

Earning a Higher Celery:  
A Participatory Impact Assessment of the Nabasunga Primary School Garden

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## **Abstract**

This thesis investigated the impacts of a garden at the Nabasunga Primary School (NPS) in Zambia. Community gardens can improve economic stability, local food supply, health, and education. In 2017, the Day by De Foundation provided the resources for a community garden in the NPS. An established framework, the Participatory Impact Assessment (PIA), was applied to assess the garden to determine whether a chicken farm should be added on. Fifteen individual stakeholders, including teachers, parents, and community members of at least 18 years of age and living in the Nabasunga community were surveyed in retrospect to the garden's implementation. Health and education were the top rated priorities of the survey participants and were therefore prioritized in assessing the benefits of the garden. Eighty percent of the participants' reported personal priorities and forty-six percent of reported expectations of the garden were met. The real impacts of the garden included feeding school patrons and community members, educating teachers on nutrition and gardening skills, increasing gardening interest, offering opportunities for community engagement, as well as providing a source of income and means for self-reliance for the school. I concluded that the garden was successful for the school, Nabasunga community, and the Day by De Foundation. This study revealed the importance of a grassroots approach to aid, beyond the Day by De Foundation's work. It is imperative for organizations providing humanitarian aid to start this process with a preliminary roundtable discussion that includes stakeholders from diverse demographic groups represented among the beneficiaries prior to a project's implementation to determine their priorities, needs, and expectations for the project and then follow up afterward to assure completion and satisfaction among these individuals. This study revealed that humanitarian project assessments can be successfully conducted via online communication.





## **Preface**

I believe it is vital to invest in small, underrepresented communities to help make them more habitable in preparation for impending climate instability. While interning with the Day by De Foundation, I recognized the importance in creating projects assessments that analyze a project holistically in time and space and found a deeper understanding and passion for helping communities in Zambia. I was initially drawn to this organization by their grassroots approach to international aid. Through this thesis project, I was given the opportunity to conduct Day by De's first project assessment, which embodies their mission to support communities from the most localized group of beneficiaries.

I would like to thank Chileshe Kabwe, who helped me on a weekly basis and answered all of my late-night questions, and Narendra and Candice De, who made this project possible. I owe extreme gratitude to the administrators at the Nabasunga Primary School, who kindly allowed me to use their campus for my research and were generous in their participation in my research study. Professor Sarah Rogers helped focus my study, find a framework to model my research after, and reminded me to strive for excellence, not perfection. She kept me on my schedule, which was crucial to the success of this project. Professor J. Terrence McCabe gave me guidance on data collection, reviewed survey questions, and aided in the analysis of this case study that I could not have done without his expertise. Professor Dale Miller connected me with the Day by De Foundation in early 2018 and served as my primary advisor for this thesis. He was supportive and patient with me throughout the entire process and I could not have finished this project without his constant reminder to “trust the process” and take care of myself. My partner, Bryan Harant, provided constant support: from several draft revisions to late night ice cream runs. I owe all of my success to the individuals who kindly lent their time, attention, and care to this project.

## Table of Contents

Abstract .....	iii
Preface .....	vi
Table of Contents .....	vii
Introduction .....	1
Background .....	2
<i>Economic History</i> .....	3
<i>Geography and Climate</i> .....	3
<i>Demographics</i> .....	5
<i>Culture</i> .....	6
<i>Economy and Zambian Wellbeing</i> .....	6
<i>Poverty</i> .....	8
<i>Need in Nabasunga Primary School</i> .....	9
<i>The Day by De Foundation</i> .....	10
Community Gardens .....	10
<i>Community Gardens in the United States</i> .....	11
<i>Community/School Gardens in Rural Villages of Africa</i> .....	13
<i>Community Garden Evaluation Platform</i> .....	14
<i>Participatory Impact Assessment</i> .....	14
Methods .....	15
<i>Participatory Impact Assessment:</i> .....	15
<i>Stage 1: Identifying the Key Questions</i> .....	15
<i>Stage 2: Defining the Boundaries of the Project in Space and Time</i> .....	16
Nabasunga Primary School Garden Timeline .....	16
Nabasunga Primary School Garden Map .....	17
<i>Stage 3: Identifying Indicators of Project Impact</i> .....	18
<i>Stage 4: Decide Which Methods To Use For Measuring Change</i> .....	19
<i>Stage 5: Decide Which Sampling Methods and Sample Size To Use</i> .....	19
Sample Methods .....	19
Sample Size .....	20
<i>Stage 6: Decide How to Assess Project Attribution</i> .....	20
<i>Additional Institutional Review Board Research Details</i> .....	21
<i>Follow Up Questions</i> .....	22
Results .....	22
<i>Semantic Differential Closed-Ended Questions</i> .....	23
<i>Value of Health</i> .....	24
<i>Value of Education</i> .....	25

<i>Value of Relationship with Students</i> .....	26
<i>Value of Income</i> .....	27
<b>Open Ended Questions</b> .....	<b>28</b>
<i>Awareness of Garden Implementation</i> .....	28
<i>Garden Frequenting</i> .....	29
<i>Reported Expectations of the NPS Garden</i> .....	30
<i>Reported Impacts of the NPS Garden</i> .....	31
Reported Impacts on the Participants' Personal Lives .....	31
Reported Impacts on the Community .....	32
<i>Garden Attributions</i> .....	33
<i>Monetary Earnings</i> .....	34
<i>Future Garden Goals</i> .....	35
<i>Follow Up Information</i> .....	36
Facebook Access.....	36
Individual Questions.....	37
<b>Discussion</b> .....	<b>37</b>
<b><i>Stage 7: Triangulate Results from Participatory Methods with Other Information</i></b> .....	<b>37</b>
<i>Respondents' Priorities and Expectations</i> .....	38
<i>Respondents' Priorities and Outcomes</i> .....	38
<i>Respondents' Expectations and Outcomes</i> .....	39
<i>Day by De Foundation's Priorities, Expectations, and Outcomes</i> .....	40
<i>Observations</i> .....	40
<i>Secondary Findings</i> .....	41
<i>A Broader Context</i> .....	43
<b>Conclusion</b> .....	<b>43</b>
<i>Supported Hypothesis</i> .....	44
<i>What I learned</i> .....	44
<i>Beyond The Day by De Foundation</i> .....	45
<b>Recommendations</b> .....	<b>46</b>
<i>To the Day by De Foundation</i> .....	46
<b><i>Stage 8: Plan the Feedback and Final Cross-checking of Results with Communities</i></b> .....	<b>47</b>
<i>To the Nabasunga Primary School</i> .....	47
<b><i>For Further Research</i></b> .....	<b>48</b>
<b>Bibliography</b> .....	<b>50</b>
<b>Appendix A: Recruitment Messages</b> .....	<b>54</b>
<i>Message to Day by De Foundation's representative</i> .....	54
<i>Message Over Social Media to Qualifying Survey Participants (1-3 Identification Method)</i> : .....	54
<i>Message Over Social Media to Qualifying Survey Participants (4th Identification Method)</i> : .....	55



<b>Appendix B: Survey Questions.....</b>	<b>56</b>
<i>Teachers/Administrators at Nabasunga Primary School:.....</i>	<i>56</i>
<i>Parents from Nabasunga School: .....</i>	<i>57</i>
<b>Appendix C: Themes Reported in Priorities, Expectations and Revealed Outcomes .....</b>	<b>58</b>

<b>Abbreviations</b>	<b>Explained</b>
GDP	Gross Domestic Product
HDI	Human Development Index
IRB	Institutional Review Board
NGO	Non-Governmental Organization
NPO	Non-Profit Organization
NPS	Nabasunga Primary School
PIA	Participatory Impact Assessment

## **Introduction**

Over half of the world's population is living off of less than \$2.50 USD per day. Out of this level of poverty, comes hunger, malnourishment, and lack of access to clean water in rural communities. Government corruption in Zambia is one factor has led to a lack in oversight and welfare programs for the smaller communities within the country, which contributes to the perpetuation of poverty within them (Nyirenda, 2004; Odhiambo, 2009). Nabasunga is a small and impoverished village in the Central Province of Zambia. With little to no political recognition, the rural villagers of Nabasunga are underrepresented in national politics and federal aid, meaning public schools, such as the Nabasunga Primary School (NPS), receive minimal funding (Nyirenda, 2004; Kabwe, 2018).

The Day by De Foundation is a nonprofit organization (NPO) that strives to improve the lives of rural Zambians. Day by De's aid initiatives provide training and resources to foster entrepreneurship through undertakings such as community gardens and animal farms. Locations for such projects are based on the organization's Zambian team members' partnerships: in this case, Day by De's project manager in Zambia, Chileshe Kabwe, had connections with individuals living in Nabasunga.

In an attempt to address the health, educational, and financial needs of individuals living in Nabasunga, Day by De partnered with the Rhodes Foundation in their most recent initiative to provide funds, resources, and training programs to build a pilot-test garden cooperative at the Nabasunga Primary School (NPS). This garden was intended to feed, educate, and supply funding to patrons of NPS and local members of the Nabasunga community. Upon completion of the garden in 2017, teachers at the school identified that they purchased manure from a nearby poultry farm, which was an added expense of time and money. NPS administrators asked the

Day by De Foundation to help build a chicken farm to work in conjunction with the garden to contribute to a sustainable, closed system. Before Day by De could consider undertaking this additional project, an assessment of the initial garden needed to be conducted to determine its successes and shortcomings.

This paper strives to evaluate the real impacts of the NPS garden by adapting the Participatory Impact Assessment (PIA<sup>1</sup>) to the unique circumstances of this study. I seek to answer the question: What are the real<sup>2</sup> impacts of the Nabasunga Primary School Garden on the school's teachers and administrators? To answer this, I followed the PIA as a guideline to review the performance of the project, understand the real impacts and consequences of the garden, and evaluate whether a chicken farm should be implemented into the garden. These steps are outlined in my **Methods** Section.

I hypothesized that the PIA will show the Nabasunga Primary School Garden to be successful and offer a framework to assess Day by De Foundation's future projects in bordering or similar communities.

## **Background**

This section outlines the historical, geographic, and economic factors that have contributed to Zambia's high poverty rates, as well as a demographic and cultural context that provide insight into Zambian livelihood, through the Nabasunga Primary School's lens. In the subsection, "The Day by De Foundation," I present the foundation's mission, connection to Kabwe, and their investment in the Nabasunga Primary School.

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<sup>1</sup> The Participatory Impact Assessment (PIA) is a project assessment framework constructed by Tufts University and funded by the Bill and Melinda Gates Foundation, first written in 2008 and later revised and republished in 2014.

<sup>2</sup> The PIA uses the term "real" to describe positive, negative, intended, and unintended impacts a project has had on a community, "those benefits and changes to people's livelihoods, as defined by the project participants, and brought about as a direct result of the project" (Pg.10)

### ***Economic History***

Zambia is a young country that became independent from Britain in 1964, when it was considered the second wealthiest sub-Saharan African country, which was both a blessing and a curse. Zambia's geology is rich in copper resources (Auty, 2002; Maverick, 2015). During the Vietnam War, copper prices increased in response to demand, which drove Zambia's international trade (Hobson, 2019). However, dependence on rich sources of native copper have also sent the country into the spiraling effects of the natural resource curse, wherein they suffer from financial mismanagement (Auty, 2002). Zambia has been receiving international aid since the 1950s when they partnered with the World Bank and USAid (World Bank, 2010).

Unpredictable droughts and floods within Zambia have forced the country to ask the United States and European countries for international food aid (Nyirenda, 2004; Taylor, 2006). Foreign governmental, non-governmental, and non-profit organizations around the world, including Bicycles for Humanity, World Food Programme, The World Bank, CARE, Action for Children, and others have also made it their initiative to provide aid to Zambia since 1955 (Nyirenda, 2004; World Bank, 2010; Care, 2017). The Day by De Foundation began funding projects in rural Zambia in 2016.

### ***Geography and Climate***

Zambia is a landlocked country, located in the southern-central region of Africa, and is divided into nine provinces: Northern, Luapula, Northwestern, Copperbelt, Eastern, Lusaka, Western, Southern, and notably, Central Province (Mwakikagile, 2010). The Central Province covers 58,654 miles of land over six districts which accommodate 10% of the entire country's population (Musambachime, 2017). This region is subject to two extreme climates between seasons: dry and rainy, which result in varying seasonal agricultural yields and water supplies

(Hobson, 2019). The typical planting season in the Nabasunga community takes place between the months of May and July, when the climate is drier and temperatures range from 10 degrees to mid 20 degrees Celsius (Kabwe, 2018; Hobson, 2019). Kabwe is the provincial capital, located in the Kabwe District (previously known as Broken Hill), and is located in the central eastern nook of the Central Province, just southeast of the mineral rich Copperbelt Province. Nabasunga is a small village located in Kabwe that does not yield results when searched on Google's web browser. See Figure 1a and 1b.



