DEVELOPING FOOD RESILIENCE

IN EARLY CHILDHOOD EDUCATION:

A Lyttelton Harbour Basin Example

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

- Project Lyttelton was interested in understanding if edible gardens in early childhood education were beneficial for promoting long-lasting food resilience in the Lyttelton Harbour Basin.
- After the earthquakes in 2011, the Lyttelton Harbour community was significantly impacted and became isolated for days. As a result, there is now a need within the community towards greater food resilience.
- The study was conducted using both semi-structured interviews and a focus group that included prominent figures within the educational community.
- The short-time frame impacted on the quantity of the results. However, results are representative of the overall trend within the Lyttelton Harbour Basin.
- The findings illustrated significant health, educational, and societal benefits from gardening activities introduced at a young age. Notable limitations to implementing and maintaining gardens at educational institutions were assessed.
- Recommendations include; the introduction of gardening programmes at a national level, with the support of the curriculum, parental involvement and paid employment to maintain gardening programmes.
- A longevity study within the Lyttelton Harbour Basin is recommended to assess the likelihood of food education through edible gardens benefiting to long-life food resilience of the community.

2. INTRODUCTION

As part of the community-led initiative 'Project Lyttelton (PL)', the 3-year long programme 'Harbour Resilience Project' aims to increase food resilience and self-sufficiency in the Lyttelton Harbour Basin (LHB) (Project Lyttelton [PL], 2013) After the 6.3 magnitude earthquake on February 22, 2011, the Lyttelton township was cut off from its surroundings for multiple days as the main entry, the Lyttelton Tunnel, was closed and other access routes were equally inaccessible (Ozanne & Ozanne, 2013). This identified the need for greater resilience and self-sufficiency within the natural disaster-prone zone. The concept of resilience refers to the ability of a system to adapt to crises and disturbances but also the ability to foresee such crises and prepare through recovery planning, aimed at mitigating any negative effects (Pir, 2009). Resilience in food systems is multi-facetted, focussing on processes starting with sustainable food production and ending with waste management, in order to facilitate a more locally-based, independent food system within the community (Pir, 2009). It is inherently connected to the concept of sustainable development, which was defined as "*….development that meets the need of the present without compromising the ability of future generations to meet their own needs*." (World Commission on Environment and Development, 1987, p.43)

Much of the scientific literature stresses the importance of familiarising young children with gardening programmes to enforce life-long awareness of current global issues around food, such as food resilience and sustainable development (e.g. Bowker & Tearle, 2007; Kahriman-Öztürk et al. 2012; Lohr & Pearson-Mims, 2005). This literature also suggests that children as young as three are aware of the importance of sustainable practices concerning food and that these practices are an essential part of early childhood education (ECE).

Therefore this report is aimed at investigating the feasibility of gardening programmes in centre-based ECE facilities (Ministry of Education [MOE], 2010) around the LHB. It also asks the question if gardening programmes can have long-lasting beneficial effects on children's sense of food resilience. Long-lasting is

defined as (a) intergenerational: the ability to pass on knowledge from one generation to the next and (b) the continuity of programmes around food resilience from ECE up until secondary or tertiary education. The report outlines the current state of knowledge about gardening programmes in ECE facilities around the world. Through volunteering at community gardens and with the aid of focus groups and semi-targeted interviews with the community members and educators, the study assessed the current situation of ECE facilities and primary schools around gardening programmes in the LHB. The report summarises multiple benefits of gardening at young ages and presents the challenges that currently stand in the way of initiating such programmes around the LHB. The overall conclusions of the study are summarised in three recommendations for PL and possibilities for potential further studies.

