Final Project Report

# KITCHEN(KINDER) GARDEN: IMPROVING EARLY CHILDHOOD EDUCATION & ENVIRONMENT

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# Introduction

The immediate beneficiaries of the project were students specifically between the ages of 3-6, and the wider community of the Hope Valley Experimental School. The impact of the kitchen garden project on those who participated, and the beneficiaries was significant.

The Hope Valley Experimental Infant and Primary School is located within the community of August Town in Kingston, Jamaica, with a population of approximately 8,000 residents. The community is situated in the eastern part of Kingston and is bounded by the Hope River to the north and the Blue Mountains to the south. The socio-demographics of August Town are diverse, with a mix of both urban and rural characteristics. The community is predominantly working-class, with a high level of poverty and unemployment. The education level in August Town is low, with many residents having only a primary or secondary level education. This has led to limited job opportunities, with many residents relying on informal employment in the informal sector.

August Town has a rich cultural heritage, with a strong tradition of music, dance, and art. The community is also known for its vibrant sports scene, with many young people involved in football, track and field, and basketball. The community is home to several community-based organizations, including youth groups, sports clubs, and community development organizations. Despite the challenges facing August Town, there is a strong sense of community spirit and a commitment to improving the lives of residents. Many individuals and organizations in the community are working tirelessly to address the issues of poverty, unemployment, and social exclusion, and to promote social and economic development.

In recent years, the community has seen an increase in violence and crime, which has had a negative impact on the community's social and economic development. However, there are ongoing efforts by internal and external stakeholders, including the Mona Social Services (MSS) at the University of the West Indies, to address these issues, including community policing initiatives, youth empowerment programs, and the promotion of positive youth activities.

In summary, August Town is a diverse and vibrant community with a rich cultural heritage and a strong sense of community spirit. Despite the challenges facing the community, there are ongoing efforts to promote social and economic development and to improve the lives of residents.

The project under study started during March 2022. The project involved a group of 60 children, ranging in age from 3 to 6 years old, who were purposively selected as the primary target groups. Also, six educators, those that oversee the classes with children ranging from 3 to 6 were engaged in the project as well. Apart from direct school staff other community members and organizations worked with the project team to achieve the project goal. These individuals and/or groups include the Lions Club of Mona, the Greater August Town Community Development Council and Mona School of Engineering.

The location for the kitchen garden was a small plot of land within the compound of the Hope Valley Experimental Infant and Primary School. The benefits of the kitchen garden project were far-reaching. The children were able to learn valuable skills such as gardening, teamwork, and responsibility, while also gaining a sense of accomplishment as they watched their garden grow. Some of the primary differences experienced due to the implementation of the kitchen garden were:

1. Provision of a balanced healthy meals for students while at school – because many students are from a low-income background (households earning minimum wage or less), resources at home to provide a healthy and nutritious meal are often inadequate. Therefore, the kitchen garden provided supplemental produce in the form of vegetables to complement the schools feeding programme. Additionally, in instances of surplus, children and/or staff were also able to take home the produce they harvested, which helped to supplement their families' diets with fresh and healthy fruits and vegetables.
2. Provision of a natural space for children to engage in play and for teacher to use to supplement their teaching. The garden serves as a green area where children can play and interact with nature given that the school compound is predominantly concrete. Additionally, the garden is also a teaching tool that facilitates teachers to incorporate it within their lesson plan to reinforce concepts being taught in the classroom.

3. Provision of an alternative water source to be used when water disruption occurs. This reduced the need for classes to be dismissed thereby increasing access to education for over 1,000 students. Considering that classes are often disrupted by the lack of water provision by the National Water Commission, the installation of the kitchen garden and a wastewater source, allows for the conservation of water to be used by the garden and sanitation facilities.