Figure 1a: Illustration of 9,000 Miles Between Zambia and Colorado<sup>3</sup>

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<sup>3</sup> Retrieved from Google Maps

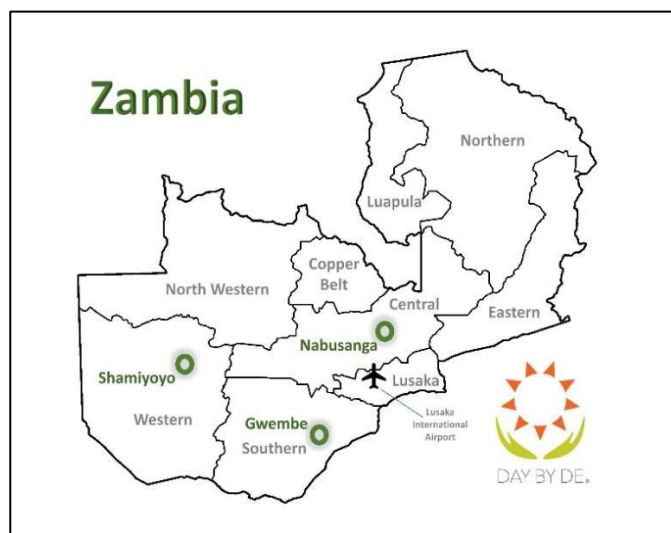


Figure 1b: Day by De Foundation's Map of Projects in Zambia

### ***Demographics***

Zambia currently has a population of nearly 14 million people, 64% of which are living on less than \$1 USD per day (CIA, 2017). There are many reasons why most Zambians are impoverished, including illiteracy, diseases, government corruption, lack of women's rights, the country's history, as well as others (Nyirenda, 2016; Clay, 1981). Zambia's population growth rate is ranked 9th highest in the world at 2.93%, compared to the United States of America's 0.81% (ranked 129) (CIA, 2017). This is due to Zambia's birth rates at 4.15% relative to 1.22% death rates each year (CIA, 2017). More than 202,000 individuals live in Kabwe (Central, 2012).

The majority ethnicity in Zambia is Bemba (Kabwe, 2018). There are 72 dialects around the country, making it fairly difficult to communicate between provinces and even districts (Kabwe, 2018). The most commonly spoken language in the Central Province is Bemba, with several dialects (Lala-Lamba-Bemba, Goba, Totola-Simaa, and Tonga-Ila), all members of the Bantu language (Central, 2012; Hobson, 2019). The literacy rate in the Central Province is higher than the national average at 70.90%, (Central, 2012).

## ***Culture***

Respect is greatly valued in all variations of Zambian cultures. Many Zambians are generous and will offer to give more than they have. Christianity is a widely accepted and practiced religion, although there is a wide range of denominations stemming from individuals' worldviews and experiences (Taylor, 2006; Norrby, 2008).

Zambia's society is dominated by the patriarchy. Women are often beaten by their husbands if they try to become self-sufficient (Reporter, 2003; Lawoko, 2008). Additionally, poverty among Zambians is disproportionately distributed among men and women in the country, as women earn only half the income that men do, "Both general poverty and extreme poverty are slightly more significant in women, and women's education and literacy levels lag behind those of their brothers and husbands" (Norrby, 2008). Because school tuition can be costly, families may opt to only send one child to school: usually the son (Norrby, 2008). Be as it may, an interview with Chileshe Kabwe revealed that the majority of teachers at Nabasunga are women, and roughly half of the students, aged 8-12, are girls (Interview 2018).

## ***Economy and Zambian Wellbeing***

Some economists commonly link a country's Gross Domestic Product (GDP) per capita to the overall happiness of its people (Bertolucci, 2018). Zambia's GDP per capita is \$4,000 USD (CIA, 2017). According to the "Easterlin Paradox," which states that income can only correlate to happiness until a certain point, Zambian overall happiness would be relatively low (Easterlin, 2010). However, income inequality, corruption, dependency rate, environmental degradation, and culture are not accounted for in the GDP per capita equation when each play a vital role in individuals' happiness. There are several other human development reports that measure the wellbeing of populations. For example, the Human Development Index (HDI),

however, measures life expectancy, knowledge, and standard of living as a metric for happiness. The HDI offers an alternative approach to studying the standard of living. The Human Development Report released in 2016 found Zambia had a 0.586 HDI, which was an all-time reported high for the country (United, 2016). One principle of economic theory states that growth leads to an increase in jobs and wages for middle- and upper- class benefactors long before it affects the lower class (Piketty, 2018). When a country has a lot of jobs and wages for the middle class, they can raise tax revenue, wealth transfers, or universal education, such as in the United States. In 2010, the World Bank rated Zambia's economy one of the fastest growing worldwide because of their abundance of minerals and natural resources, which indicated a rise of middle-income status (World Bank, 2010).

In 2006, The Republic of Zambia created a 24-year plan that reflects their local economic aspirations, called "Vision 2030". This plan strives to gather the fiscal resources to ensure the country's competitiveness in worldwide trade and enhance efficiency for all its people with its vision, "A prosperous Middle-income Nation" (Mwanawasa, 2006). Foreign investment advances a developing country's growth. International initiatives and aid for growth in underdeveloped countries such as Zambia may become less of a necessity if this vision sees its end. Once a certain level of self-sufficiency is reached, this could eventually eliminate issues of international-dependency.

The Nabasunga Primary School Garden is an initiative to create self-sufficiency within NPS that will hopefully continue to grow revenue and fresh produce for the school and community so they can become less dependent on external inputs from the government and international organizations and improve their overall wellbeing.



## ***Poverty***

To put Zambia's currency into perspective, the Zambian Kwacha is equivalent to \$0.08 USD, and while Zambia's economy is slowly growing, 70% of rural populations around the country are in poverty (Powell, 2019; Nyirenda, 2016). These communities suffering from extreme poverty are a central focus for welfare development. Zambia's government needs to enhance economic diversification to realize investment opportunities, because they are currently heavily dependent on the copper industry, which is subject to fluctuations and cannot offer enough job opportunities to sustain the entire country's population (Maverick, 2015).

There are more than 100,000 registered non-profit organizations (NPOs) in Southern Africa and over \$1 trillion USD have been pooled from developed countries and transferred to Africa between 2004 and 2009 (Stuart, 2013; Moyo, 2009). However, Dr. Dambisa Moyo claims that this money has not actually created long-term, sustainable development (Moyo, 2009; Warner, 2019). This may be due to organizations' misunderstanding of a community's needs, cultural practices, and desires as well as mismanagement (Honig, 2018). Going into a community and providing aid in a manner the organization sees fit is a top-down management approach that has been proven to have a negative impact on communities (Honig, 2018). The cultural needs of the intended beneficiaries can be understood via interviews and meetings, not through observations and assumptions. For this reason, I believe it is also important to administer pilot tests for such initiatives, and then analyze them to understand the impacts that projects have actually had on communities. The PIA is designed to evaluate projects from start to finish with the beneficiaries' priorities and expectations in mind.

### *Need in Nabasunga Primary School*

Nabasunga is an underrepresented village in Zambia, and does not yield any results when searched on Google. I interviewed Chileshe Kabwe, a born and raised Kabwe resident, who revealed the following information about the Nabasunga Village and local Primary School. The village of Nabasunga struggles to maintain educational infrastructure, economic stability, proper nourishment, and women's engagement (Interview 2018). "The local community started the construction of the school in 1988. At roof level of a 1X4 classroom block, they ran out of resources and applied for assistance from the government through micro finance. This was granted unto them and that's how the block was completed" (Interview 2018). While Nabasunga Primary School teachers are dedicated to their jobs, the institution lacks the proper school supplies, maintenance, and healthy lunch programs. Annual operational costs for the Nabasunga Primary School are approximately \$10,000 USD (K 119,475), while government funding is inconsistent (Interview 2018). To combat this, NPS created a Parent Teacher Association (PTA) who decided to charge a tuition fee for students. However, most families do not have the means to afford this, and if they do, families send their sons before they send their daughters. This perpetuates the inconsistency between male and females' opportunities within Nabasunga. In 2004, the World Health Organization revealed it is all too common that children who do not attend school join gangs, engage in unprotected sex, and use drugs, mostly alcohol and marijuana, which is known as, "daga, ibange, or ichamba," at a young age (World, 2004).

Not only are individuals limited in terms of education, but they also struggle to receive proper nutrition. If and when they have the means, individuals in the Nabasunga community get their produce from a nearby market, which can be costly. Otherwise, individuals mostly eat nshima, a corn-ground meal, on a daily basis.

### ***The Day by De Foundation***

Since its start in 2016, Day by De Foundation's mission has been to foster entrepreneurs, create self-sufficiency, sustainability, leadership, and community engagement in rural villages in Zambia. In early 2017, the Day by De Foundation recognized the needs of the individuals in the Nabasunga community. Project managers met with NPS administrators to collaborate on a plan forward that would provide multiple benefits to the school and community. Day by De invested \$3,800 USD into the garden by supplying seeds for cabbage, tomatoes, peppers, carrots, onions, and pumpkins, fertilizer, a protective fence, and monthly training sessions for a year (Kabwe, 2018). Day by De estimated that the Nabasunga Primary School Garden would help feed 750 students and 30 teachers, be used as an educational tool, and would allow grown crops to be sold in exchange for school supplies. The garden was cultivated in April 2017 when students planted seeds with the guidance of Nabasunga School teachers and Day by De staff members (Kabwe, 2018).

Each of Day by De Foundation's projects is intended to go through a grassroots approach and target small communities in rural Zambia. Projects then enter a trial period which call for data collection and assessment to be analyzed for further improvement, expansion, or emulation elsewhere. In this thesis, I am providing the assessment of the NPS garden for the Day by De Foundation, providing information on the real impacts of the garden, and determining whether or not Day by De should implement a chicken farm to work in conjunction with the garden.

### **Community Gardens**

Community gardens are plots of land that are gardened and cultivated by a group of people. They are usually funded by local governments, non-profit organizations, schools, or faith-based organizations and run by local community members. Their purposes range from

offering increased access to fruits and vegetables, improvement of economic stability, community engagement, physical activity, nutrition education, and reduced emissions. In this section, I present the use of community gardens in the United States, versus Africa, and then I present the Participatory Impact Assessment as a conduit for evaluating the NPS garden.

### ***Community Gardens in the United States***

Community gardens were first implemented into modern United States neighborhoods/communities during the 1890s to address “urban congestion, immigration, economic instability, and environmental degradation” (Lawson, 2005). During the beginning of this movement, most beneficiaries were lower income individuals in urban settings, who were later joined by people of collective backgrounds (Lawson, 2005). Studies reveal urban community gardens in the United States have helped increase nutritional education, fresh fruit and vegetable consumption, interpersonal and social communications among similar and diverse groups, self-esteem, while decreasing neighborhood crimes, ethnocentrism, and obesity levels (Draper, 2010). There are far fewer data on rural community gardens in the United States than there are of urban community gardens. However, these, too, reveal increased awareness of environmental conservation and health benefits of fresh, local produce.

In 1999, Tina Waliczek and Jayne Zajicek wrote “School Gardening: Improving Environmental Attitudes of Children Through Hands-On Learning”, wherein they sought to understand children’s perception of environmental issues before and after a garden was implemented at their schools. Surveys were given to students before and after the garden was grown on their school campuses, asking whether they agree, neither agree nor disagree, or disagree with different environmentally-centered questions. Waliczek et al. mention the movement of families from rural to urban neighborhoods, where there is intrinsically less nature,

affecting children's environmental attitudes. Survey results indicated that after students spent time in the garden, no matter for how long or how involved they were, they generally had a more positive attitude towards the environment (Waliczek, 1999). This reveals that community gardens offer a means for students to gain an environmental perspective in Kansas and Texas.

Donna L. Armstrong's "A Community Diabetes Education and Gardening Project to Improve Diabetes Care in a Northwest American Indian Tribe" outlines her study of the effects a community garden in the rural areas of Northwest America had on people with diabetes and obesity within a nearby American Indian tribe. Armstrong held diabetes health workshops in conjunction with cooking interventions with leaders and elders of the community. She found cultural practices and beliefs to be integral factors in physical and mental health within this tribe. The outcomes of the garden included an open space for walking (as the tribal leaders identified they wanted), which increased physical activity and health, as well as access to fresh produce, which were measured qualitatively through interviews of the community garden beneficiaries and tribe leaders, revealing the community engagement program to be effective.

In 2005, Heather Graham and other researchers sought to investigate the standing of California school gardens, which they analyzed and published in "Use of School Gardens in Academic Instruction". To collect quantitative data, they used a cross sectional study by sending internet and mail surveys to 9,805 schools across California. Fifty-six percent of the respondents were from elementary schools and 57% of total respondents reported having a garden on their school's campus. Most of these schools with gardens were in urban environments, not rural. The other 43% reported lack of time, funding, training, and active members restricting them from growing a garden in their schools. This study found that school gardens across California are mostly used as a supplement to academic instruction, and not as much for patrons' sustenance.

This may be the case because California has much greater access to fresh produce than, say, villages in Zambia do.

### ***Community/School Gardens in Rural Villages of Africa***

There are not many published studies on community gardens in Africa, or more specifically, Zambia. However, that does not mean the gardens don't exist as gardens are universally beneficial, “[c]ommunity gardens are used by, and beneficial for, individuals of any age, race, ethnicity, and socioeconomic status, as well as the disabled and nondisabled alike” (Draper, 2010). This has inspired organizations to fund such community gardens in rural villages of Africa to benefit community members to various degrees.