3. LITERATURE REVIEW

Gardening programmes in schools and ECE have been addressed in various ways by the scientific literature. Many studies cite the necessity of gardening programmes early on in education to enable the integration of sustainable practices into every-day life (Bowker & Tearle, 2007). Kahriman-Öztürk et al. (2012) go as far as stating that in an increasingly urbanised world, with increasing anthropogenic impacts on Earth, sustainable development should be an essential part of human life. Climate change and natural disasters, such as the Canterbury earthquakes, also show a need to increase food resilience within communities. Whichever motivation drives the establishment of edible gardens in ECE facilities and primary schools, the literature shows extensive benefits from such programmes. While some studies directly assess the impact of gardening on child obesity and nutrition (Libman, 2007) , others focus on the vast benefits in learning for young children (Duhn, 2012; Nimmo and Hallett, 2008; Stoelzle Midden & Chambers, 2000). Yet others stress increasing social competencies (Bowker & Tearle, 2007; Nimmo & Hallett, 2008) or an increasing

awareness of ecosystems and sustainable use of natural resources (Kahriman-Öztürk et al. 2012; Stoelzle Midden & Chambers, 2000).

All but one of the studies (Lohr & Pearson-Mims, 2005) assess the short-term impact of edible gardens on children. However, the results of Lohr & Pearson-Mims (2005), showing the long-term effect of gardens on food resilience and sustainable practices, lacks the control of essential variables as the study was conducted on adults referring back to their childhood experiences. No study has assessed the quantitative results of childhood gardening experiences on sustainable and resilient practices in adulthood so far. Nevertheless, gardening programmes are highly sought after by parents and are very successful. One noteworthy programme is the Kitchen Garden Foundation (KGF) by Stephanie Alexander, which has been implemented in various schools around Victoria with government funding (Kitchen Garden Foundation, 2013).

Strikingly, many studies and reviews (e.g. Blair, 2009; Bowker & Tearle, 2007; Libman, 2007) focus primarily on primary school age children or pre-teens, but little quantitative research has been done on preschool gardening experiences. Duhn (2012) mentions that such programmes in ECE aren't considered, as society still views ECE facilities as a place of innocence and children this young should not be burdened with highly political concepts such as sustainability. Others (Stoelzle Midden & Chambers, 2000) stress the fact that gardening programmes have to be initiated with the eager motivation of teachers and parents, as (fear of) lack of expertise could hinder a successful programme.

4. METHODS

To get a better understanding of the research area and teaching practices in garden settings, the research group volunteered at the Lyttelton community gardens. During this session, each member of the group was assigned a group of children to take around the garden and teach. This experience aided with getting a better

understanding of the capabilities of children in ECE as well as with getting acquainted with the LHB community. An intensive literature review of relevant studies around edible gardens and their benefits was conducted by each team member, in order to become familiar with appropriate research methods. Based on this, it was decided that qualitative data would be best suited to answer the research question sufficiently.

Four semi-structured targeted interviews were conducted. Semi-structured interviews were chosen as this allowed for some important questions to be answered with the flexibility of adding fitting questions during interviews. The interviews were held at each of the following schools: Lyttelton West Primary, Diamond Harbour Primary, Busy C's Preschool, and Governor's Bay Primary (Fig. 1). Each interview was conducted by two members of the research team, lasted approximately 30 minutes, and consisted of a conversation based around a series of questions (Appendix A), with additional questions added throughout the interview. Two interviews were held with primary school principals, one with a primary school teacher, and one with a preschool teacher. Each interview was recorded and analysed in order to obtain comprehensive data.

Additionally, a focus group was held at the PL headquarters to get opinions and ideas of several participants around the topic of edible gardens in ECE. This informal interviewing process allowed for participants to speak their mind freely amongst like-minded people. The participants included: a parent and restaurant owner from the community, two teachers from Kids First kindergarten, one teacher from Lyttelton West Primary School, and one teacher from Busy C's preschool (Fig. 1). The focus group entailed approximately two hours of discussion based around pre-determined questions (Appendix B). One researcher, the facilitator, objectively prompted discussions amongst the participants. Data was audio-recorded by two group members and later analysed to assess common themes that arose during the discussion.

