing enough to feed the teachers. Playcentre children were also reported to be choosing new foods as a result of their garden-related experiences.

#### GAINING KEY COMPETENCIES

Across the Primary School and the ECE settings, staff reported observing how their students and children are gaining important life skills as a result of working in the garden. These include:

- Cooperation/Team work/Communication – by having to take turns and listen to one and other
- Patience – by watching things grow
- Resilience - through learning from failure
- Responsibility – by taking care and nurturing plants
- Helping others – through older children help younger ones or through supporting those with special needs

Students from the Primary School described how they collectively reach practical solutions (i.e., problem solving) to issues they encounter, e.g., sourcing materials from home, such as plastic netting and bamboo stakes to grow beans up; using a sprinkler to save time watering; and, to avoid using sprays, experimenting with organic pest control, such as slug traps (using water and yeast in plastic bottles).

Kindergarten staff had noticed how the garden worked particularly well for boys as they get to do something physical whereas Playcentre staff indicated that these types of impacts had been successfully extended to children aged under two, by involving them in garden activities.

#### **THE SCHOOL GARDEN: A TOOL FOR LINKING WITH THE COMMUNITY?**

The edible garden underway at Riverton is linked to the community in various, mostly informal, ways, such as donations of seeds and seedlings, dairy farm manure, equipment etc. The Primary School has encouraged students to engage parents, and on occasions more senior people in the community have also contributed their expertise in the form of advice and practical assistance to the student groups, while the ECE services reported increasing engagement from families. The garden's location outside the school/ECE service grounds makes it more visible and accessible to the wider public, and stories about the garden are shared through school/ECE service newsletters.

Through a “green day” fundraiser the school raised money for worm farm containers, and meanwhile the South Coast Environment Society is supporting the community garden initiative by providing free advice, such as around organic/permaculture concepts and methods, and by making heritage seeds available. The local nursery has donated seeds and seedlings, and it was indicated by staff that partnerships with businesses is likely to become more important with the Nutrition Fund no longer being available.

#### PRACTICES, ATTITUDES AND KNOWLEDGE TRANSFERRED TO THE HOME ENVIRONMENT

Although it was still ‘early days’ for garden-related benefits in the home to be occurring, the Principal sees children as a catalyst for this to happen, anticipating they would take their enthusiasm home with them and share the knowledge and skills they had learnt around growing and eating their own food. The kindergarten indicated more gardens were now being planted at home.



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## CHALLENGES AND SOLUTIONS

The overall challenges of the Riverton ‘education community’ garden have centred on the large scale of the project. The need to communicate across the four settings and to take small simple steps, therefore, has delayed progress to a certain extent.

*“We have had to learn to accommodate different approaches, from ‘purist’ to pragmatic, and original plans have had to be adjusted”* (Primary School Staff).

For the Primary School, ongoing challenges in sustaining progress in the garden include limited time available for the Principal and other staff to supervise and manage the project accompanied by a low interest generally amongst teachers (only two are fully committed, with others seeing the garden as an add-on activity). However, the Principal is committed to applying a whole-school approach to extend the benefits of the garden.

Continuing challenges reported at the other settings include:

- Lack of ECE staff time to fit the garden into the teaching day (e.g., they hadn’t managed to develop all of their beds); caring for the garden over the summer holidays; parent involvement (at the Playcentre all parents work, and the parent-child ratio inhibits the kindergarten visiting the main garden, which is some distance away and unfenced);
- Although the person maintaining the college plot reported the garden is “*still ticking over*”, involvement of college staff and students is minimal, in part because he is no longer employed there.

## SUSTAINABILITY AND FUTURE DIRECTIONS

All parties involved in the Riverton community garden expressed confidence that the initiative will continue. The infrastructure now in place at the primary school to support the garden reflects the school’s commitment to its long-term success. Students also voiced their desire for the garden to provide a sustainable source of food, with one commenting that “*the truck that delivers the [FiS] fruit might not keep doing that, so that’s why we need to plant fruit trees*”. The Principal’s future goals for the garden, alongside ongoing support for the dedicated student garden groups, (involving them in problem-solving rather than just physical labour), are for the garden to be part of a whole-curriculum focus. The Lead Teacher is planning to initiate this in 2011, e.g., focus on “the environment: renewable and sustainable”. With cooking not yet incorporated into garden activities at the school, this too is expected to start in 2011.