In 2007, John C. Burns and Omeno W. Suji followed the PIA to assess the “Zimbabwe Dams and Gardens Project,” funded and implemented by CARE International. This project was intended to alleviate famine by remediating an existing dam and implementing an irrigation system channeling water to a garden in the village of Zipwa, Masvingo Province, Zimbabwe. The assessment took place 6 months after the project’s implementation and studied the real impacts on “food security status, income and livelihoods of the project participants” through surveys and interviews (impact scoring, before and after scoring, and focus group discussions) of local community members (Burns, 2007). Burns and Suji observed factors outside of the study parameters for a holistic analysis, such as the grain market and local climate conditions. They found that the project provided a new, steady supply of nutritionally diverse and fresh food, alongside an average 45% increase in participants’ household income since the beginning of the project, despite “hyper-inflation” and a “failed cereal harvest” (Burns, 2007). Burns and Suji triangulated their baseline survey with their observations and post-project survey responses to

conclude that the project achieved its initial goal of providing food security to participants, directly and indirectly by providing income to buy food.

### ***Community Garden Evaluation Platform***

Most garden evaluations have a qualitative approach, because gardens impact communities in very different, dynamic, and unquantifiable ways. The Participatory Impact Assessment is an assessment guide designed to use a grassroots approach to understand a community's needs, create a project to effectively reflect these, then analyze the actual outcomes, and hold the organization accountable for these outcomes, whether they are positive or negative.

### ***Participatory Impact Assessment***

The Participatory Impact Assessment was designed by researchers at the Feinstein International Center at Tufts University to help organizations model assessments of their own projects. The creation of this design guide was funded by the Bill and Melinda Gates Foundation and was the most well-documented and thorough project assessment model I could find in my research. The PIA offers a flexible framework that can be uniquely applied to humanitarian focused project assessments.

My intention of using the PIA was to maximize effectiveness of the humanitarian work in rural Zambia, catalyze Day by De's understanding of their projects' impacts, and improve upon the foundation's accountability of their projects. This assessment offers a flexible framework I uniquely applied to the circumstances of my study, as outlined in my **Methods** section (Stage One through Six) and **Discussion** section (Stage Seven and Eight).

## **Methods**

This section describes the methods that I followed under the PIA framework and the University of Colorado Boulder's Institutional Review Board (IRB) protocol to conduct my study of the Nabasunga Primary School garden.

In order to understand the real impacts of the new garden at the Nabasunga Primary School since its completion, it was critical to talk to the teachers at the school, who are directly affected by its implementation and existence. In order to gather this information, I conducted a survey to ask just this of the teachers and administrators who work at the Nabasunga Primary School as well as the parents of students of this school and members living in the surrounding community of Nabasunga. The purpose of this survey was to collect data reflecting the intended, as well as the unintended, impacts that this garden has had on the teachers at NPS and decipher whether a chicken coop would be a beneficial and reasonable addition. This study took place during the Fall of 2018, when the Nabasunga Primary School was in session, during the hours of 7:00AM to 12:00 PM Central Africa Time Zone (GAT/GMT/UTC +2) in Zambia. This was revealed to be the time yielding the most responses from participants.

### ***Participatory Impact Assessment:***

The PIA offers a framework that I applied to the unique circumstances of my study in eight stages. This section presents my application of *Stage One* through *Stage Six*.

#### ***Stage 1: Identifying the Key Questions***

The PIA recommends using Stage One to identify the key questions driving the focus of a survey. These are suggested to be limited to five focused questions, each offering different and specific perspectives that provide insight into the overall research question. My research question asks: what are the real impacts of the Nabasunga Primary School garden on the school teachers



and administrators? In order to understand the full scope of impact, I chose the following key questions to focus my survey around:

1. How has the NPS garden impacted, if at all, the nutrition of the teachers working at the school?
2. How has the NPS garden impacted, if at all, the livelihoods of the teachers working at the school?
3. How might the garden be changed to improve its impacts in the future?

### *Stage 2: Defining the Boundaries of the Project in Space and Time*

Stage Two of the PIA includes interviews and interactive components that outline the temporal and special boundaries of the project in order to ensure understanding of the physical and time limits between the organization and the targeted community. Suggestions for this stage include asking the community to create the parameters, indicating what physical aspects and milestone events they feel are important to include on the map and timeline.

#### Nabasunga Primary School Garden Timeline

The following timeline was created post-garden-implementation with input from teachers at NPS, Day by De's project manager in Zambia and myself.

2017	Early January	Day by De Co-Founders, Project Managers, and Nabasunga Primary School Administrators planned the garden.
	January to February	Day by De Project Manager purchased seeds for cabbage, tomatoes, peppers, carrots, onions, and pumpkins, as well as fertilizer and a protective fence.
	February 15	Ground dedicated to the NPS garden's physical limits was broken.
	April	The NPS garden's infrastructure was ready for planting.
	Early May	Day by De's Project Manager trained NPS teachers and students and together, they planted 1,250 cabbage seedlings.
	June to July	Eight hundred cabbages were fully grown and ready for harvest.
	September	The cabbage market was found to be fully saturated and NPS was unable to sell most of their cabbage plants.
2018	June	The NPS garden was officially handed over from the Day by De Foundation to the Nabasunga Primary School
	December	My survey was sent to NPS teachers

#### Nabasunga Primary School Garden Map

Prior to the garden's implementation, NPS administrators, Day by De Co-founders, Narendra and Candice De, as well as Day by De's project manager in Zambia, Chileshe Kabwe, discussed the spatial boundaries of the garden. The map shown below was, however, retroactively created, hand-drawn, and faxed to me after the garden's implementation.

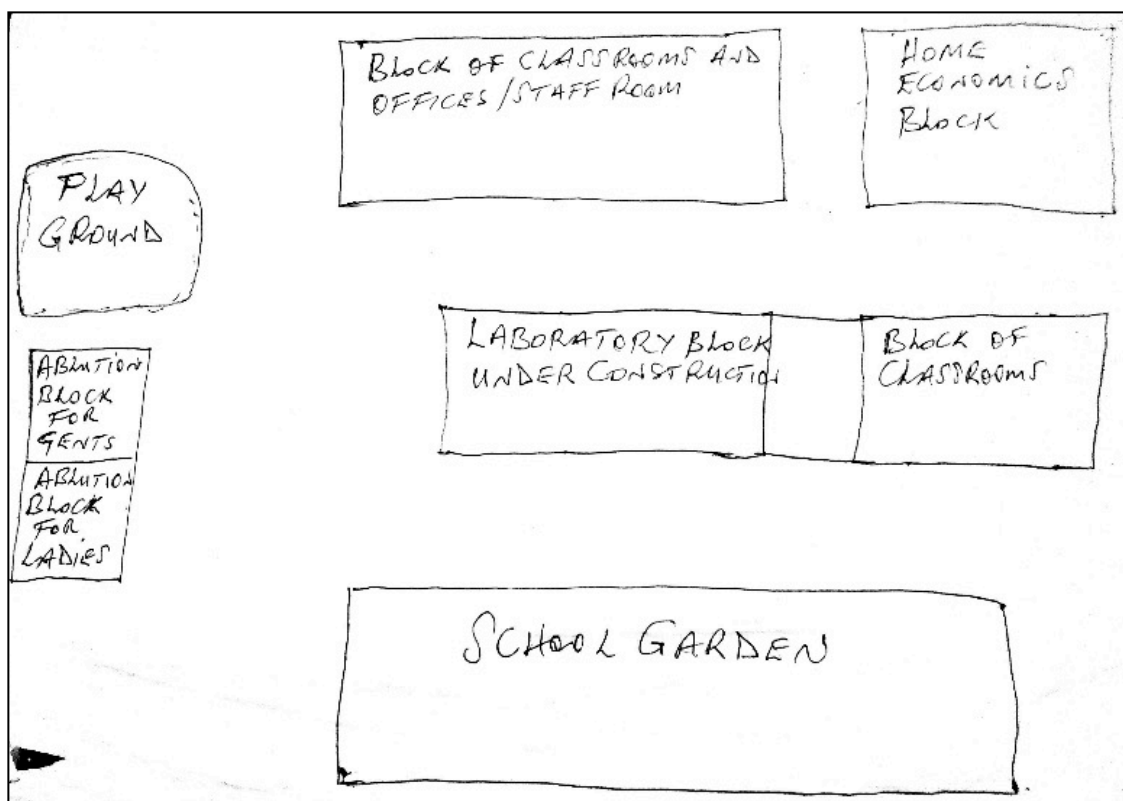


Figure 1c: Hand Drawn Map of Nabasunga Primary School Campus<sup>4</sup>

### *Stage 3: Identifying Indicators of Project Impact*

Stage Three calls for the identification of impact indicators as outlined by the PIA: process and impact indicators. Process indicators measure the physical aspect of project implementation; for the NPS garden, these include delivery of inputs (including seeds, fencing, and fertilizer), construction of the fencing, and crops harvested. Impact indicators measure quantitative and qualitative impacts on people's lives; for the NPS garden, these include training, and teachers' reported expectations. Refer to **Results: Open Ended Questions: Reported Expectations of the Nabasunga Primary School Garden.**

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<sup>4</sup> Not to scale.

#### *Stage 4: Decide Which Methods To Use For Measuring Change*

After selecting the process and impact indicators, Stage Four of the PIA suggests to decide which methods to measure them. To measure the indicators I identified above, I designed a survey of closed ended questions with semantic differential scoring to quantify participants' valuation of priorities and open ended questions that use before and after scoring to engage participants in qualitative feedback on their expectations, outcomes, and future goals of the garden.

#### *Stage 5: Decide Which Sampling Methods and Sample Size To Use*

Stage Five of the PIA calls for selection of sample methods and suggests using a random sampling method to yield a representative sample of the targeted group. However, I decided to conduct my study remotely via telecommunications, primarily through Facebook and WhatsApp, between myself and teachers, parents of the Nabasunga Primary School, and Nabasunga community members individually.

#### *Sample Methods*

Participants in my study were not randomized, as they were contacted based on their social media availability and awareness of the garden. I identified these individuals in four different ways. In each of these, I introduced myself, explained my reason for contact, and outlined the purpose of my study. See Appendix A.

First, I looked through the “Ministry of General Education: Nabasunga Primary School” Facebook page and contacted individuals who were listed as a teacher at the NPS. I was already Facebook friends with four of these individuals.

Second, I collected the NPS contact list from the Day by De Foundation, which contained WhatsApp phone numbers and Facebook links.

Third, I posted a public message on the Day by De Foundation's Facebook page. This allowed individuals to contact me directly if they were interested in participating in the study.

Lastly, after interviewing qualifying participants, I asked them to recommend other teachers at NPS who would be qualified and willing to participate in an identical survey.

If these individuals indicated they were interested in participating, I sent a series of preliminary, pre-screening questions. Qualifying criteria included individuals being at least eighteen years of age, having at least seen the NPS garden, being able to communicate that in English, and consent to participate in the survey. If all of these conditions were satisfied, the individuals were prompted to answer a series of my predetermined survey questions. See Appendix B. If one of these conditions was not satisfied, the individual was not be able to participate. They were thanked and left alone.

### Sample Size

The PIA explains that if a project assessor chooses to sample a community using a non-random approach, it is up to their discretion to choose the study's sample size. For my study, I did not predetermine a sample size. However, I set out to survey as many of the thirty total teachers at the NPS as I could. Forty-seven individuals were contacted.

### *Stage 6: Decide How to Assess Project Attribution*

When projects have been implemented in communities, changes will likely occur over time (Catley, 2014). The PIA notes that the assessment of attribution is critical to isolating these variables and understanding whether they are attributable to the project or other factors. In order to understand which reported outcomes are directly accredited to the NPS garden, I asked participants to consider this in the survey. See **Results: *Open Ended Questions: Garden Attributions.***

### ***Additional Institutional Review Board Research Details***

Although I used the Participatory Impact Assessment for the framework of my study, the University of Colorado Boulder's IRB outlined additional policies and procedures that needed to be followed per their human subjects research protocol. The following information presents sampling demographics of participants and additional information on contact methods used within my study, per the IRB protocol.

Teachers' and administrators' ages were anticipated to range from 20 to 75 years old. They were all anticipated to reside in the same village, Nabasunga, in the Kabwe District of the Central Province in Zambia. If participants were native to this area, then they were most likely of the Bemba ethnic group. If they were not native, their ethnicity could not be expected. No demographic information of respondents was recorded in the data collection and no sensitive information was exchanged by the respondents.

All ten questions were asked in English in one message sent either via Facebook messaging or WhatsApp. See Appendix B. Respondents were able to answer whichever questions they wanted in whichever order they preferred.

Duration of the entire study was expected to be 3 months to recruit participants, conduct the survey, and analyze all responses. Coercion was avoided by my initial message relaying that participation in the study was completely optional and termination of participation was allowed at any time for any reason without prejudice. The subjects were informed that they could terminate their participation in this study at any time for any reason without prejudice or penalty. Any subject who chose to participate was informed that they could refrain from answering any questions without penalty should they feel their privacy or comfort would be violated. No additional personal contact information was collected beyond what the Day by De Foundation already had on file.

Individuals who declined to participate in the study were thanked for their time and were not contacted again. If a respondent declined to answer a question, they were informed to simply leave it blank in their written response. No information that could potentially identify these individuals was recorded.

### ***Follow Up Questions***

After reviewing all survey responses, I had additional inquiries that became pertinent to my understanding of the participant's initial responses. I wanted to understand the actual sample size, so I asked qualifying participants the following questions:

1. Do you access Facebook primarily on your phone, computer, or other electronic device?
2. How much does your monthly phone data plan cost?

The following questions were asked of respective, individual participants:

1. What does “kkkk” and “kkk” mean?
2. What does this angry (or thumbs down) emoticon mean?
3. Which vegetables are you growing in your garden at home?
4. Who is the man in the photo?