Data collected from both the semi-structured interviews and the focus group was split into categories based around the initial research question. These categories were: participants' background in gardening education, benefits of gardening

education, limitations to gardening programmes in the LHB, and the relationship between primary school and ECE facilities. Based around these categories and relevant literature, recommendations and future research possibilities were formulated.

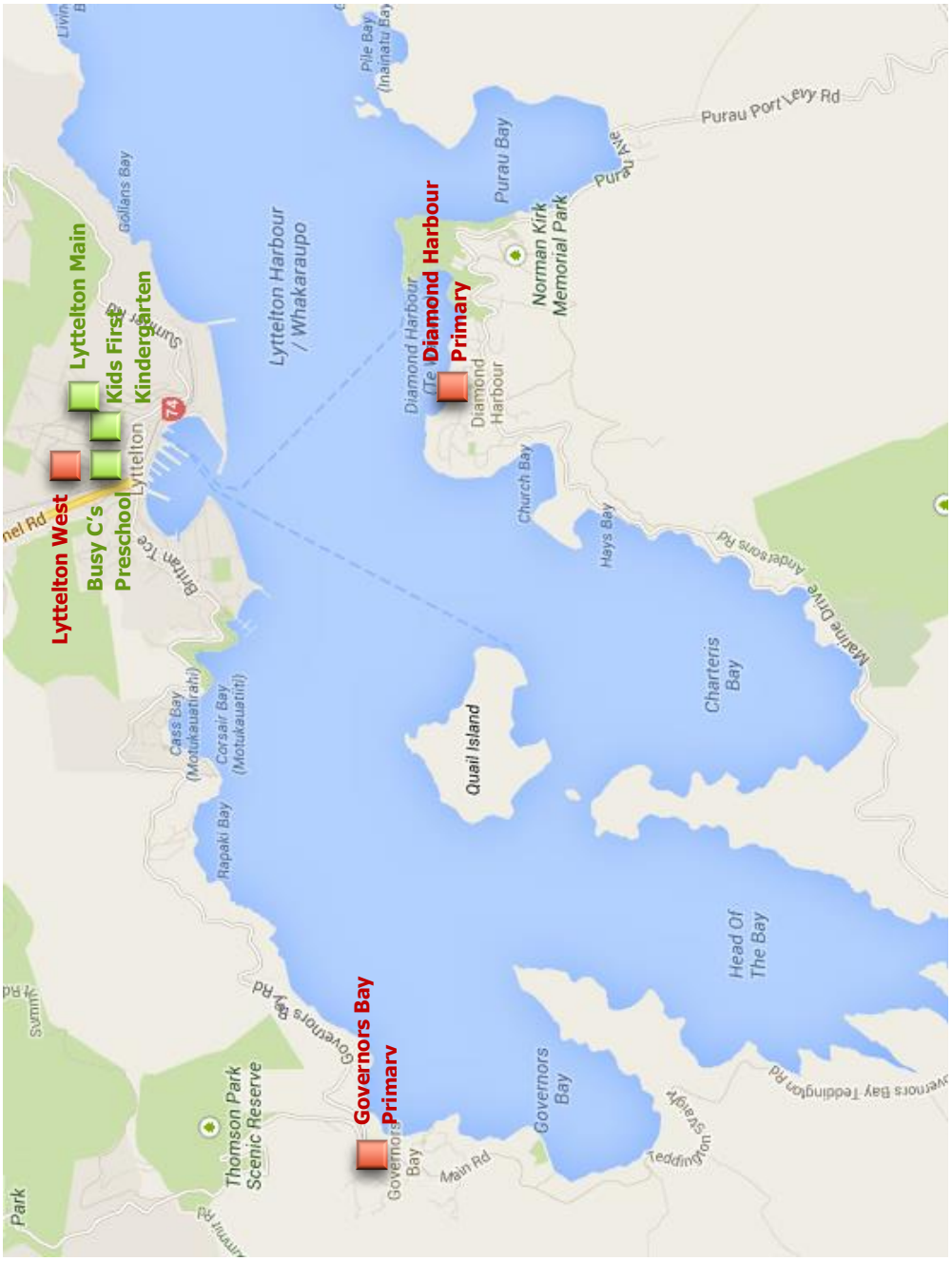

Fig. 1 Map of the Lyttelton Harbour Basin showing (1) the interviewed education facilities in red, (2) teachers from schools participating in the focus group in green.