A Froebelian approach places a strong emphasis on the child's individual needs and interests and provides opportunities for children to explore and discover the world around them in a safe and supportive environment. The kitchen garden project supported the Froebelian approach to early childhood education by prioritizing the following principles:

1. Play-based learning: when children visited the kitchen garden during circle time or nature walks this interactive time facilitated guided freedom for children to play with nature by feeling, touching plants, playing in the soil while they assist with the watering of the plants. The kitchen garden gave the children an opportunity to interact with nature, which is frequently rare in their communities given their underserved and marginalized location. This Froebelian approach of engaging with nature also facilitated the early childhood curriculum as well as children's participation in, and witnessing of, several transformative cycles of nature, such as the changing of a seed into a plant or fruit. The process of engaging nature is the recognition of the interconnectedness between the child and the natural world. Nature provides an ideal setting for children to develop their physical, intellectual and emotional capacities.
2. Child-centered approach: the garden facilitated freedom through guidance which allowed educators to utilize the garden, ensuring that play corresponds to each child's unique needs and interests using 'gifts' and 'occupations'. The use of the garden at Hope Valley Experimental has encouraged children to use the garden to display their strengths and interests, whereby teachers saw children engaged in song development showing creativity, as well as students demonstrating dance moves that mimic gardening practices. Additionally, there were instances where children have used the garden tools to incorporate in their building and re-counting of stories to their peers.

3. Creative expression: the use of song and dance by children in the garden facilitated and encouraged children to express themselves creatively through art, music, and movement. Utilizing the kitchen garden educators shared that students composed and participated in songs and dance to communicate actions and concepts related to planting and other subject matter.
4. Social interaction: outside of guided interaction in the kitchen garden facilitated through nature walks and circle time, children were allowed to play in the garden. Usually, children engaged in play within classroom or indoors, however, the use of the garden allowed for the development of cooperative play while interactions facilitated a sense of community and empathy.

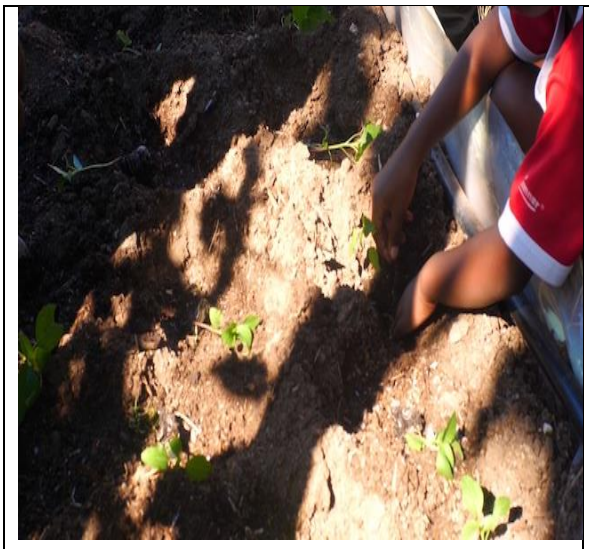
Our experience implementing this project has provided us with several lessons that we wish to share with other stakeholders – non-governmental or community-based organizations who may wish to undertake a project of this nature. If you are undertaking the implementation of a kitchen garden project, please consider the following:

1. Plan ahead: Before starting the project, take the time to plan out the garden layout, the soil appropriateness, types of crops to plant, security of the produce and the necessary resources and materials. In this regard a carefully plan budget is essential. Consider too the needs of the project and its beneficiaries, and make sure to plan for the long-term maintenance and sustainability of the garden.
2. Engage the community: Involve members of the community in the planning and implementation of the project. This can help to build a sense of ownership and pride in the garden and can also lead to valuable partnerships and support.
3. Invest in quality resources: Choose high-quality material, seeds, tools, and other resources to ensure the success of the garden. This will also reduce the need for costly replacements or repairs down the line.
4. Provide education and training: Offer education and training to project participants, especially if they are new to gardening. This can include workshops on soil preparation, planting, maintenance, and harvesting. Providing training will empower participants to take ownership of the garden and to continue its success.

5. Maintain the garden regularly: Regular maintenance is crucial for the success of the garden. This includes tasks such as watering, weeding, pest control, and pruning. Make sure to schedule regular maintenance and involve the community in the upkeep of the garden. Also allow for resting of the soil after several rounds of reaping.
6. Celebrate successes: Celebrate the successes of the garden, including the first harvest, the first meal from the garden, the diversity of crops, and the participation of community members as well as other persons within the school. This can help to build a sense of pride and accomplishment and encourage continued participation.
7. Monitor progress and adjust as necessary: Keep track of the progress of the garden and be prepared to make adjustments as needed. This can include changing the types of crops planted, adjusting the layout of the garden or even expanding through innovative planting methods.