Responses to these questions are presented in **Results: *Open Ended Questions: Follow Up Information.***

### **Results**

I intended to survey teachers working at NPS to understand the impacts that the garden has had on them personally, if at all. In this section, I present the responses to my study's survey questions. Forty-seven individuals were sent the initial greeting message. Fifteen individuals within the Nabasunga community responded to this survey: some responded to all of the questions and some individuals only answered select, indiscriminate questions. Twelve

respondents currently work at the Nabasunga Primary School, four reported they were senior teachers (similar to administrators), six reported they were class teachers, one said they were a “Deputy headteacher”, and one respondent did not disclose this information. One respondent said they used to be a teacher at the Nabasunga Primary School. One respondent reported they were a parent of a student currently attending the school, and another respondent said they are a local community member in Nabasunga.

In the section, “Semantic Differential Closed-Ended Questions,” I first present survey respondents’ personally rated importance-valuation of health, education, their relationship with their students, and their own income, respectively. Then, in the section, “Open Ended Questions,” I present survey responses to questions about the outcomes of the garden, both expected and revealed. Then I indicate how much money the garden has reportedly earned, how these profits have been managed, as well as participants’ hopes for the garden, and answers to follow-up questions I had after reviewing the data.

### ***Semantic Differential Closed-Ended Questions***

To measure the impact indicators I identified in Stage Three of the PIA, I designed a survey of closed ended questions with semantic differential scoring to quantify participants’ personally rated importance of health, education, their relationship with their students, and their own income, respectively. On a scale from 1 to 10, respondents were asked to value these priorities individually, where 1 indicates the lowest importance and 10 indicates the highest importance. Responses to these questions offer insight into the qualitative impacts that the garden has had on participants’ lives, based on which priorities are most important to them personally. It is vital to this assessment to understand participants’ valuations because they are the basis for understanding how the garden has impacted these individuals’ deepest priorities.



### *Value of Health*

I asked participants to report how highly they valued the importance of their health and their students' health. Fourteen individuals responded to this portion of the survey. Thirteen of them are or have been teachers at NPS and one is the parent of a student currently attending the Nabasunga Primary School. On a scale from 1-10, 10 being the most important, teachers and administrators valued their students' health at an average of 9.5. While 70% (9) of teachers and administrators ranked their students' health at a 10 out of 10, 30% (4) of teachers ranked their students' health at an 8. The parent valued their child's health at a 10.

When asked to rank level of importance of their own health, teachers and administrators responded with an average 9.8. While 85% (11) of teachers and administrators valued their health at a 10, 15% (2) valued their health at a 9. The parent valued their health at a 10, equal to that of their child.

Teachers and administrators at Nabasunga Primary School valued their own health higher than they valued the health of their students by a degree of 3%. See Figure 2.

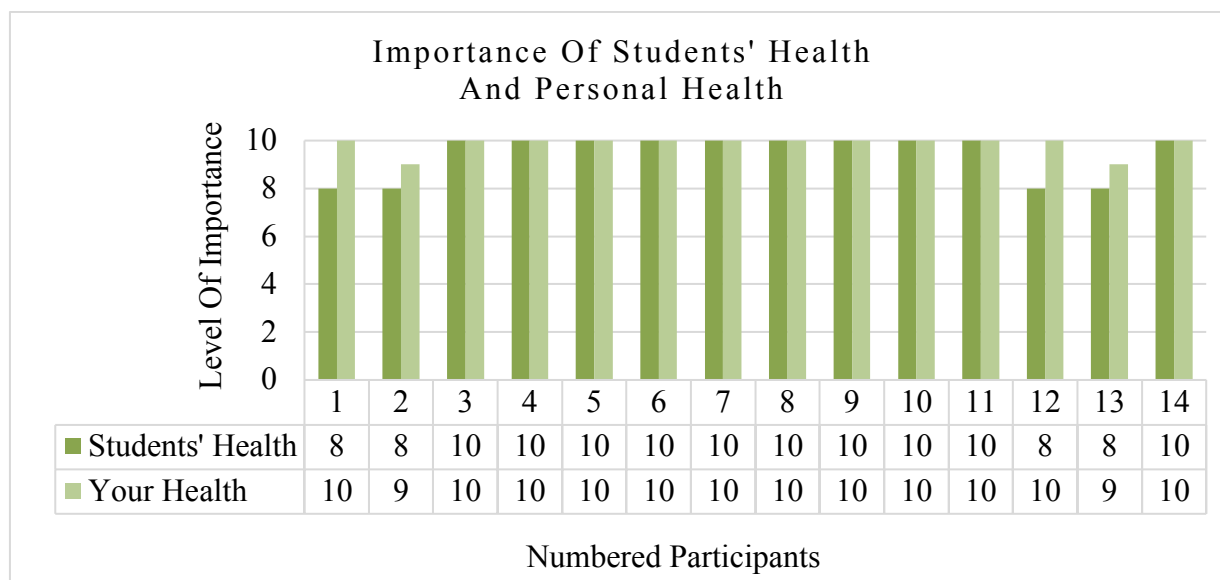


Figure 2. Graphical Demonstration Of Participants' Valuation Of Student's Health And Personal Health.

### *Value of Education*

I asked participants to report how highly they valued the importance of their education and their students' education. Teachers and administrators valued their students' education at an average of 9.2 out of 10. While 70% (9) of teachers and administrators valued their student's education at a 10, 23% (3) valued their student's education at a 7, and 0.07% (1) reported a valuation of 9.

When asked to rank level of importance of their own education, teachers and administrators responded with an average 9.7. While 70% (9) of respondents valued their education at a 10, 30% (4) valued their education at a 9. The parent valued their own education at a 5, significantly lower than they valued the education of their child, at a 10. Upon completion of the survey, the parent added, "thanks but am not good in English because i didnt go very far with my Education". However, teachers and administrators at Nabasunga Primary School valued their

own education higher than they valued the education of their students by a degree of 5%. See Figure 3.

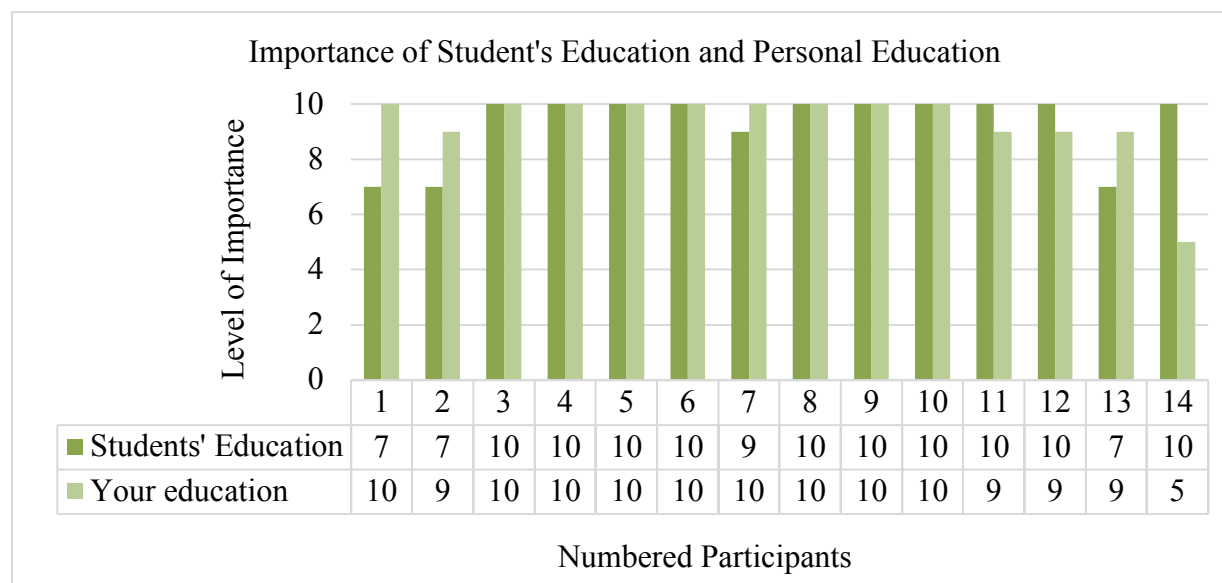


Figure 3. Graphical Demonstration Of Participants' Valuation Of Student's Education And Personal Education.

#### *Value of Relationship with Students*

I asked teachers to report how highly they valued the importance of their relationship with their students. All thirteen teachers answered and reported an average 9.7 out of 10. While 77% (10) of teachers and administrators reported a 10, 15% (2) reported a 9 and 0.07% (1) reported an 8. Parents and community members were not asked this question. See Figure 4.

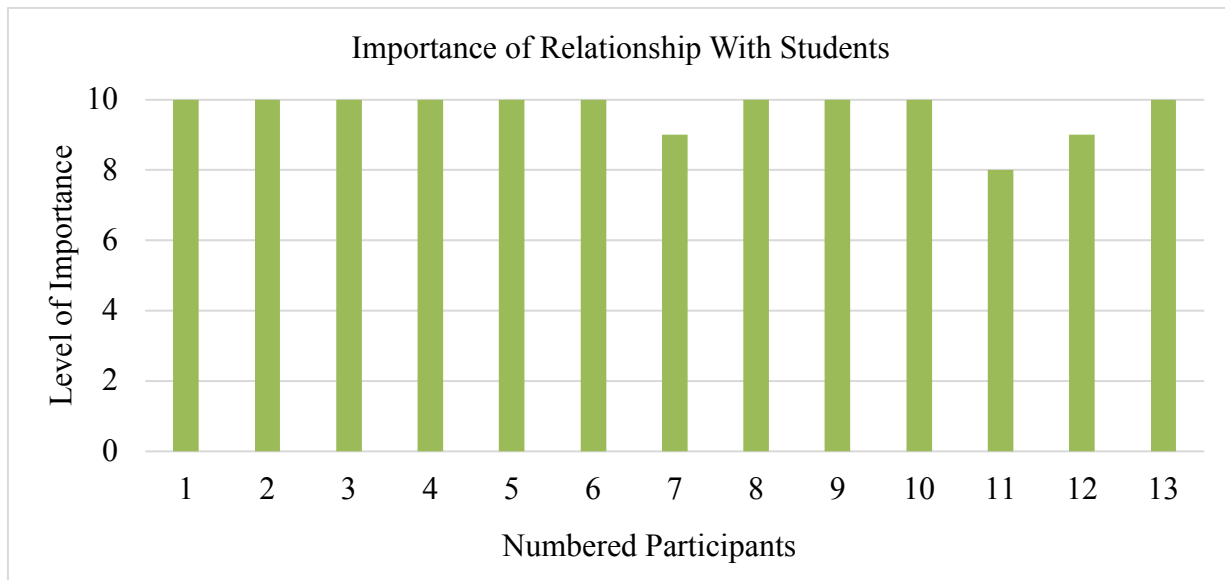


Figure 4. Graphical Demonstration Of Participants' Valuation Of Their Relationship With Their Students.

#### *Value of Income*

I asked participants to report how highly they valued the importance of their personal income. Twelve teachers from NPS and one parent responded. The average valuation was 7.8 out of 10. While 34% (4) of teachers valued their income at a 10, 25% (3) valued their income at an 8, 17% (2) valued their income at a 7, 17% (2) valued their income at a 5, and the remaining 8% (1) reported a value of 6. The parent respondent valued their income at a 5. See Figure 5.

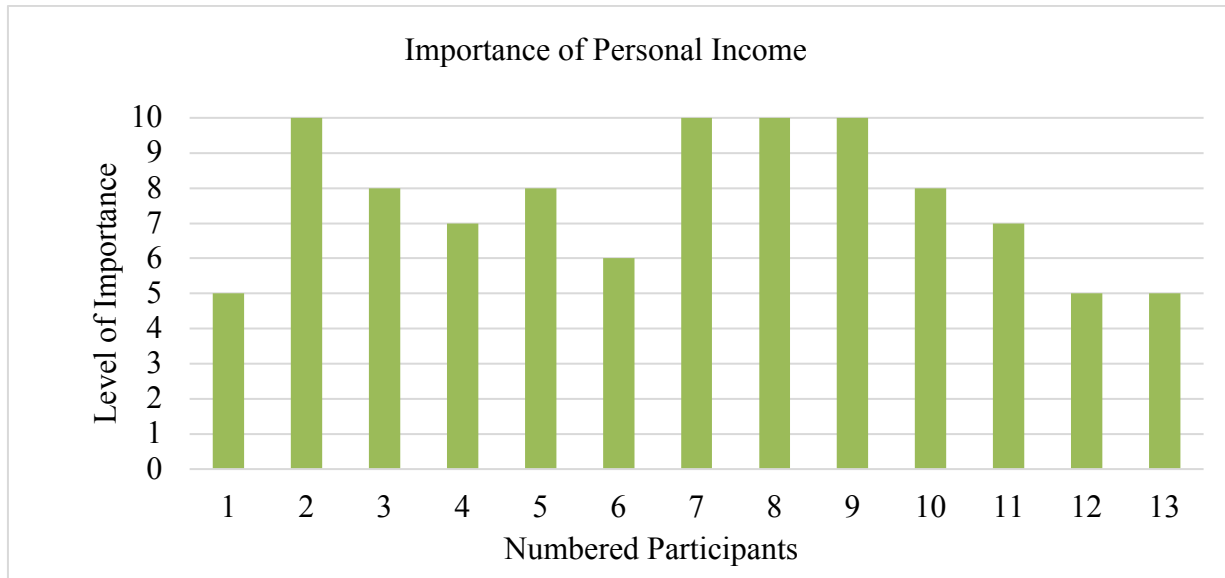


Figure 5. Graphical Demonstration Of Participants' Valuation Of Their Personal Income.