Future plans at the ECE services include: using vegetables in morning teas; staggering planting times and giving any surplus produce to the families/community; developing their own teaching resources; increasing community involvement; and visiting the main garden more so that children have the freedom to explore. It is hoped that as children go on through to school and later, college, their knowledge and skills will become more refined and sophisticated.

The person maintaining the college plot is hopeful of renewed interest at the college. He plans to involve students to plant amongst the green crops without exposing soil by ‘crimping’ (crushing crops so they don’t re-grow, but continue to provide shelter and nutrients). In this way he believes that the long-term sustainability of the college plot is assured, benefiting as it is from having no exposure to sun and wind, no cost and no need to water or mow, with perennials always re-sprouting and providing their natural protection without any intervention.

Overall the garden was seen to project a good community feel, and it is hoped that in this wider context, Riverton’s edible garden will become an ongoing feature of the social and physical environment of Riverton.

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## ST JAMES SCHOOL: CARING FOR THE COMMUNITY THROUGH GARDENING

### INTRODUCING ST JAMES PRIMARY SCHOOL

St James School is a Decile 1 Integrated Catholic primary school located next to a Catholic church in the suburb of Aranui in Christchurch. It has a roll of approximately 100 students, made up of 60% Pacific (predominantly Samoan), 20% Māori and 20% other ethnicities. As a result of the recession many families in the area struggle to maintain regular employment, which is resulting in financial crisis and transience. In addition, immigration-related issues are a concern for some new migrants. The school tries to help by putting parents in contact with support agencies, and it does what it can to reduce the cost of children's schooling needs. Despite these difficulties, there is a strong sense of community amongst the school's families, and they are supportive of their children's education.

The school's core values (aroha – alofa – love; family values of caring and sharing; secure learning environment; culture of peace; responsibility for self; and high expectations) provide the framework to help students feel at home. The school vision reads: *'Together in faith we develop as learners on our pathway to success'*. The school has a supportive Board of Trustees (BoT) and emphasises the importance of student consultation.

*"All ideas come from the students. We let children take the lead and make learning opportunities as they do"*  
(Staff).

During our two visits to the school, we interviewed the Principal, the garden lead teacher, four other teachers, six parents and 27 students.

### INTEGRATING HEALTH AND WELLBEING INTO THE SCHOOL'S EVERYDAY PRACTICE

Prior to gaining Nutrition Funding, St James School had a strong existing emphasis on health and wellbeing, for example, it is a water-only school and was one of the first schools to get rid of its tuck shop. This focus has been strengthened through the school's commitment to several interlinked wellbeing-related initiatives, with which the garden closely aligns. These initiatives provide a structure to the health and wellbeing and environmental focus, and include Health Promoting Schools (HPS), Fruit in Schools (FiS) and Enviroschools. These initiatives have encouraged the school to embed whole-school approaches in what they do. The school has been involved in FiS since it began in 2005. FiS supported the school to focus on physical activity and sun protection in addition to healthy eating. FiS is integrated as *"part and parcel of the gardens"* through *"showing children and families how to grow their own food ... and letting them experiment"* (Staff). All surplus fruit goes home to families, and fruit peelings go into buckets for the school worm farm and bokashi.

Under Enviroschools, each class has responsibility for maintaining a dedicated area of the school grounds, as well as representation on the Envirogroup. As part of their Enviroschools focus on waste, the school's teaching unit, 'Waste not, want not', includes discussion about the interdependence of species, and the consequences of species extinction. The garden came about as an 'off-shoot' of Enviroschools. The school is also involved in other environmental projects, including Education for Sustainability (EfS) and planting /caring for the Bexley and Charlesworth wetlands.