By following these tips, you can help to ensure the success of your kitchen garden project and make a positive impact on your community.

# The Transformation



## Overview

A report from the Food and Agriculture Organization (FAO) of the United Nations Rome (2021, p.8), asserts that "the COVID-19 pandemic was having a devastating impact on the world's economy...and that the food security and nutrition status of millions of people, including children, would deteriorate if we did not take swift action." This is the reality for low-socioeconomic communities like those comprising the Greater August Town (GAT) area.

A significant proportion of families within GAT communities are unable to provide their children with balanced meals (Burke, 2021). This inability stems from the low socio-economic profile of the majority of individuals within the community. The lack of nutrient high foods at home impact the students' level of engagement and learning whilst at school (Chen, 2020).

In addition to children experiencing food insecurity, which was exacerbated by the Covid-19 pandemic, kindergarten/infant schools in the communities face significant barriers in the provision of an enabling environment for education and play. Issues such as irregular water supply, lack of green space or access to nature, under -nourished children hinders the school's ability to provide an enabling environment to facilitate optimal teaching and learning. Unfortunately, these challenges continue to impact the most vulnerable especially

children living in fragile contexts. Within the GAT over 250 students between the ages of 3-6 years old in the community were disproportionately affected, their educational engagement, learning and playing threatened.

Considering these challenges Mona Social Service (MSS) aimed to address multiple intersecting needs of the student population through the implementation of a rainwater harvesting system and a kitchen garden. The Hope Valley Experimental Infant and Primary School was the selected project site. The school was selected because its principal had expressed that they had a budding school feeding program that needed to be scaled up as well as their challenges with classes being interrupted by water lock off in the hotter months. Being close to the university, the research decided to undertake a project to address these issues through a university-community engagement initiative. The proposed implementation of a kitchen garden was underscored by prior exploratory observation by kindergarten schoolteachers who observed that infants and young children suffered from inadequate access to nutritional meals, due to the economic background of their families. The lack of access to nutritious meals negatively impacted the children's interest, participation, learning and understanding of concepts taught. Also, their interest in playing and interacting with other children was low.

The overarching aim of the project was to facilitate engagement with nature and encourage play and guided learning. Against this background the main objectives were to:

1. Implement a rainwater and kitchen garden at the Hope Valley School
2. Explore how education practitioners integrate the kitchen garden in their daily teaching and learning exchange.
3. Explore and identify the level of importance early education practitioners attach to learning through play, utilizing a kitchen garden.

# The Grant

During the grant period, our project aimed to implement a kitchen garden and a wastewater management system. In addition, our original proposal included objectives to explore how educators of children between ages of 3-6 integrate the kitchen garden in their teaching and identify the level of importance they placed on learning through play, utilizing the kitchen garden.

Over the course of the grant period, the project team successfully identified the area for the kitchen garden; developed a design for the garden and waste-water management system, cleared and prepared the area for the kitchen garden with assistance of the Lions Club of Mona and the UWI School of Engineering, Physics Department. However, the researchers also encountered some challenges that led the team to modify the original objectives and procedures. For example, due to limited funding resources, the team was unable to design a more sophisticated wastewater management system and therefore devised a system that utilized more cost-effective materials. Another challenge that led to the modification of the original project was the number of educators interviewed. In the original proposal the researchers outlined the aim to interview ten (10) teachers. However, upon initiating the research process the school only had six (6) classes that catered to children ages 3-6. As result the number of educators interviewed was reduced to six.

Despite these changes, the research team made significant progress towards achieving the goals. The kitchen garden and waste-water management system were successfully installed and have provided several batches of reaped produce, used to supplement the school feeding programme. Further, the research was conducted and each of the six teachers was interviewed. Our analysis of the data revealed that the kitchen garden was well received by the school community and integrated into each of the educators' lesson plans. We also found that teachers placed a high level of importance on learning through play. As such, teachers encouraged children to play and utilize creativity, during scheduled sessions called circle time or nature walk.