### ***Open Ended Questions***

To measure the impact indicators I identified in Stage Three of the PIA, I designed the second portion of the survey to ask retroactive, open-ended questions that allow participants to reveal qualitative data about the NPS garden. In the sections to follow, I present participants' awareness of the garden prior to its implementation, as well as expected and revealed outcomes of the garden. Then I indicate how much money the garden has reportedly earned, how these earnings have been spent, participants' hopes for the garden, and answers to follow-up questions I had after reviewing the data.

### ***Awareness of Garden Implementation***

I asked participants if they had known about the NPS garden prior to its implementation in 2017. Most respondents, 87% (13) said "Yes", indicating they were aware of the garden prior to its implementation: eleven were teachers, one was a parent, and the other was a local community member in Nabasunga. The other 13% (2) of participants who said they were not aware of the garden before its cultivation added they had not yet been working at the Nabasunga

Primary School. The parent respondent said their child came home and told them about it. See Figure 6.

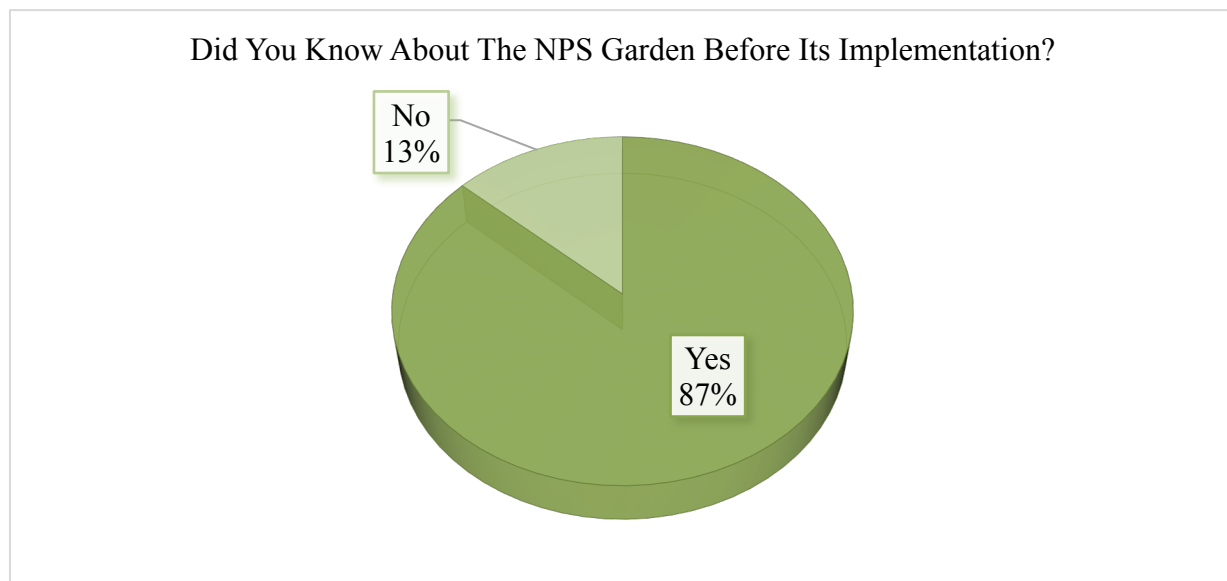


Figure 6. Graphical Demonstration Of Relative Reported Knowledge of The Garden.

#### *Garden Frequenting*

I asked participants how often they are physically present in the NPS garden. All fifteen respondents reported having visited the garden at least once, which qualified their participation in this study. Only 13% (2) of respondents, namely the parent and the community member, have not stepped foot in the garden more than once. Only 7% (1) of respondents said they visit the garden once weekly. However, most teachers at the Nabasunga Primary School (80%) who responded to this survey report visiting the garden on a daily basis during the school week. They mentioned that students in grades one through four are scheduled for thirty minutes to an hour every Thursday in the school year to participate in garden activities: pulling weeds, planting new seeds, transplanting seedlings, watering crops, and eating harvested vegetables. Sometimes the students are able to take vegetables home to their families as well, one parent reported. See Figure 7.

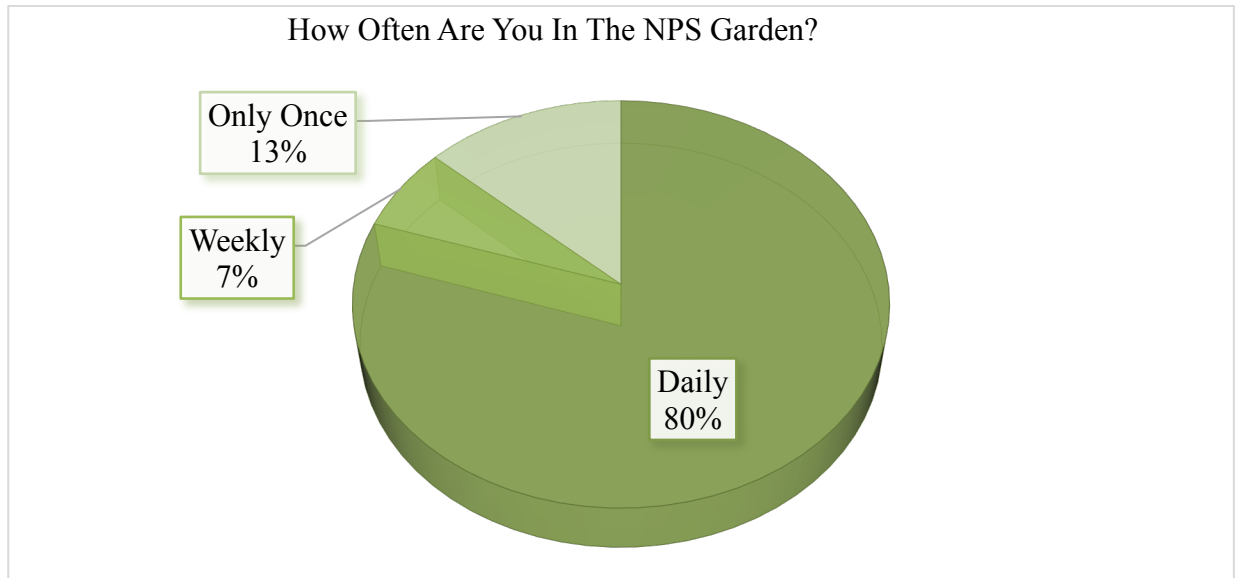


Figure 7. Graphical Demonstration of The Relative Garden Frequenting Among Participants.

#### *Reported Expectations of the NPS Garden*

I asked participants to retroactively report their expectations of the garden when they heard about its implementation, prior to February, 2017. All fifteen participants responded to this question, each with at least one theme<sup>5</sup>. Six total themes were reported: acquired skills, improved health, increased school attendance and performance of students, increased engagement and participation within the school and community, increased income for the school, and improved wellbeing and understanding of the environment. Sixty-seven percent (10) of participants expected acquiring skills: gardening, entrepreneurial, and record-keeping skills. While 26% (4) of participants expected improved health, 13% (2) expected improved school performance, 13% (2) expected an increased care for the environment, 6% (1) expected income for the school, and 6% (1) expected increased engagement and participation. See Figure 8.

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<sup>5</sup> Themes: outcomes, both expected of the garden before its implementation and/or reported a year after its cultivation.

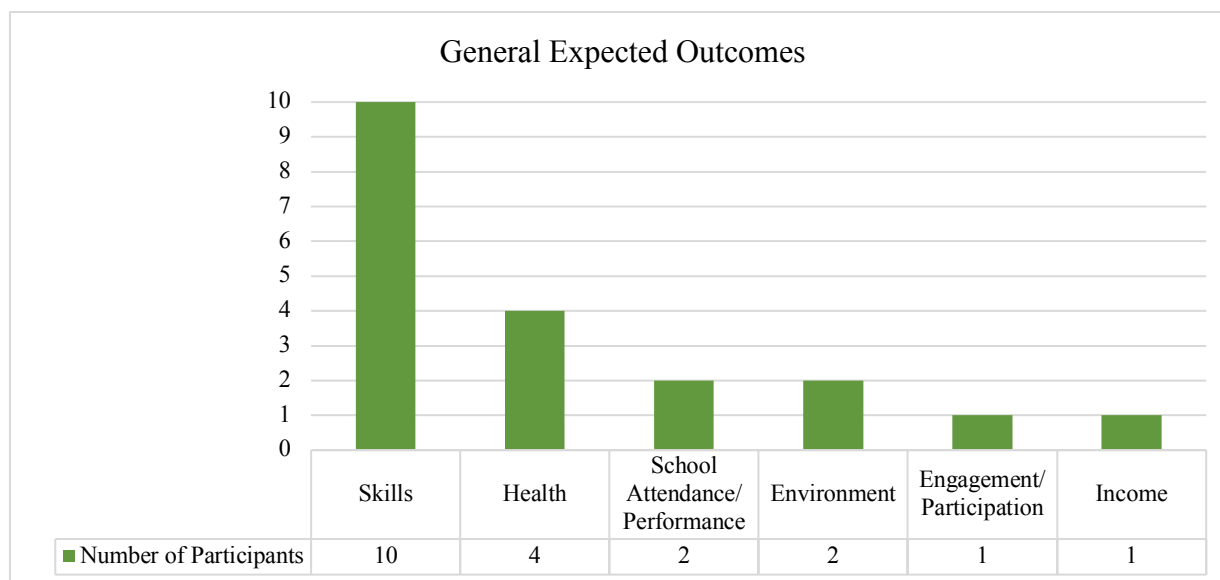


Figure 8. Graphical Demonstration of Number of Participants Who Expected Each Theme

### *Reported Impacts of the NPS Garden*

I asked participants to report the revealed outcomes of the garden in two regards: in relation to their personal lives and in relation to the community.

### *Reported Impacts on the Participants' Personal Lives*

I asked participants to report the impacts the NPS garden has had on their personal lives since its completion in May, 2017. Thirteen individuals responded to this question. Six themes were reported: increased (gardening) skills, improved personal health, increased access to local produce, emulation, increased participation within the community, and an increased interest in gardening. A surprising 46% (6) of respondents reported gardening skills, which translated into 23% (3) of respondents, each teachers, growing their own gardens at home. Emulation was an unexpected outcome. While 38% (5) of respondents reported a personal impact of improved health, and 7% (1) reported increased participation within the community. Two other unexpected



outcomes were found: 30% (4) of respondents reported increased access to local produce, 7% (1) reported an increased interest in gardening. See Figure 9.



Figure 9. Graphical Representation of Reported Personal Impacts of the NPS Garden

#### Reported Impacts on the Community

I asked participants to report the impacts the NPS garden has had on their community since its completion in May, 2017. Fourteen individuals responded to this question. Six themes were reported: emulation, increased access to local produce, increased participation, increased income, improved health, and self-reliance. Three expected outcomes were reported: 14% (2) of respondents reported increased participation within the community, 14% (2) reported increased income for the community, and 7% (1) reported improved health within the community. Three unexpected outcomes were reported, at higher quantities: 57% (8) of respondents reported emulation within the community, 50% (7) reported increased access to local produce, 7% (1) reported “the community has become self-reliant”. See Figure 10.

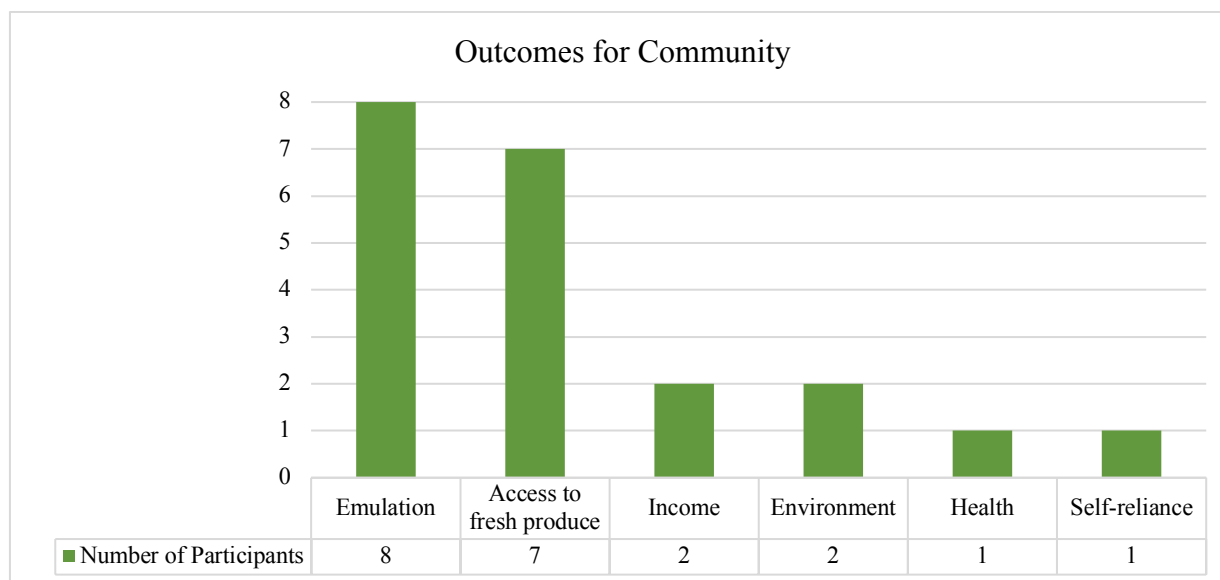


Figure 10. Graphical Representation of Reported Personal Impacts of The NPS Garden

#### *Garden Attributions*

In order to understand the garden attributions identified in Stage Six of the PIA, I asked participants to report which changes in the community were directly attributable to the NPS garden. Thirteen individuals responded to this question. Out of the revealed outcomes, 15% (2) of respondents attributed improved skills, 15% (2) attributed increased participation, 15% (2) attributed increased income, 7% (1) attributed improved health, 7% (1) attributed increased interest, and 7% (1) attributed increased access to fresh produce to the garden's implementation.