### GARDENING AT ST JAMES SCHOOL

#### ESTABLISHING THE GARDEN

Given the school's commitment to supporting wellbeing and the environment the next logical step was to start an edible garden. When the Nutrition Fund was offered in 2007, the Principal and BoT saw it as the perfect opportunity to realise this plan as they try and steer away from fundraising within a school community that is already facing financial challenges.

*"Without the money we wouldn't have done it. We would have had to raise the money in other ways"* (Staff).

One of the first steps was a consultation with students, and the garden layout largely corresponds to their designs. Firstly, teachers asked classes what they wanted; then the lead teacher and three children visited another Christchurch school with an established garden. They asked pre-arranged questions and visually recorded the garden and after their visit wrote a brief report about what they had observed. Subsequently,

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experts from the Christchurch Community Gardens (an initiative to encourage gardening skills and self-sufficiency amongst communities in a number of suburbs) came to St James and talked to the children about practical aspects of starting a garden (e.g., different designs, the best location, what to grow).

Because they were not quite sure how the garden might be kept going, and to limit vandalism, the school decided to position the garden in the main area of the school, rather than out of sight. Nutrition funds were used to construct planter boxes (which are oiled regularly to maintain them), soil, pavers, weed mat, plumbing from a tank off the neighbouring church hall, and bark. The boxes were designed to be the right size and height for children to easily work in the garden, as well as sit around and talk. Help to build the garden boxes came from Christchurch Community Gardens, as well as a community trust to assist people back into the workforce, parents and parish families. Children were also involved in building the boxes, after which they planted their first seedlings, donated by a local nursery where a parent worked. The lead teacher's class became the original garden team, and they conducted a survey to find out what other students wanted to grow. Formal celebrations were held to open the garden, which was blessed by the parish priest.

Parents reported that they and the parish were delighted with the garden, regarding it as helpful in light of the current difficult financial situation of some families. In retrospect, staff indicated that involving a wider committee and agreeing to formal action plans might have made the process of establishing the garden easier.

#### MAINTAINING THE GARDEN

With the garden's prime location in the school grounds, effort is made for it to be aesthetically pleasing: as one student commented, "*It makes the school look nice and clean*". Each class has a bed for which they are responsible and their own set of tools. They decide what they want to grow, plant and tend their patch, generally by individual students allocated a particular responsibility, e.g., watering. Until recently, the garden team was made up of students from various classes either voted in by their peers or selected by their teachers. The group met on a regular basis to monitor the garden's overall progress. Now the Enviroschools group has taken up the oversight role they played, reporting back to class with identified issues, in the garden as well as elsewhere around the school. Overall however, mostly children's involvement in the garden is self-directed and informal, and individual students often work there at lunch time.

Developments being considered by the school include the idea of organic growing, planting lemon trees and building a hot house to grow seedlings. This idea for a tunnel house came out of a survey of the students, some of whom then investigated prices, sizes and materials. With funding for the garden being depleted, they also investigated fundraising to pay for a hot house. One possible fundraiser is to publish a recipe book with easy recipes using fresh produce from the garden.

#### TEACHING AND LEARNING IN AND AROUND THE GARDEN

The school has developed an approach to student inquiry and thinking skills that they call 'Pathway to Success'. Success is an acronym for: **S**tart, build on what we know – **U**nderstand, use what we know – **C**hallenge, develop the big questions – **C**reate to deepen your understanding – **E**valuate, stop, look, learn, listen and reflect – **S**hare the new learning – **S**howcase the learning to the community. The school views the health and environmental initiatives they are part of (i.e., EfS, FiS) and the garden as useful contexts for this learning as it allows for purposeful learning.

The cultural background of the students is also reflected in some garden activities. For example, signs have been written in Māori and Samoan; and the garden has linked in with Māori legends and vocabulary. Teachers refer informally to maramataka (the Māori Calendar).