Overall, the project has contributed to improving the dietary consumption of students at the Hope Valley Experimental Infant and Primary School while simultaneously providing a well needed alternative source of water that is needed particularly during the drier seasons when water cut-offs disrupt class. Additionally, the project also contributed to the understanding of how the kitchen garden is utilized and its impact on teaching, learning and play among teachers and students. While there were some deviations from the original proposal, the researchers believe that the modifications that were made allowed us to still achieve meaningful results within the grant period.

*Figure 1: Project Activities*

# Research Activity

## Research Background

At the core of this project is the Froebelian principle of engagement with nature. The development of the kitchen garden provides an environment for children to interact with nature (Bruce, 2021). The student's engagement with nature supports the operationalization of this project through growing and nourishing seeds, alongside the caretaker of the garden and teachers, to grow produce that will support the school feeding programme. Additionally, the establishment of the kitchen garden facilitates the development of preschoolers by engaging and encouraging their natural curiosity. The garden also provides an integrated environment to guarantee optimum performance (Burke, et al., 2021. p. 55). It further allows for children to engage with nature through play. For example, when children visit the garden, they will be afforded the guided freedom to feel, touch plants, and play in the soil while watering the garden. The children's engagement with nature through the kitchen garden allows them to be immersed in a natural environment, often scarce within their communities given its marginalized and underdeveloped context. This Froebelian approach of engaging with nature also facilitates the early childhood curriculum as well as children's experiences of several transformative cycles of nature, such as the changing of a seed into a fruit or plant. Additionally, the presence of fruits with various shapes and colours, sizes, textures and other physical features can be integrated to interrogate children's creative ideas and thought processes. Further the introduction of the nature allows children to express agency within the space and discover while learning and playing.

The Kitchen Garden and its accompanying waste-water system will serve to improve the school's water supply, contributing to sustained and uninterrupted classes. While improving water supply, the garden will simultaneously improve access to food of higher nutritional value and positively impact the teaching and learning experience and serve as a teaching aid and a natural oasis where children can learn, play, and interact with nature, thereby contributing to their well-being (Burke, et al, 2021).

## Objectives

The overarching aim of the project was to facilitate children engagement with nature and encourage play and guided learning. Against this background the main objectives of this study were to:

i. Implement a rainwater and kitchen garden at the Hope Valley School
ii. Explore how education practitioners integrate the kitchen garden in their daily teaching and learning exchange.
iii. Explore and identify the level of importance early education practitioners attach to learning through play, utilizing a kitchen garden.

To achieve these objectives, the researchers addressed the following research questions:

1. How do early education practitioners integrate the kitchen garden in their daily teaching and learning exchange?
2. What importance do early education practitioners attach to learning through play, utilizing a kitchen garden?

## Methods

*Study Design*

An exploratory qualitative case study design guided the data collection process (Yin, 2011). Gerring (2007) defined a case study as "an intensive study of a single case" (p.65). Furthermore, Meyer (2001) stated it is "a study that consists of detailed investigation, to provide analysis of the context involved in the phenomenon under study" (p.329). The exploratory case study design is deemed appropriate for this research because it allowed the researcher to focus on a single case – the Hope Valley Experimental Infant and Primary School and examine how the implementation of the kitchen garden contributed to the school community. Using the case study design allowed the research to gain insightful knowledge and a better understanding of the school community real-life experiences in light of the addition of the kitchen garden. In

undertaking the case study design the researcher utilized semi-structured interviews to collect data.

*Study Population*

The study aimed to target educators of students 3-6 years at the Hope Valley Experimental Infant and Primary School.

*Sampling*

The researcher utilised non-probability purposeful sampling to selected 6teachers who engaged with children between 3-6 age group. Onwuegbuzie and Collins (2007) indicated that the size of the sample should be informed primarily by the research objective, research question(s) and subsequently, the research design). Considering the aim of the research was to explore how the kitchen garden was integrated into learning activities and curriculum, a sample of 10 for interviews is appropriate because "the goal is to describe a shared, belief, perception of behaviour among a relatively homogenous group" (Guest, Bruce and Johnson, 2006. p.76).