Fifteen percent (2) of respondents said "growing from small to large production and growing variety" was directly attributable to the garden, while 7% (1) reported that all of the outcomes seen in the community were specifically attributable to the garden. See Figure 11.

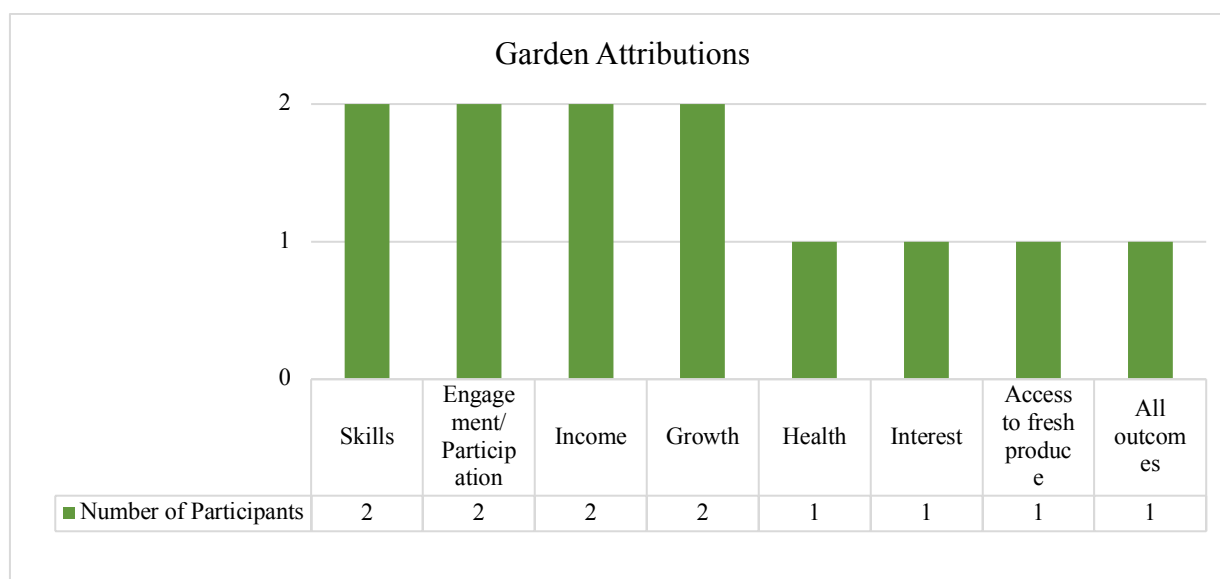


Figure 11. Graphical Demonstration of Reported NPS Garden Attributions

### *Monetary Earnings*

I asked teachers to report an accounting of the NPS garden's financial profits. Ten respondents said they did not know the answer. One respondent estimated, "by December 2017 almost a 1000 plus,"<sup>6</sup>. A month later, three respondents reported "K 3,048.00,"<sup>7</sup>. I asked all the teachers to report how these earnings have been managed. Eleven responded: 100% (11) of teachers reported a portion of the financial profits earned by the garden were used to buy more garden supplies, 55% (6) reported paying a garden helper, and 36% (4) reported buying school supplies. One teacher added that garden inputs included insecticides and pesticides, as well as seeds, manure, and buckets. See Figure 12.

<sup>6</sup> a \$83.86 USD value

<sup>7</sup> a \$255.60 USD value.



Figure 12. Graphical Demonstration of The NPS Garden Profits' Spending

### *Future Garden Goals*

The last question I asked individuals on the survey was what they would like to see happen with the garden in the future. Fifteen individuals responded, with the highest word count and most detail of all responses. Eight themes were presented. One hundred percent (15) of respondents reported hoping to see the garden expand to some capacity, 20% (3) reported a pig or chicken farm, 13% (2) reported self-sustainability, 13% (2) reported increased crop diversity, 13% (2) reported implementing garden yields into the NPS lunch program, 7% (1) reported earlier exposure, 7% (1) reported improvement in record keeping, and 7% (1) reported hoping to see students going into the agricultural field. Garden expansion encompassed ideas of physically growing bigger, hiring a full time garden employee, creating a market on campus, and preparing secondary goods, such as “tomato [sauce]” to be sold. See Figure 13.

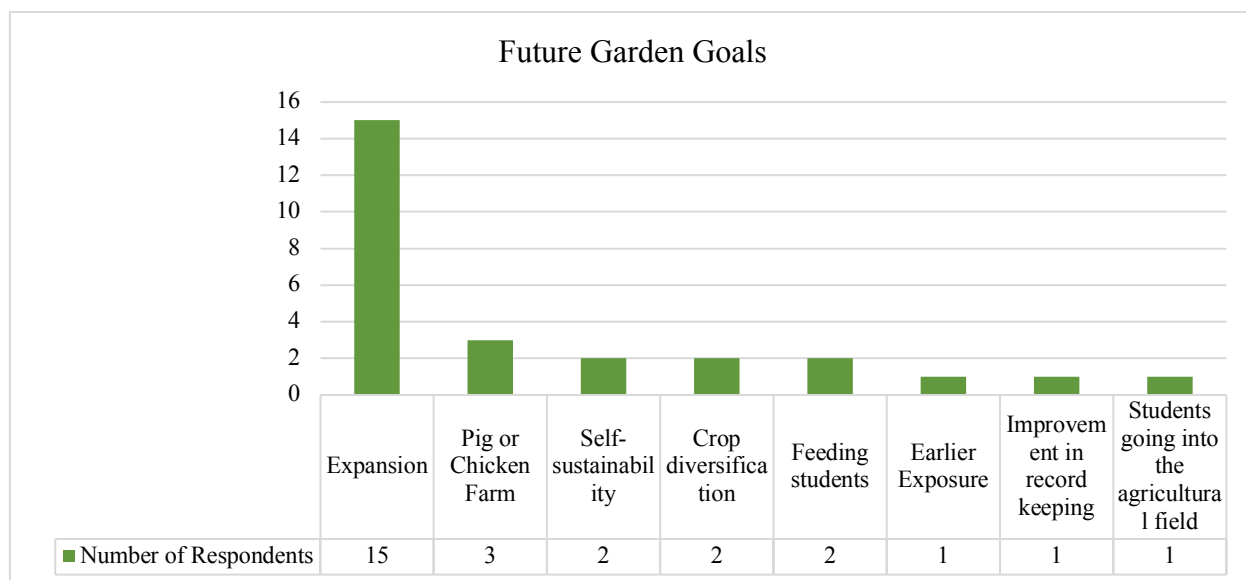


Figure 13. Graphical Demonstration of Reported Goals For The NPS Garden

### *Follow Up Information*

After reviewing survey responses, I had follow-up questions for participants: some pertained to the study itself and some pertained to individual responses. Four individuals engaged in follow-up questions.

### **Facebook Access**

I asked participants how they primarily access Facebook. Four individuals said they access Facebook on their phones and did not list another electronic device. I then asked if they have access to free wireless fidelity (WiFi) or if they pay for their data. All four respondents said they pay for phone data. I then asked how much a monthly phone data plan costs. One individual indicated that they pay “K100.00<sup>8</sup>” per month.

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<sup>8</sup> \$8.35 USD

## Individual Questions

One individual sent “kkk” in one of their responses to me, and I was not sure what this meant. Upon completion of their survey, I asked if they would feel comfortable elaborating what “kkk” meant for them. They indicated it was a laughing gesture.

After consenting to participate in this study and then receiving survey questions from me, three individuals sent me either an angry or a thumbs down emoticon. Two of these individuals did not answer my survey questions and one sent in responses. I asked all three of these individuals if they were comfortable elaborating what they meant by their virtual expressions. No individuals responded.

There were three teachers who reported cultivating their own garden at home after learning the skills at the NPS garden. I asked them if they would feel comfortable sharing crop types and photos of their personal garden with me. One respondent shared that they were growing, “maize...African eggplant called impwa...okra, Pumpkin leaves too, Tomatoes just got finished”. In one of the photos that was sent to me, there was a man in the foreground. I asked the individual who sent the photo to identify him. They responded that his name was Davis, and he was hired by NPS as a part-time garden helper.

## Discussion

In this section, I discuss Stage Seven of the PIA and present my interpretations of the data I collected through primary and secondary findings. I then extrapolate a broader interpretation for this type of assessment.

### ***Stage 7: Triangulate Results from Participatory Methods with Other Information***

Stage Seven of the PIA calls for a cross-reference analysis from all information gathered about the garden. For my project, I am reviewing and comparing respondents’ highest rated

priorities, expectations, reported personal impacts and communal impacts of the garden, with Day by De's expectations and my personal observations. As outlined in Stage One of the PIA, I want to understand the impacts of the NPS garden by answering the three key questions throughout this section.

### *Respondents' Priorities and Expectations*

Priority valuation averages were reported as follows: personal health 9.8, personal education 9.7, relationship with students 9.7, students' health 9.5, students' education 9.2, and personal income 7.8. Personal health, relationship with students, and personal education were rated at the highest level of importance for respondents. Respondents' written in responses reported "learning and improving gardening skills", which I categorized as contributing to, "education". Similarly, I categorized "access to fresh produce" and "improved health" as health and "participation and engagement" as a contribution to "relationship with students". In this case, nine respondents reflected their highest valued priorities in their personal expectations for the garden. Assuming priorities remain constant, this means before the implementation of the NPS garden, almost half of the participants in this study put good faith into the garden's outcomes.

According to the data from this survey, the participants did not highly prioritize income nor did 93% of them expect the garden would provide this for them. See Appendix C.

### *Respondents' Priorities and Outcomes*

The highest rated priorities (health, relationship to students, and education) were also found to be reflected in the garden's outcomes. Twelve out of fifteen individuals revealed at least one of their highest priorities, as mentioned in their valuations, was met by the outcomes of the garden. This indicates that, although some individuals may not have *expected* the garden's

impacts to meet their priorities, it did regardless at a high success rate. The garden's yields and outcomes met and exceeded respondents' personal expectations. Additionally, while the reported average valuation of income was lower than other priorities of respondents, two individuals reported income as a communal impact of the NPS garden.

### *Respondents' Expectations and Outcomes*

There were six expectations and eight outcomes of the NPS garden prior to its implementation. Four of these expectations were reportedly met by the garden's presence and yields in either personal or communal impacts by study respondents: improved skills, improved health, increased income, and increased participation. Four unexpected outcomes were reported as well: interest in gardening, emulation, access to fresh produce, and self-reliance. See Figure 14. Expectations that were not reportedly met include school attendance and care for the environment, which is different than outcomes of community gardens in the United States.

Written In Themes	Expected Outcomes	Personal Impacts	Community Impacts
Skills	10	6	0
Health	4	5	1
School Attendance/Performance	2	0	0
Environment	2	0	0
Income	1	0	2
Engagement/Participation	1	1	2
Interest	0	1	0
Emulation	0	3	8
Access to fresh produce	0	4	7
Self-reliance	0	0	1



Figure 14. Reported Expectations, Personal Impacts, and Community Impacts of the NPS Garden

*Day by De Foundation's Priorities, Expectations, and Outcomes*

The Day by De Foundation's team members' goal for their projects is to help create self-sufficiency for the most localized populations in rural communities. Their original goal for the NPS garden was to provide fresh and healthy produce, hands-on learning, and help the Nabasunga Primary School pay the \$10,000 USD equivalent annual operational costs. Access to fresh produce and enhanced education coincided with NPS teachers' priorities and expectations, which were found to be successfully met by the garden's outcomes. Although income was not a high priority for NPS teachers or local community members, the garden earned \$255 USD equivalent in profits, which is nearly 70% of an average individual's annual income in Nabasunga. These did not seem to go wasted, either, as participants reported reinvesting these earnings into garden and school supplies. While emulation was not expected, Day by De team members were delighted to find that NPS teachers and other Nabasunga community members cultivated their own gardens, as this bolsters their self-sufficiency, indicating the overall goal for the garden was met.

*Observations*

My first key question, identified in Stage One of the PIA, offers information to help understand my research question: how has the NPS garden impacted, if at all, the nutrition of the teachers working at the school? The garden has reportedly impacted the nutrition and health of 53% of NPS teachers by providing fresh, nutritious, and local produce.