The methods chosen had some drawbacks that need to be accounted for as they impacted the quantity of the data. The first notable limitation to the study was a short time-frame, which proved difficult as interviews and focus groups are very time intensive methods. These methods require the coordination of numerous participants and conflicting schedules. With only ten weeks to perform research, four interviews and one focus group consumed the entire research process. The methods also required travelling to the research area, which was difficult because the LHB is isolated outside of Christchurch. Although the data obtained was limited in quantity, it is nevertheless representative of the majority of opinions within the LHB.

5. RESULTS

The LHB community values food education and believe in the importance of being self-sustaining and resilient. Therefore, all of our participants were familiar with the idea of education in gardening and the importance of it. The majority of the participants has been or is currently involved in a gardening programme in the LHB. Diamond Harbour Primary, Governor's Bay Primary, Busy C's, and Kids First Kindegarten all run gardening programmes to some extent. Lyttelton West Primary was the only school included with no gardening facilities on site.

Every participant stressed the vast benefits of gardening for children in ECE. The participants outlined three common benefits for children involved in gardening: educational, health, and societal. It was stressed that children are learning more in the garden than '*just how to grow tomatoes*'. In fact, they are able to express imagination, curiosity and creativity. Teachers also noticed a difference in the eating habits of children. Children who had participated in gardening activities were eating more diverse foods. Finally, it was brought up that gardens are a place to work with others, including the wider community. Gardening can help instil a sense of community and teamwork at a young age.

Even though gardening is seen as beneficial by all of the participants, certain limitations can prevent schools from participating in a gardening programme. All school participants expressed facing some limitations due to seasonality of gardening and the cost of such a programme. However, the participants also noted that these limitations could easily be solved. Edible gardens can be maintained during the winter, such as in the form of indoor containers. Funding issues can be addressed through fundraisers and community involvement. Another major limitation discussed was the need for a passionate person to either guide teachers or educate the children themselves. Our participants agreed that it is not possible for a garden programme to work without a dedicated teacher, parent, or community member leading the programme on a regular basis.

The data obtained from the research methods gave the impression that ECE is exposing students significantly more to gardening and food resilience than primary schools. The primary school principals interviewed noted that this can partly be explained by the curriculum. Gardening education is not a part of primary school curricula and therefore other academic subjects are given priority. ECE teachers stated they enjoy more freedom in what they teach, resulting in a greater emphasis being placed on edible gardens.