*Inclusion/Exclusion Criteria*

The following inclusion criteria will guide the study:

- Teachers delivering educational content to 3–6-year-old.

*Procedures for Recruitment and Consent*

A purposeful sampling (Patton, 2015; Creswell, 2014) approach was used to identify and select participants from the Hope Valley Experimental School. Purposive sampling was appropriate given the availability, location, time and access to participants (Merriam and Tisdell, 2016). Given that there were six (6) teachers who teach classes with children between 3-6, the lead researcher informed all the teachers of the study. Notably, the target group of participants are only teachers with the responsibility of educating students ages 3-6. All the prospective participants were invited to attend an information session which was conducted via Zoom. They were given the opportunity to ask questions and seek clarification prior to deciding whether they wanted to participate in the study. After this session teachers were asked to indicate their interest in participating in the study. Teachers who indicated their interest in

participating in the study was provided with a consent form prior to their interview session. Each teacher was asked to read, sign the consent form and return it during their schedule interview.

## Data Collection

Grounded in the constructivist paradigm, this case study was used to respond to the objectives of the study. Approval was sought from Hope Valley Experimental Primary and Infant School principal to conduct the study.

Four weeks after the installation of the kitchen garden the researcher conducted in-depth interviews with the participants selected using the purposive sampling which comprise of six teachers. The data collection instrument for the interviews was guided by a self designed, semi structured, open ended questions which was administered face to face.

Conducting interviews fostered an in-depth understanding and provided explanation regarding the integration of the kitchen garden (Creswell and Plano Clark, 2018). As participants in the research, each individual was asked to complete an informed consent form before attending the interviews. All interviews were recorded with the permission of the participants. Each session lasted approximately 20 minutes.

## Data Analysis

After the completion of the interviews each was transcribed, exported to NVIVO, and analyzed. A thematic analysis guided the data analysis. According to Braun and Clarke (2006) there are six phases of thematic analysis – familiarizing yourself with the data, generating initial codes using NVIVO, searching for themes, reviewing the themes, defining, naming the themes and producing the report.

## Ethical Considerations

In observation of our ethical responsibilities, the researcher sought the necessary approval from the UWI Ethics Committee and principal of the research site. Moreover, no interview was conducted prior to ethical approval. The following ethical considerations were incorporated by

the researcher, informed consent, voluntary participation, confidentiality, and anonymity of participants. Notwithstanding, there were no ethical issues encountered during the grant period.

## Findings

There were two core objectives which the research component sought to explore:

i. How do education practitioners integrate the kitchen garden in their daily teaching and learning exchange?
ii. Identify the level of importance early education practitioners attached to learning through play, utilizing the kitchen garden.

Based on the coding of the interviews conducted, several thematic areas arose from the data analysis process. The themes of *integrating the kitchen garden in the curriculum* and *exploring nature-circle time/nature*, and the *advantages of the garden* answer the first objective of the research. While the themes of *importance of play* and *an enabling environment for socialization* address the second objective.

**The Merging of Curriculum and Food Security**

In order to increase food security, the study looked into the methods educators employed while teaching children about plants, food, and nutrition in a garden. The study's participating teachers used the garden as a tool to augment and enhance the curriculum's intended learning objectives for students between the ages of 3-6. The inclusion of the garden in the learning process made the teaching and learning process more enjoyable and interactive for the children and improved their comprehension of the ideas, this sentiment was shared by five teachers.

According to all the teachers, a range of subject areas, including mathematics and literacy, were taught using the kitchen garden. Another teacher utilized the garden to teach counting and addition as well as the recognition of shapes and colors. As an illustration, one teacher asked her children to spell the word "plant" while showing them a plant in the garden. In addition, the garden was utilized to impart nutritional knowledge and healthy eating practices. One

teacher emphasized using the garden to instruct children on the value of healthy eating, active living, and the kinds of foods that are necessary for keeping the body in excellent shape.

All teachers encouraged the creation of songs or poetry that promoted creative expression, play, and learning as an add-on to the lesson plan. Children were able to put concepts into practice by watering plants or making a hole in the ground to sow seeds, or they could point out rhyming lines in poetry about plants.