#### EXPLORATORY LEARNING

The garden has proven to be a useful learning tool, so that the school is seeing its importance beyond the edible side of it. Overcoming the ongoing challenges with the garden is a big learning experience for all, such as: trying to grow pumpkin, but discovering they require too much space; broccoli bolting (going to seed); and planting things too close together. Students are also exploring how they might be able to grow taro in the unfavourable climate. The lead teacher indicated that all teachers have "*bought into*" the garden

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as a potential source of learning experiences. Encouraged by its prominent and accessible position, and the manageable size of the class plots, teachers take whole classes out to observe progress, to plant and tend the garden, and to harvest food. The lead teacher commented that greater use of the garden as a teaching tool would occur if more garden-related resources were available, with only limited access to garden-related curriculum resources through EnviroSchools, EFS and the internet.

#### LINKING THE GARDEN TO THE CURRICULUM

Ways the school incorporates the garden in teaching programmes include: whole-school curriculum themes, such as a topic on 'Change', where juniors explored the changing seasonal environment and seniors looked at how insects change. To explore differences in the garden, two classes let crops die off for winter, while others bedded their gardens in by planting mustard seed and other crops for nutrients. In a relationship unit the school incorporated aspects of caring, within which tending plants was included as an example of caring for nature.

Individual subject areas linked to the garden have included: Literacy, such as reading and writing with a garden theme, e.g., some classes read *Jack and the Beanstalk* and others wrote a 'vegetable monster' story book, which is both fictional and factual, in conjunction with Margaret Mahy and a class from a school in India; Health combined with Art/Technology, e.g., in a nutrition/physical activity unit students made their own TV cartoon with clay characters, showing different energy levels from healthy eating compared with not eating well; Maths, e.g., measuring growth in the vegetables; Science, e.g., testing soil pH levels; and Religious Studies, e.g., relating biblical garden stories.

Outside the garden student learning has included cooking lessons with a local chef who passionately volunteers his time. They have made dishes such as spinach soup and students reported using vegetables they had grown themselves, such as tomatoes, cucumbers, silver beet, spinach and herbs, to make things like sandwiches, soup, salads and fritters. The focus on cooking and eating food grown in the school garden has on occasion included visitors, e.g., the children picking produce from the garden to add to sandwiches for afternoon tea. The lead teacher believed this could be extended, e.g., by the chef providing cooking classes for families to show how cheap and easy it can be to create healthy meals.

#### IMPACTS

##### LEARNING ABOUT GARDENING AND THE NATURAL WORLD

Involvement in the garden has enabled many students to learn outside the classroom (which they love) and to gain practical knowledge and skills, e.g., about digging, planting and transplanting, weeding and watering. Activities in their class plots which the students reported enjoying included: planting, watering ("*so they keep fresh*", "*to make it grow*"), watching the plants blossom; and harvesting ("*When it's finished you can eat it!*"). The children interviewed listed over ten different vegetables and herbs they have grown, with some identifying herbs such as basil, parsley and chives. Through studying what is in the garden in their term topic on 'change', children have learnt: that the garden is important for living creatures; that they live in places like under the soil, on and under leaves; and that some are beneficial (e.g., worms and ladybirds) while others are detrimental (e.g., caterpillars and aphids). As well they have learnt ways to encourage good, and deter bad, bugs.

Teachers reinforced the view that children are acquiring gardening knowledge, through seeing plants grow "*from seed to the end product*" and observing seasonal changes in the garden, and an appreciation of the importance of caring for nature. They reported the garden has enabled reconnection with "*an art that's been lost*", such as learning about winter crops and how to manage pests organically (e.g., by picking off caterpillars and snails). Parents also attributed an increase in environmental awareness amongst children to what they are learning at school, e.g., enhancing soil quality with leaf mulch and food scraps.