My second key question asked: how has the NPS garden impacted, if at all, the livelihoods of the teachers working at the school? Although emulation was not expected, it was

the most commonly reported impact the garden had on the Nabasunga community. The fact that emulation of the garden ensued after its implementation speaks greatly to the impact it had on the teachers who cultivated their own gardens, as well as the surrounding schools and families who did the same. There were three reported cases of personal emulation and eight reported cases of communal emulation, indicating the NPS garden exceeded its expectations, spreading impact beyond the bounds of the garden itself. All of the garden's beneficiaries now have the opportunity to use the gardening skills learned and apply them elsewhere: whether they grow their own vegetables, offer trainings for other schools or communities, or grow a harvest to sell for profit and/or trade for other goods and services.

Most of the participants (80%) said they are in the garden every day, meaning this garden has a significant presence in their lives. Whether the garden's yields offer benefits to the teachers is a great indicator of the degree to which the garden affects them. Because most of the teachers at the Nabasunga Primary School are women, this garden offers increased opportunity for their engagement and empowerment within NPS and their community.

My third key question asked: how might the garden be changed to improve its impacts in the future? All fifteen respondents said they would like to see expansion of the garden to some extent, whether that be growing more crops, adding a chicken farm, growing a great variety of crops, opening a market on campus, and hiring a full-time employee to help look over the garden. This indicates they are satisfied with the outcomes and would like to continue using the garden and investing time and energy into maintaining it.

### *Secondary Findings*

There is little publication on the lifestyles for individuals living in the Nabasunga community. Speaking with this sample of fifteen individuals provided insight into the daily

practices and culture that extend beyond the impacts of the school garden. After additional follow-up discussion with some respondents, I learned why it might have been difficult to get in contact with more parents and Nabasunga community members. Because individuals in Nabasunga do not have access to free internet, or wireless fidelity (Wi-Fi), they are subject to pay for data: 100 Kwacha is a lot of money that people need to pay for phone data per month. This may be what warranted the unhappy and thumbs-down emoticons in responses I received from some individuals. They may not have wanted to spend their money and data on a long message from someone across the world who they didn't know.

There was a wide range of responses from individuals. Some people kept their answers really short, some people skipped a few questions, and others didn't want to interact with me beyond this. Some people were on the opposite side of the spectrum and sent me pictures of their own garden, updates about their daily activities, "happy new year's" greetings, and checked in with me up until the submission of this paper. This highlights the variety of personalities within this community.

One respondent reported that administrators at NPS occasionally give away some of the garden's produce, rather than sell it. This may be related to the teachers' and administrators' lower priority of income or their culture of generosity. If the goals for the teachers were to be able to feed themselves and their local community members, then the garden was able to meet this desire. However, if the reasoning for giving away produce lies in the fact that the cabbage market was already saturated, then that has other implications. One of the limitations to this study is that I do not have all of the information to be able to make such extrapolations.

### ***A Broader Context***

Higher income may not be the highest priority for NPS teachers. However, an increase in profits can lead to a greater investment in health and education through health insurance, medicine, and tuition. If the NPS garden continues to accumulate profits over the coming harvests, these funds may be able to cover tuition costs and allow more students to attend NPS as well. This could educate more females and offer a higher opportunity cost for teen pregnancy. With lower births per female and lower young-mother birth rates, the Nabasunga community's growth rate could stabilize. Lower population also means that the existing wealth can be more evenly distributed among individuals in the community, increasing GDP per capita and wellbeing, according to Easterlin's happiness-income paradox. Additionally, these young adults will have more job opportunities if and when they graduate. If they stay in their villages, they can apply their knowledge to help their communities grow and prosper in place. This reduces vulnerability within the community, which will help increase resiliency against impending climate change.

### **Conclusion**

This study was designed to understand the real impacts of the Nabasunga Primary School garden on the teachers in order to determine whether a chicken farm should be implemented. Thirteen NPS teachers responded to this survey and reported their priorities, expectations, personal outcomes, and communal outcomes which were used to understand the successes and shortcomings of the garden. Thirteen out of the thirty current teachers at the school responded to my inquiries. This reveals information about almost half of the teachers of the Nabasunga School campus. Twelve individuals (80% of participants) reported the garden's outcomes having met at least one of their personally highest rated priorities.

One hundred percent of expected and revealed outcomes of the garden were reported to be positive and beneficial, not only to the teachers at the Nabasunga Primary School, but also to community members within Nabasunga. Forty six percent of participants' expectations of the garden were met, and even exceeded. All of the NPS garden's beneficiaries now have the opportunity to use the gardening skills they learned and apply them elsewhere: whether they grow their own vegetables, offer trainings for other schools or communities, or grow a harvest to sell for profit and/or trade for other goods and services.

### ***Supported Hypothesis***

I hypothesized that the PIA would consider the NPS garden to be successful and offer a framework for the Day by De Foundation's future project assessment. The data revealed in this study supports this hypothesis. Not only was the garden successful, but it exceeded expectations of this study's participants and the Day by De Foundation's team members.

### ***What I learned***

The requirements of research become more complex and demanding when conducted internationally. Throughout this project, I pushed the boundaries of my known abilities. Conducting this experiment all virtually from Colorado, over 9,000 miles away from my research group posed many challenges. I found it extremely helpful to talk to professionals who have conducted transdisciplinary studies in Anthropology and Environmental Studies fields. I found that priorities, no matter how big or small, cannot be assumed of another person or community. This is exactly why project assessment such as this one is necessary and beneficial for targeted communities as well as the organizations. I also found my voice in advocacy for humanitarian project assessments, as I now understand how simply they can be conducted and

help organizations and communities around the world increase efficiency and understanding of collaboration efforts.

### ***Beyond The Day by De Foundation***

Information revealed from this finite study of the Nabasunga Primary School garden can be broadened to a larger context of project assessments. In spite of the fact that this assessment was not done to the full capacity per the PIA's suggestions, especially because it was conducted remotely, it still reveals useful information about the garden itself and assessments in general. There are over 100,000 registered non-profit organizations dedicated to providing humanitarian aid to populations in Southern Africa (Stuart, 2013). The widespread use of internet allows representatives from these NPOs to conduct assessments through online surveys of their projects' beneficiaries. This study highlights the availability of information, even with limited resources to assessors. There is no excuse for the limited amount of documented assessments on humanitarian projects in rural populations around the world. Recording some data about projects' outcomes is more valuable than having no data at all.

The PIA reveals an objective methodology to record what a community wants and needs, as these are not intuitive to outside observers. Just as the Day by De Foundation did not fully understand NPS's teacher's prioritization of income, other organizations cannot make assumptions about any benefiting communities. This in itself has a global relevance to the ten million plus nonprofit organizations taking action worldwide.

While there were quite a few limitations to this study, they did not curtail success of the garden. Furthermore, just because this study yielded positive results does not mean the Day by De Foundation necessarily did the project correctly, that I conducted this assessment correctly, or that all outcomes were actually positive. There is a system for organizations to follow that frame

questions in surveys, as well as creating and later assessing these projects. Just as the Day by De Foundation will need to adjust the assessment for the NPS chicken farm, other organizations need to find an objective methodology to evaluate their projects in all contexts.

## **Recommendations**

In this section I present recommendations to the Day by De Foundation, Nabasunga Primary School, and Further Research.

### ***To the Day by De Foundation***

After reviewing and analyzing the data, I recommend the Day by De Foundation continue pilot projects in communities with modifications. Before implementation of any projects, trainings, or funding, the Day by De Foundation should have a representative (preferably native-speaking) talk with the leaders and other constituents of a community about their needs and priorities. I believe it is appropriate to move forward with the implementation of the chicken farm to work in conjunction with the Nabasunga Primary School garden. However, a strict budget should be maintained and well-kept. In trainings, make sure to monitor garden and chicken farm spending and income. I also recommend that the Day by De Foundation continue to work closely with the community members to determine assessment parameters/proxy indicators/success indicators before the project starts. If the assessor is asking retroactive questions, I recommend not sending all questions at once and tailor questions to respondents' answers. For example, when retroactively asking participants if they had known about the project prior to its implementation, I recommend only asking expectations of the garden to individuals who respond confirming their prior awareness. Additionally, create a clear timeline in collaboration with the community. Make sure that post-project survey questions directly relate to pre-project survey questions to minimize loose connections. For post-project survey, ask

participants to report positive and negative impacts, as well as challenges and future goals. Continue to collect data at least once per year to uphold responsibility to the community. Lastly, have someone on the ground at least once a month to communicate with the community members to ask questions and provide support.

For more recommendations, see the ***For Further Research*** section below.

### ***Stage 8: Plan the Feedback and Final Cross-checking of Results with Communities***

Stage Eight of the PIA suggests that assessors cross-check results of their studies as well as discuss feedback and recommendations with the targeted community.

#### *To the Nabasunga Primary School*

I recommend all information presented in this study be reviewed by NPS teachers and administrators for accuracy assurance. Participants in this study reported purchasing insecticides and pesticides to be used on their crops, which have many health implications, depending on the products. Seeing as 85% of respondents ranked health a ten out of ten priority for them, they may be interested in learning about organic farming. To maximize water infiltration within the garden, I recommend leveling out the ground before the next harvest. Additionally, I recommend planting seedlings earlier in the season so their produce is competitive among the other crops entering the market in July and August. NPS teachers have the skills and resources available to them to solve problems posed by the new garden. However, should they arise, I urge the constituents of the NPS not to hesitate in reporting challenges and the garden's shortcomings to each other, myself, and the Day by De Foundation's local project managers.



### ***For Further Research***

There are approximately 750 students attending Nabasunga Primary School, making up the majority of the school's population. NPS was built to provide knowledge and resources for the students. For further research in this school, I recommend including students' perspective on the garden when analyzing the garden's broad impact on the community. I recommend studying a random sample of at least 50 students, and interviewing them in person before the chicken farm's implementation. These study group constituents should include a variety of demographics from the population if possible: students, teachers, parents, community members of all ages and sexes. These interactions should take place in person, with a voice recorder, and a scribe taking notes. All responses should be documented and stored in a safe database. Having a Bemba-English translator may also help broaden the scope of respondents.

When asking for the communities' main priorities, I recommend asking why they answered a certain way to understand their culture better. If using semantic differential scales, I recommend asking participants to rank their listed priorities, and offer other priorities they may have that are not listed.

Research about gender roles in Zambia reveals that men in heterosexual relationships are found beating their female partners if and when they are empowered by a job (Reporter, 2003; Lawoko, 2008). Because the NPS garden offers female engagement and participation, an additional research question that may be worth examining is: how does the NPS garden impact female teachers' relationships with their husbands?

Other research questions include:

1. How have the students at NPS been impacted by the school garden?
2. How has the NPS garden impacted, if at all, the local produce markets?

3. Which local communities in Kabwe would benefit from the implementation of a community garden?

## Bibliography

- About Us. (n.d.). Retrieved from <https://sirolli.com/about-us/>
- Armstrong, D. (2000). A community diabetes education and gardening project to improve diabetes care in a northwest American Indian tribe. *Diabetes Educator*, 26, 113–120.
- Armstrong, D. (2000b). A survey of community gardens in upstate New York: Implication for health promotion and community development. *Health and Place*, 6, 319–327.
- Auty, Richard. *Sustaining development in mineral economies: the resource curse thesis*. Routledge, 2002.
- Bertolucci, S. (2018, October 31). Beyond GDP: Economics and Happiness. Retrieved from <https://econreview.berkeley.edu/beyond-gdp-economics-and-happiness/>
- Blattman, C., Fiala, N., Martinez, S.; Generating Skilled Self-Employment in Developing Countries: Experimental Evidence from Uganda, *The Quarterly Journal of Economics*, Volume 129, Issue 2, 1 May 2014, Pages 697–752, <https://doi.org/10.1093/qje/qjt057>
- C. E. Persons; Women's Work and Wages in the United States, *The Quarterly Journal of Economics*, Volume 29, Issue 2, 1 February 1915, Pages 201–234, <https://doi.org/10.2307/1884958>
- Care. (2017). Zambia. Retrieved from <https://www.care.org/country/zambia>
- Catley, A., Burns, J., Abebe, D., & Sujji, O. (2014). Participatory Impact Assessment: A Design Guide. *Tufts University: Feinstein International Center*, 1-65. Retrieved from [http://fic.tufts.edu/assets/PIA-guide\\_revised-2014-3.pdf](http://fic.tufts.edu/assets/PIA-guide_revised-2014-3.pdf)
- CIA. “The World Factbook: ZAMBIA.” Central Intelligence Agency, Central Intelligence Agency, 19 Sept. 2018, [www.cia.gov/library/publications/the-world-factbook/geos/za.html](http://www.cia.gov/library/publications/the-world-factbook/geos/za.html).
- Central Statistical Office. (2012, December). 2010 Census of Population and Housing. Retrieved from [http://www.zamstats.gov.zm/phocadownload/2010\\_Census/2010\\_Census\\_of\\_Population\\_National\\_Analytical\\_Report.pdf](http://www.zamstats.gov.zm/phocadownload/2010_Census/2010_Census_of_Population_National_Analytical_Report.pdf)
- Chifwepa, V. (1997). Rural Information Provision in Zambia: Problems and prospects. *SAGE Journals*, 13(3), 128-131. doi:<https://doi.org/10.1177/0266666974238726>
- Clay, E. J. (1981). *Food policy issues in low-income countries* (No. 473). Washington D.C: World Bank.
- Copestake, J., Bhalotra, S., & Johnson, S. (2001). Assessing the Impact of Microcredit: A Zambian Case Study. *Journal of Development Studies*, 37(4), 81-100. doi:10.1080/00220380412331322051
- Bryer, D., Cairns, E. (1997) For better? For worse? Humanitarian aid in conflict1, *Development in Practice*, 7:4, 363-374, DOI: 10.1080/09614529754152
- Draper, C., & Freedman, D. (2010). Review and Analysis of the Benefits, Purposes, and Motivations Associated with Community Gardening in the United States. *Journal of Community Practice*, 18(4), 458-492. doi:10.1080/10705422.2010.519682
- Easterlin, R. A. (1974). Does Economic Growth Improve the Human Lot? Some Empirical Evidence. *Economic Growth*, 30-37. doi:10.1057/9780230280823\_6
- Easterlin, R. A., McVey, L. A., Switek, M., Sawangfa, O., & Zweig, J. S. (2010). The happiness–income paradox revisited. *Proceedings of the National Academy of Sciences of the United States of America*, 107(52), 22463–22468. <https://doi.org/10.1073/pnas.1015962107>
- Gawaya, R., & Mukasa, R. (2005). The African women’s protocol: a new dimension for women’s rights in Africa. *Gender & Development*, 13(3), 42–50. Retrieved from