In order to increase food security, the kitchen garden was incorporated into the curriculum as a tool for instructing children about nutrition, food, and plants. For the benefit of the pupils, the teachers enhanced and supplemented the learning process with the garden. The garden's adaptability made it possible to incorporate a number of topics, including science, arithmetic, and reading. The garden also lends itself to the sustainable food security considering that it supplements the school meal programme allowing them to provide nutritious meals the community. With the garden on the compound the school community can ensure that vegetables and fruits are constantly being produced and utilised in meals for the benefit of the children and community.

**Exploring Nature**

Every respondent said they participated in an activity known as "circle time or nature walk," which required allowing the children to congregate in and around the garden. According to the subject area being taught, the instructor either started her lesson in the garden or let the children view, touch, and feel the plants, trees or fruits. Alternatively, educators could decide to begin the lesson in the classroom and allow for the reinforcement of concepts in the garden, giving the children a chance to show how much they have understood. Consequently, it could be concluded that circle time made it easier to combine theory with actual practice or in-person observations. The teachers hoped that by including garden activities, learners who are visual, tactile, and kinetic will also benefit from the lesson. Five respondents indicated that the children explored the garden for about ten to fifteen minutes during circle time/nature walk.

Furthermore, students were engaged and guided with instructions and teachers noted that activities within the garden allow children to use their observational skills, identify plants,

shapes, colors and use adjectives to describe what they were seeing. Additionally, children were also allowed to play freely in the garden and plant seeds and aid in the watering and maintenance of the plants. By incorporating these activities into their lessons, teachers were promoting an understanding of food security and sustainability, allowing children to develop a deeper appreciation for the natural world and the role it plays in providing us with the food we need to survive.

**Benefits of a School Garden**

All study participants highlighted the benefits of having a school garden. A school garden offered hands-on learning experiences that complemented classroom lessons and provided children with a practical understanding of what they are learning. The garden also served as a tool for sensitization, helping children understand the importance of vegetables and the nutrients required for them to grow. Children learned about the health benefits of food grown in garden and how it can improve their overall health.

Furthermore, the school garden taught children about the elements of a balanced meal and helped them appreciate the value of a nutritious meal. They learned which food groups were necessary to create a well-balanced meal and how vegetables played an essential role in this.

All respondents noted that prior to the school garden, children were not interested in vegetables and often refused to eat them. However, since the school garden's establishment, children have become more interested in the production process and are now eager to eat the produce they have grown themselves. This has led to children requesting more vegetables to be included in their meals, resulting in healthier eating habits.

The benefits of a school garden extend far beyond the classroom. One of the most significant advantages is its contribution to food security. By growing fruits and vegetables the school can provide nutritious for their students, helping to combat food insecurity in the community. Additionally, the recycling of rainwater to maintain the garden is an environmentally sustainable practice that reduces water waste and conserves this precious resource. By utilizing rainwater for irrigation, schools can reduce their dependence on municipal water sources, which may be limited or expensive. The garden can also serve as a valuable educational tool,

teaching students about the importance of sustainable practices and the interconnectedness of the environment. Furthermore, the garden can provide a space for community engagement and connection, bringing students, teachers, and community members together to cultivate and enjoy the fruits of their labor. Overall, the school garden is a valuable asset that promotes food security, sustainability, and community building.

**Importance of Play for Food Security /The Intersectionality of Food Security and Play**

All the educators interviewed highlighted the importance of play in supplementing learning, and how traditional and contextual factors have restricted most learning to indoor settings. However, the establishment of a school garden created an opportunity for quality outdoor play experiences that are important for promoting food security. Most of the educators observed that contact with the natural environment through the school garden provided unique stimuli that draws children's curiosity and attention. The garden provided many opportunities for play, allowing children to explore natural materials such as sticks, rocks, flowers, soil, water, and plants, and stimulating their imagination and problem-solving skills. This engagement with nature was important for fostering a sense of connection and familiarity with the environment from an early age, which can lead to ecological and sustainable behaviors later in life. In addition, outdoor play and exploration of natural components provided opportunities for integrated learning across different subject areas. For example, children could learn mathematical concepts and scientific principles through activities involving playing with soil and water, while also learning new terminology as they talk about their experiences. Through gardening, children learned about plant growth and the importance of a balanced diet, reinforcing the concepts taught in the classroom. Moreover, recycling rainwater to upkeep the garden also provided opportunities for children to learn about water conservation and sustainability.