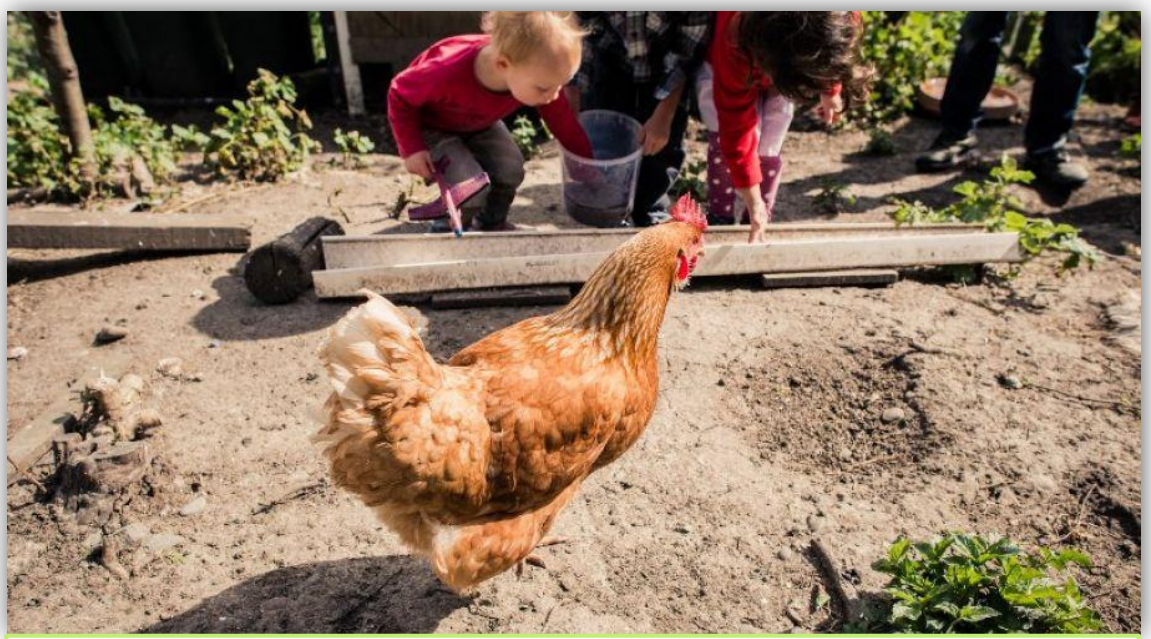

Fig. 2 Community members hard at work at the Lyttelton community gardens. (source: www.lyttelton.net.nz)

6. BENEFITS

This section seeks to expand on the results and will be supported by relevant literature. The benefits have been categorised into health benefits, educational benefits and societal benefits.

6.1. Health Benefits

Children are perceived to spend too much time in the classroom and not enough time in outdoor recreational areas. Furthermore, outdoor recreational areas commonly exclude natural areas such as the garden (Stoelzle Midden & Chambers, 2000). Participants of the focus group and interviews believed that getting children outdoors for activity would encourage spending time away from technology and becoming more aware of surroundings. It can be argued that the garden is a natural classroom where many topical things such as climate change, waste management and ecosystems can be taught (Stoelzle Midden & Chambers, 2000). This natural classroom will help to create children who love spending time outdoors, undoubtedly having a continued effect as they get older.

Our study also demonstrated a change in children's eating habits. Several of our respondents noted a transformation in terms of food preferences and children's attitudes towards new foods. Children began to try a diverse range of fruits and vegetables after having spent time in the garden. The current obesity 'epidemic' is becoming a real threat to young children. Blair (2009) states that broadening a child's perspective on fruits and vegetables and re-personalising that food can be a step towards reducing the threat of obesity. Installing healthy eating habits early will not only ensure that children are receiving a nutritious diet but can also help install such habits at home. Young children are given the opportunity to bring home positive interactions from the garden. In turn, parents adopt new eating habits which could aid in the promotion of long-lasting food resilience (Libman, 2007).

6.2. Educational Benefits

The education of children during the early years is perhaps the most important period of learning. So, should gardens be part of this learning, are they beneficial for a child's education and will such learning be long-lasting? The literature and our findings suggest that edible gardens promote learning in early years. Not only are gardens a place for young children to explore and try new things but they also show children where food comes from (Bowker & Tearle, 2007). Despite the young age of pre-schoolers, engaging them in environmental learning will install a life-long temperament of care for the environment (Hacking & Barett as stated in Duhn, 2012). Gardens can teach children about the growing process from seed to plate. Gardens can also "*introduce young gardeners to local sustainable food systems, as children eat their own produce, compost cafeteria food waste, and connect with adult growers and market gardeners*" (Blair, 2009, 18). Several studies have demonstrated that teaching kids these skills will equate in an increase in environmental awareness, nutrition and will also raise achievement in maths and sciences at school (Libman, 2007; Blair, 2009; Stoelzle Midden & Chambers, 2000). Children from a school that was visited were asked by their teacher about what they had learned thus far from their edible garden. One child responded by explaining the importance of pollination for gardens and food production, basic ecosystem processes provided by the garden environment and the vast biodiversity. This clearly demonstrates an educational benefit that has been gained from the garden environment.