##### INCREASED AWARENESS OF THE BENEFITS OF HEALTHY EATING

Building on FiS-supported learning about the nutritional benefits of fruit, the garden helps by exposing them to new vegetables, such as leeks and spinach. The cooking opportunities was seen to add to this, by exposing them to "*experience new foods outside of the family sphere where they might just reject them immediately*" (Staff). Teachers said some children's reluctance to try food disappeared after trying little pieces, then "*they kept coming back for more!*". Staff and parents indicated children are showing more knowledge of healthy food

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through growing it themselves. Parents described their children choosing healthy snacks over fast food (e.g., making a sandwich with things in the garden after rugby practice), and telling them fruit and vegetables makes them strong for playing sport.

Many of the students interviewed demonstrated understanding of why it was important to eat fruit and vegetables, listing the five fruit and vegetable colour groups and their health benefits, e.g., *“It keeps you healthy so you don’t get sick”*, *“They make you strong, and help you think and learn”*, *“You have more energy”*, and *“They speed up the metabolism: they burn fat!”*. There was general awareness that fruit and vegetables contained vitamins: *“It comes from food like carrots”*. Many preferred brown bread over white, due to its health benefits. Students have learnt, too, that fruit and vegetables don’t just come from the supermarket. One mother reported her son saying while shopping: *“Someone has taken the time to grow all these, like at home”*. Other parents commented that growing food at school has sparked their children’s interest about where food comes from. Most students said they liked vegetables grown in the garden better than bought ones, with one commenting about unhealthy additives in processed food.

#### IMPROVED COOKING/BAKING AND FOOD PREPARATION SKILLS

Students enjoy preparing and cooking produce from the garden, whereby they have come to recognise both the health and taste benefits of consuming fresh food, including adding herbs to food, such as garlic and coriander *“to get a nice taste”*. That cooking was popular was obvious when a third of students said they wanted to be chefs when they grow up. Students have also learnt the importance of hygiene and safety when preparing food, as one commented *“Put safety first”*. Examples of their knowledge of hygiene included: washing food before cooking, *“because it might be dirty and you could get sick”*, and wearing gloves because *“you can spread germs”*. Knowing the importance of safe handling of knives was demonstrated too: *“You should curve your fingers and use a chopping board”*; and *“If you don’t know how to use the knife you should ask an adult for help”*.

#### DEVELOPMENT OF KEY COMPETENCIES, LIFE SKILLS AND PRIDE

According to the Principal, the school focus on gardening supports children to develop all five key competencies in the new curriculum. Wide involvement by students in the garden has reinforced and broadened their participation and leadership in the way it is managed, e.g., allocating roles and responsibilities around planning and maintenance. Having these leadership opportunities helps to build skills and confidence: *“It makes them feel important and feel better about themselves”*. Students related how the garden encourages self-responsibility and decision-making, e.g., about what to plant (they vote in class after discussing what is suitable to grow). They also indicated it has reinforced the school’s culture of caring for others, possessions and property.

The garden has a positive influence on student engagement, which seems to be encouraged by an element of friendly competition: for example, parents noted their children were seeing who could grow the biggest beans. By growing, preparing, cooking and eating food together, children are learning cooperative skills, such as taking turns, sharing and teamwork. Moreover, teachers reported students don’t have to ask what needs to be done (*“They take responsibility and just do it”*) and are confident children will take the skills they are learning in the school garden forward into adulthood. Teachers identified particular students who receive benefit from participating in gardening activities. Being allocated time after lunch to do jobs in the garden has given one really quiet boy *“the chance to be a leader in a nice environment which is time-out from the classroom”* (Lead teacher). Both he and a female student in a similar situation work unsupervised without needing to be told what needs to be done, which was regarded by a teacher at the school as important *“to help them step up”*.

The fact that students are encouraged to take responsibility in the garden has fostered a strong sense of ownership and pride. The Principal and lead teacher both reported how proud children are of the garden, as they enjoy the rewards of their efforts, show the garden off to their parents and other visitors, and take home what they have grown.