**Enabling Environment for Socialization**

The school garden provided a safe and open environment for children to express themselves and showcase different aspects of their personalities that may not be evident in a traditional classroom setting. Outdoor play promoted socialization and enabled children to form stronger connections with their peers by sharing ideas, toys, and engaging in team-based activities that require cooperation. In the garden, children were more likely to work together and engaged in

less conflict. The collaborative and inclusive nature of the environment encouraged children to develop shared objectives, which led to a sense of camaraderie and friendship. Moreover, playing outside in the garden allowed children to learn from each other as they worked together to solve problems and overcome challenges.

## Conclusions and Achievements

An objective of this project was to implement a rainwater system and a kitchen garden at the Hope Valley Experimental Infant and Primary School. The project team achieved this objective through implementing and handing over the wastewater system and kitchen garden to the school which they have been utilizing in their lesson plan, playing and learning activities; the produce from the garden being used to provide warm meals to the entire school population which accounts for over 1000 students at all grade levels. Additionally, the implementation of a kitchen garden provides a green space within the concrete laden community. This outdoor green environment provides an environment in which children can interact with nature and enjoy the outdoors in well curated space.

In terms of achievements the project team has managed to impact the nutritional consumption of the school population in a positive manner by providing access to vegetables and food items that are often limited within the homes of some students.

Secondly, through the implementation of the wastewater system the project increased access to stored water which will be essential for the school community given that classes are often impacted by the disruption of water by the national regulators especially the drier season. The installed waste-water system will allow for the continuation of school despite water disruption since it will be able to sustain the washing of hands and other sanitation needs.

## Learning

*The Kitchen (kinder)Garden: Improving early childhood teaching and learning process and environment* project was successful in meeting its goals, but there were some challenges along

the way. In the initial stages our team had difficulty with project management especially around the design of the wastewater system. This was due in large part to the conflicting schedules of the engineering department and volunteers who had exams at the time as was preoccupied carrying out prior projects as well as final examinations. This challenge led to delays in the project timeline.

Lessons Learned: The project showed the importance of having a clear project plan, regular communication and effective project management. Even though the engineering team was unable to design the wastewater system within the specified timelines which led to delay in the timeline, this did not significantly impact the delivery of the project. Secondly, we learned that frequent check-ins, team meetings and task prioritization helped us avoid some of the challenges we faced.

## Implications

The implementation of the kitchen garden had the following implications:

i. Provision of fruits and vegetables for a balanced hot lunch for over 1000 students
ii. Provision of a natural space for children to engage in play and for teachers to use to supplement their teaching.
iii. Provision of an alternative water source to be used when water disruption occurs. This will reduce the need for classes to be dismissed thereby increasing access to education for over 1000 students.
iv. At the policy level the implementation of the garden complements the national schools policy around food which seeks to promote a healthier consumption of foods by students.

Notably, above mentioned implications were all met during the project lifespan.

## Other Funding

No other funding was obtained.

## Publications and Other Outputs

No publication has yet been identified.

## Future Plans

Based on the findings of this project, there are several potential areas for future research in the field. One possible avenue would be to investigate the long-term impact of school gardens on children's attitudes and behaviors related to healthy eating and food security. This could involve follow-up surveys or interviews with students several years after their initial exposure to the school garden, as well as comparisons with a control group of students who did not participate in the program.

Another area for future research could be to investigate how the school garden can be integrated into broader sustainability initiatives within the school and community.

An additional area of research could be on climate change and the importance of kitchen garden

Finally, future research could examine the potential benefits of school gardens for children with special needs or those who may face barriers to healthy eating and food security. This could involve working with schools and community organizations to develop tailored gardening programs that meet the specific needs and interests of these populations, as well as evaluating the impact of these programs on participants' health outcomes and quality of life. Overall, there is a great deal of potential for future research in this field, and continued investigation can help to further our understanding of the many benefits of school gardens for children and communities.