Often the classroom is a place filled with a variety of learning levels. The garden, however, offers a neutral environment for all types of learners. A number of schools we visited had children who struggled with learning in the classroom but often excelled in the garden and were even looked upon as role-models. Children might not remember the specifics of gardening. However, this is not the main role of the garden. This was an important topic that was raised by our focus group participants. ECE facilities tend to have a free-play or experimental learning environment which lends itself to imagination, curiosity and creativity (Nimmo &

Hallett, 2008). Children are able to explore the boundaries more so in ECE than in primary school. This is beneficial, as installing such learning at a young age means that children can continue this experience, even in the structured learning environment of primary schools.

One final educational benefit is the opportunity for kids to learn a range of practical skills such as knowledge about soil nutrition, maintenance of the garden, and cooking (Stoelzle Midden & Chambers, 2000). These skills can be taught early and can hopefully be further developed in primary school. Practical skills open up a new thought process for the children and offer a more applied approach to learning about food resilience.

6.3. Societal Benefits

The LHB is a very community-oriented area. All of our interview and focus group participants mentioned that gardens can be a place for community involvement. Some of the schools and early childhood educators already receive some form of help from community members in the running of the gardens. Community involvement can be a great way of generating external funding and assistance to help maintain the garden for future use. In addition, the involvement of the local community means children are taken even further outside their comfort zones and must learn to interact with their elders (Nimmo & Hallett, 2008).

Fig. 3 Jacqueline Newbound working in the children's section of the Lyttelton community garden. (source: www.lyttelton.net.nz)

A rather different societal benefit to come from gardens is the interactions amongst children themselves. Kids are taught to share food amongst classmates. Some young find it

challenging to engage with their fellow peers in the classroom (Nimmo & Hallett, 2008). However, gardens are a place where kids can socialise in a neutral environment. Many of our participants agreed with this and said that children learn how to mix with other children. Libman (2007) determined that gardening offers positive social interactions and was regarded by parents as the aspect that would have the longest lasting effect on their children.

Although it is hard to quantitatively assess how resilient and long-lasting a garden programme in the LHB can be in such a short time-frame, the benefits discussed undoubtedly have run-off effects that will promote long-lasting resilience within the LHB community.

7. CHALLENGES

This part of the report outlines the limitations of promoting long-lasting food resilience in ECE facilities. Limitations include: school curricula, lack of trained teachers with expertise, seasonality, and lack of space.

Promoting long-lasting food resilience in ECE is met with the difficulty of incorporating food and sustainability education into the school curriculum. Typically in Western countries there is a perception that 'real learning' takes place indoors (Duhn, 2012). There has been considerable debate that education for sustainability should not or does not take priority over traditional subjects such as Mathematics and English, as no quantifiable results may come from it (Blair, 2009).

There are also worries for children's safety in the outdoor environment. Newer learning technologies can offer attractive alternatives that may outweigh the idea of experimental, 'risky' learning in natural outdoor play spaces (Malone, 2008; Palmer, 2006). Although there are many arguments that early education for sustainability is beneficial, the ECE sector, as well as primary schools, has been hesitant in incorporating this into the curriculum. Worldwide research journals have strong opinions about the importance of teaching sustainability. This is not met with much support. There has been an increase in interest from ECE and environmental

organisations, however, it is met with lack of support from government departments (Elliot & Davis, 2009).

Expertise of teachers is an extremely important aspect when teaching children about food resilience as the teachers and principals are the foremost variables in the success of the schools' gardens (Blair, 2009). In Lyttelton, Jacqueline Newbound, employed by PL, successfully leads 'Grow Harbour Kids' and the gardening programmes in educational facilities (PL, 2013). The results of the interviews and focus group indicate that her support is critical in maintaining programmes in the LHB. Problems can arise when teachers are not knowledgeable about gardening practices and aren't confident to pass knowledge on to children. The majority of parents are appreciative about children learning about sustainability and resilience. However, some parents prefer the teaching of quantifiable subjects to increase numeracy and literacy skills instead (Ball &Vincent, 2005). Some parents also view ECE as an expansion of the motherly care received at home, with the aim of maintaining children's innocence in play (Duhn, 2012).