#### THE SCHOOL GARDEN PROVIDING OPPORTUNITIES FOR LINKING WITH THE COMMUNITY

The garden at St James has enhanced the strong family focus at the school by providing linkages with parents and whānau, with children frequently taking produce and recipes home; and the chef inviting the

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community to his cooking classes, which have introduced them to dishes from other cultures (e.g., chop suey), as well as to different herbs. Conversely, the school's desire to explore how to include taro in the range of vegetables available at the school (a request from Pacific students at the school who talked about cooking it at home) was mentioned by the Principal as an example of the school linking with, and respecting, the culture of its community.

Families are kept informed about ongoing developments in the garden via the school newsletter and informal chats as children are collected at the end of day. The community has supported the school garden in a range of ways including through building plant boxes, donating seedlings or seeds, helping making sandwiches, cooking and baking taro scones; and providing chicken manure for the garden. Other linkages and networks developed as a result of the school garden have been with Christchurch Community Gardens; the Māori health promoter from the Public Health Unit (who gave advice about what to grow and provided resources); and another school which has provided seedlings.

#### PRACTICES, ATTITUDES AND KNOWLEDGE TRANSFERRED TO THE HOME ENVIRONMENT

Inspired by the school garden, it was widely reported that home gardens are being started. One teacher said it was "*wonderful*" that the school had the opportunity to encourage this. Parents reported their children show more interest in helping with gardening (e.g., weeding and watering) and cooking at home, and contribute practical ideas learnt at school. One mother helped her son set up his own garden, but it was his idea and he already knew about building up the soil and planting in the best position for the sun. Other examples of influences from school reported by parents included: a boy who brought worms home from school now often collects them from around the yard and adds them to soil in the garden; another boy catches butterflies to stop them eating plants; and a third boy entered his garden in a local garden competition.

Among the children spoken to in class, about half said they grew vegetables at home, such as potatoes, pumpkin, broccoli and tomatoes. All the individual students interviewed had their own garden and have used the food grown to cook with (e.g., tomato and chicken soup), to feed the rabbit and chickens, and in one case to "*give away to those who don't have much*".

#### CHALLENGES AND SOLUTIONS

There were a number of strengths acknowledged by the lead teacher in the school's approach to the garden, including: its central location; having a chef and experimenting with new food; teachers' willingness to help out over the holidays; and most importantly the ownership and enthusiasm of students in and around the garden. At the same time, she identified challenges, which she nonetheless did not consider insurmountable, in view of the widespread pride the garden generates. The main challenges centred on: lack of time and other priorities limiting fuller involvement of teaching staff; ongoing running costs to sustain the garden (with limited capacity to fundraise because of the income level of the community, they will have to rely on their overall budget to fund the garden into the future); and lack of widespread involvement of families limiting the extent of benefits from the garden. Additional challenges included: not enough space for students to grow everything they would like (which on the other hand makes the project more manageable); issues around the weather and climate, e.g., short length of the growing season ("*It's difficult to get anything big enough to eat and then you have to get everything in so quickly before winter*"); maintenance over the Christmas holiday period; and access to specialist knowledge and resources.

#### SUSTAINABILITY AND FUTURE DIRECTIONS

The principal and lead teacher placed high importance on long-term planning and whole school involvement as key to ensure the garden is sustainable.

*"If it's the one teacher and he or she moves on, it may fall over".*

Suggestions to ensure sustainability of the garden included: sharing ideas with other schools and organisations; tapping into the local Community Trust's tool hire/loan system; keeping the image of the garden "*fresh*" and making it a "*celebration*"; and allowing for student ownership. To enable student ownership, it was noted that resources particularly for students would be useful.

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*“Ultimately it comes down to the students taking responsibility, so a child-centred resource booklet is needed to guide them through planning, set-up and implementation” (Staff).*

There is confidence at the school that their garden will continue, due to: the school philosophically taking it on board; its connection with the school’s “big picture” focus on health, wellbeing and the environment; BoT support in keeping it going; and the fact that it is, in a large part, driven by enthusiastic children. The following prayer written by a student encapsulates the special significance of the school garden at St James...

*“May God bless this beautiful garden and help it blossom and grow”*

*Amen*

Liam and Sialoa 2009



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## APPENDIX C – CASE STUDY REFERENCES

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