Seasonality is another limitation when it comes to facilitating a garden for children to learn and play in. Numerous teachers mentioned the difficulty of maintaining such a programme during the cooler months. The growth of plants is limited. However, participants also mentioned that this can easily be overcome by shifting the garden indoors, in the form of containers and pots.

Lastly, space can be a limitation. Not every school can commit to making space available for the teaching of the children. Therefore, schools may have to take the children to community gardens. This can be hard for some ECE facilities located further. In this case the school would rely on transport and parents' consent to leave school grounds.

Although there are limitations to installing edible gardens in ECE facilities, the benefits mentioned before urge the endorsement of such programmes at ECE level. The following recommendations can possibly resolve or at least provide some alternative solutions to these issues, which will enable the successful running of edible gardens for the promotion of food resilience

8. RECOMMENTATIONS

In recent years, many authors have expressed increasing concern about how disconnected children have become from nature (e.g. Sobel, 1996). Through our research we have established three recommendations to help sustain food resilience for on-going generations within the LHB.

8.1. Curriculum

"The romantic image of a garden where innocent children can grow and develop according to nature's blueprint continues to shape Western early childhood education philosophy, curriculum and pedagogy." (Duhn, 2012)

Curricula within New Zealand schools haven't changed significantly over the last few decades aside from the introduction of national standards (MOE, 2013). The national standards address consistency issues across all New Zealand primary schools in reading, writing and mathematics. The introduction of garden-based learning would be a change in the way the same curriculum is taught in the classroom by moving it outside into an interactive environment. Although currently the MOE places no emphasis on the importance of interactive learning in the garden, some studies have shown that students who attend schools with developed landscapes demonstrate an increased knowledge of botany and more favourable attitudes toward the environment (Harvey, 1989).

When talking to participants involved in the data collection process, we identified a lack of connectivity in learning from ECE into the primary school level. We believe that introducing a standardised national curriculum in gardening would be of great benefit to the long-life resilience in children not only in the LHB but children throughout the country. A successful example of a working programme is the Kitchen Garden Foundation (KGF) initiative in Victoria, Australia introduced by

Stephanie Alexander, where teachers endorse and support the workings of the initiative:

> *"I believe that education has to be education for life. The children in the Stephanie Alexander Kitchen Garden Program learn how to grow, harvest, prepare and share delicious and wholesome food – experiences that will influence and inform the rest of their lives." - Stephanie (KGF).*

As a national curriculum, this needs to be adopted by governmental organisations and promote gardening and sustainable living through a quantifiable level of grading, including credits, in the same way that national standards operate.

Children who struggle with communicational or behavioural issues could be helped through a change in the curriculum. There is an opportunity for those struggling children to learn, communicate and excel in an environment where kids can interact in an alternative and more open way (Miller, 2007).

8.2. Parental Involvement

When comparing parental involvement at ECE facilities to those at primary school levels, it is evident that there are differing attitudes about the inclusion of parents in the schools weekly routine. We suggest there is not only a need to invite parents to be a part of the learning environment in ECE and primary schools, but also, there is a need to get parents involved by volunteering their time to the schools through activities like maintaining gardens or helping prepare food grown on site. Parents we spoke to suggested that they *"felt that when the child passes through to primary school, they become a burden and want to be asked to involve themselves."*

The continuity of classroom-learning and home-learning could be dramatically helped if the children could take home a part of the garden represented by plants in pots, seeds or produce to encourage the longevity of learning after the school bell rings the end of the day. This would increase the connectivity of gardens as a school subject and gardens as an integral part of life-long learning for food resilience.

8.3. Paid Employment

The LHB community is lucky in the respect that the community has provided every child the opportunity to engage with gardening within the community or school gardens. To enable consistency within each school gardening programme, we recommend a dedicated community member looking after the programme. Currently there is a paid employee assessing, maintaining and covering many aspects of each school's programme. It is hard to determine whether or not employing an outside person is sustainable. However, it is important for consistent gardening standards across all schools. Whether this shows a need for a paid employee or a committed community member is up to the community.

The issue of funding is hard to quantify as each school faces different budgeting problems. Grants from agents within the area are available for the establishment of the initial garden, while up-keep by families and a community partners could help to keep costs to a minimum. If gardening became part of the national curriculum we could assume that funding on a national scale would dissolve any further paid employment recommendations. We will, however, suggest that the availability of seeds and produce could be helped with schools increasing the communication, interaction and sharing with other community parties and schools within the area.

9. FUTURE RESEARCH

Due to the short time-frame of the study, we could only shine a light on small aspects of gardening programmes and their effect on the establishment of long-lasting food resilience within the community Therefore, we suggest a longevity study within the LHB to investigate if there are any benefits to people progressing through the schooling system with edible gardens introduced in ECE. Future research should examine the length of participatory time necessary to make lasting changes on

young people's attitudes and behaviours toward sustainability and food resilience (Libman, 2007).

We suggest the observations of mentally or behaviourally disadvantaged children in gardening programmes to ascertain if participants in such gardening programmes can surpass limitations by engaging in this alternative learning method.

Finally, we as a group, all believe that gardens in schools can positively affect the wellbeing not just of children, but the land, the community and potentially the nation as a whole.

10. ACKNOWLEDGEMENTS

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12. APPENDICES

Appendix A: Interview questions for the semi-structured interviews.

- What prevents all ECE facilities to have a maintainable garden?
- Have you noticed behavioural and educational changes in children who use gardens or participate in sports? Would you consider physical activities to have beneficial effects on children's learning?
- What is the cost of initiating a programme and is it sustainable over long periods of time? Would that cost decrease over time?
- What is your experience/ background/ previous knowledge of gardening/ edible gardens? Have you worked at a school with a garden programme before? If yes, did it have impacts on children's learning? Can children's improvements be attributed to the programme and can you make comparisons. Give examples.
- Based on the children: What is the best way to get information across? Free play or more structure?
- How can we incorporate and combine a gardening programme at the preschool age with the current primary school programme? How would you incorporate it with other preschool programmes or primary programmes within the LHB
- Are there better ways to teach pre-schoolers sustainability and resilience other than gardening programmes?
- In your opinion what is the biggest hurdle to implementing a garden programme other than financial reasons?
- What type of involvement would you expect of parents?
- How do you estimate the enthusiasm of parents for such a programme to be? How do you gain support when parents don't want to be part of it?
- Is this a discussion topic in the ECE/ community already? If so, what ideas does everyone involved in the discussion have?
- Is there any training going on at teacher's college for gardening etc.?
- Are there enough educators/staff? Would recruiting them be an issue? Community involvement?

Appendix B: Focus group questions.

- What specifically would you like the children to get out of a gardening programme?
- Would you implement an edible garden at home to aid/further the programme at the ECE?
- What benefits do you expect from gardening skills taught to children in ECE for ongoing education?
- Are edible gardens installed at ECE a necessity or are trips to the local community garden sufficient for the same learning outcomes?
- If a gardening programme would be included in an ECE facility are there any specific aspects of the garden design you want to see?
- What role should parents play in maintaining a garden in an ECE?
- What should be the role of an ECE facility? Whose responsibility is it to teach children about sustainability/ food resilience?
- Should we be teaching gardening this early on? Are children below the age of five able to garden individually or would they destroy the garden?
- How important is starting a gardening programme/ edible garden to you? Are there any other issues surrounding the ECE facilities that are currently more important?