- <http://search.ebscohost.com.colorado.idm.oclc.org/login.aspx?direct=true&db=fyh&AN=19451235&site=ehost-live&scope=site>
- Gibbs, Lisa & Staiger, Petra & Townsend, Mardie & Macfarlane, Susie & Gold, Lisa & Block, Karen & Johnson, Britt & Kulas, J & Waters, Elizabeth. (2013). Methodology for the evaluation of the Stephanie Alexander Kitchen Garden program. *Health promotion journal of Australia: official journal of Australian Association of Health Promotion Professionals*. 24. 32-43. 10.1071/HE12905.
- Giridharadas, A., & Bradsher, K. (2006, October 13). Microloan Pioneer and His Bank Win Nobel Peace Prize. Retrieved from <https://www.nytimes.com/2006/10/13/business/14nobelcnd.html>
- Gomes, R., & Lawson, M. (2005). Pro-Poor Macroeconomic Policies Require Poverty and Social Impact Analysis. *Development Policy Review*, 23(3), 369-384. doi:10.1111/j.1467-7679.2005.00292.x
- Graham, H., Beall, D. L., Lussier, M., McLaughlin, P., & Zidenberg-Cherr, S. (2005). Use of school gardens in academic instruction. *Journal of Nutrition Education & Behavior*, 37, 147-151.
- Haushofer, J., & Shapiro, J. (2013). Household Response to Income Changes: Evidence from an Unconditional Cash Transfer Program in Kenya\*.
- Heeks, R. (2002). Information Systems and Developing Countries: Failure, Success, and Local Improvisations. *The Information Society*, 18(2), 101-112. doi:10.1080/01972240290075039
- Hjelm, L., Handa, S., Hoop, J. D., & Palermo, T. (2017). Poverty and perceived stress: Evidence from two unconditional cash transfer programs in Zambia. *Social Science & Medicine*, 177, 110-117. doi:10.1016/j.socscimed.2017.01.023
- Hobson, R. H., Williams, G. J., & Roberts, A. D. (2019, March 07). Zambia. Retrieved from <https://www.britannica.com/place/Zambia/Colonial-rule>
- Honig, D. (2018). *Navigation by Judgment: Why and When Top Down Management of Foreign Aid Doesn't Work*. New York, NY: Oxford. doi:ISBN: 9780190672454
- Hulme, D., Hanlon, J., Hanlon, J., & Barrientos, A. (2017). Social Protection, Marginality, and Extreme Poverty: Just Give Money to the Poor? *Marginality*, 315-329. doi:10.1007/978-94-007-7061-4\_19
- Huys, N., De Cocke, K., De Craemer, M., Roesbeke, M., Cardon, G., & De Lepeleere, S. (2017). School Gardens: A Qualitative Study on Implementation Practices. *International Journal of Environmental Research and Public Health*, 1-12. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5750873/pdf/ijerph-14-01454.pdf>.
- Jensen, R.; Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India , *The Quarterly Journal of Economics*, Volume 127, Issue 2, 1 May 2012, Pages 753-792, <https://doi.org/10.1093/qje/qjs002>
- Johnson, B. D., Dunlap, E., & Benoit, E. (2010). Organizing "mountains of words" for data analysis, both qualitative and quantitative. *Substance use & misuse*, 45(5), 648-70.
- Jung, H., & Thorbecke, E. (2003). The impact of public education expenditure on human capital, growth, and poverty in Tanzania and Zambia: A general equilibrium approach. *Journal of Policy Modeling*, 25(8), 701-725. doi:10.1016/s0161-8938(03)00060-7
- Kabwe, C. (2018, November 28). How Nabasunga's School Garden Was Started [WhatsApp interview].

- Lawoko, S. (2008). Predictors of Attitudes Toward Intimate Partner Violence. *Journal of Interpersonal Violence*, 23(8), 1056-1074. doi:10.1177/0886260507313972
- Lawson, L. J. (2005). *City bountiful: A century of community gardening in America*. Berkeley: University of California Press.
- Maverick, D. (2015, September 21). Zambia – economy still dependent on copper and producing few jobs. Retrieved from <https://africasustainableconservation.com/2015/09/21/zambia-economy-still-dependent-on-copper-and-producing-few-jobs/>
- Ministry of Agriculture. (2014). Profile of Agriculture Commodities in Zambia. Retrieved from [http://www.agriculture.gov.zm/index.php?option=com\\_content&view=article&id=114:profile-of-agriculture-commodities-in-zambia&catid=100&Itemid=1546](http://www.agriculture.gov.zm/index.php?option=com_content&view=article&id=114:profile-of-agriculture-commodities-in-zambia&catid=100&Itemid=1546)
- Moyo, D. (2010). *Dead Aid: Why Aid Is Not Working and How There Is a Better Way for Africa*. London: Penguin. doi:ISBN: 978-037432123
- Mwakikagile, Godfrey (2010). *Zambia: Life in an African Country*. New Africa Press. ISBN 9789987160112.
- Mwanawasa, L. P., President of The Republic of Zambia. (2006). Vision 2030. Republic of Zambia, 1-42. Retrieved from <http://unpan1.un.org/intradoc/groups/public/documents/cpsi/unpan040333.pdf>
- Musambachime, M. C. (2016). *One Zambia, One Nation, One Country*. Bloomington, IN: Xlibris. doi:ISBN: 978-1-5144-6228-7
- Natali, L., Handa, S., Peterman, A., Seidenfeld, D., Tembo, G., & On behalf of the Zambia Cash Transfer Evaluation Team. (2018). Does money buy happiness? Evidence from an unconditional cash transfer in Zambia. *SSM - Population Health*, 4, 225–235. <http://doi.org/10.1016/j.ssmph.2018.02.002>
- Norrby, C., Tyllström, A., & Embassy of Sweden, Zambia. (2008). Sida Gender Country Profile- Zambia. *Sida*. doi:10.1787/888933269919
- Nyirenda, D. B. (15-16 July, 2004). THE ROOT CAUSES OF HUNGER AND HOW FOOD AID WORKS IN ZAMBIA. *Conference on HUNGER, FOOD AID AND GMOs, Maputo, Mozambique*. Retrieved from <https://www.oaklandinstitute.org/root-causes-hunger-and-how-food-aid-works-zambia-0>.
- Odhiambo, N. M. (2009). Financial deepening and poverty reduction in Zambia: An empirical investigation. *International Journal of Social Economics*, 37(1), 41-53. doi:10.1108/03068291011006166
- Office for Human Research Protections U.S. Department of Health and Human Services. (2018). International Compilation of Human Research Standards. Retrieved from <https://www.hhs.gov/ohrp/sites/default/files/2018-International-Compilation-of-Human-Research-Standards.pdf>
- Oxfam. (2018, May 9). Women in South Sudan plow forward in their fields-and in their homes. Retrieved from <https://www.oxfamamerica.org/explore/stories/women-in-south-sudan-plow-ahead-in-agriculture-and-in-their-homes/>
- Parliament of Zambia. (2013, March 22). National Health Research Act, 2013. Retrieved from <http://www.parliament.gov.zm/sites/default/files/documents/acts/Health Research Act 2013.pdf>
- Piketty, T., Saez, E., & Zucman, G. (2018). DISTRIBUTIONAL NATIONAL ACCOUNTS: METHODS AND ESTIMATES FOR THE UNITED STATES\*. *THE QUARTERLY JOURNAL OF ECONOMICS*, 133(2), 553-606. Retrieved from <http://gabriel-zucman.eu/files/PSZ2018QJE.pdf>

- Reporter, S. (2003, December 3). Wife-beating in Zambia a 'natural consequence'. Retrieved from <https://mg.co.za/article/2003-12-03-wifebeating-in-zambia-a-natural-consequence>
- Poulsen, M. N., MPH. (2015). "THEY GOT CORN OUT HERE IN THE HEART OF THE GHETTO?" COMMUNITY PERCEPTIONS OF URBAN FARMING IN BALTIMORE, MARYLAND. *A Dissertation Submitted to Johns Hopkins University in Conformity with the Requirements for the Degree of Doctor of Philosophy*, 1-231. Retrieved from <https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/37909/POULSEN-DISSERTATION-2015.pdf>.
- Powell, J. H., & Gondwe, M. M. (2019, March). USD ZMW | US Dollar Zambia Kwacha. Retrieved from <https://www.investing.com/currencies/usd-zmk>
- "Semantic Differential Scale." *QuestionPro*, QuestionPro, [www.questionpro.com/semantic-differential-scale.html#What\\_is\\_the\\_Semantic\\_Differential\\_Scale](http://www.questionpro.com/semantic-differential-scale.html#What_is_the_Semantic_Differential_Scale).
- Siwale, J. (2016). Microfinance and Loan Officers' Work Experiences: Perspectives from Zambia. *The Journal of Development Studies*, 52(9), 1289-1305. doi:10.1080/00220388.2016.1139692
- Taylor, S. D. (2006). *Culture and customs of Zambia*. Greenwood Publishing Group.
- The World Bank Annual Report 2010. (2010). World Bank Annual Report. doi:10.1596/978-0-8213-8376-6
- United Nations Development Programme. (2016). *Zambia Human Development Report 2016: Industrialisation and Human Development*. UN House. Retrieved from [http://hdr.undp.org/sites/default/files/zambia\\_human\\_development\\_report\\_2016.pdf](http://hdr.undp.org/sites/default/files/zambia_human_development_report_2016.pdf)
- Wags taffe, Elizabeth, "Foreign Aid and Donor Support: An Assessment of Current Campaigns against the Spread of HIV and AIDS in Botswana" (2011). Undergraduate Honors Theses. 24. [https://scholar.colorado.edu/honr\\_theses/24](https://scholar.colorado.edu/honr_theses/24)
- Waliczek, T. M., & Zaczek, J. M. (1999). School gardening: improving environmental attitudes of children through hands-on learning. *Journal of Environmental Horticulture*, 17, 180–184.
- Warner, M. (2019, January 22). Data Show International Aid Efforts Aren't Working. Is There a Better Way? | Matt Warner. Retrieved from <https://fee.org/articles/can-local-solutions-succeed-where-foreign-aid-has-failed/>
- Wiswall, M., Zafar, B.; Preference for the Workplace, Investment in Human Capital, and Gender, *The Quarterly Journal of Economics*, Volume 133, Issue 1, 1 February 2018, Pages 457–507, <https://doi.org/10.1093/qje/qjx035>
- World Health Organization, CDC, Ministry of Education, & Ministry of Health. (2004). *Zambia Global School Health Survey - 2004*. Retrieved from <https://www.who.int/ncds/surveillance/gshs/ZambiaFullReport-04.pdf>
- Zumla, A., Huggett, J., Dheda, K., Green, C., Kapata, N., & Mwaba, P. (2010). Trials and tribulations of an African-led research and capacity development programme: The case for EDCTP investments. *Tropical Medicine & International Health*. doi:10.1111/j.1365-3156.2010.02479.x

## **Appendix A: Recruitment Messages**

### ***Message to Day by De Foundation's representative:***

“Greetings. This is Anika Bernstein. I’m assessing the impacts that the Nabasunga Primary School garden has had on the community for a research study (IRB Protocol Number 18-0685). I’m looking for individuals who either live in the Nabasunga community, teach at the Nabasunga Primary School, or have a student at the Nabasunga Primary School. Would you be willing to send either their phone numbers, email addresses, or Facebook profile links to me? That would be much appreciated. For other information, you may contact Chileshe Kabwe, Day by De’s local project manager, via email at c\*\*\*\*\*gmail.com or phone +260 \*\* \*\*\*\*\*00.”

### ***Message Over Social Media to Qualifying Survey Participants (1-3 Identification Method):***

“Hello. My name is Anika Bernstein. I’m assessing the impacts that the Nabasunga Primary School garden has had on the community for a research study (IRB Protocol Number 18-0685). I’m looking for individuals who either live in the Nabasunga community, teach at the Nabasunga Primary School, or have a student at the Nabasunga Primary School. This study is completely optional and will only be conducted with individuals who verify their consent. You have the right to withdraw from this study, at any point and for any reason without prejudice. If you fit any of these descriptions, would you mind if I ask you a few questions about Nabasunga Primary School’s garden and how it has affected you personally and your community? By responding “Yes” to this message, you are acknowledging that you are at least 18 years of age, speak English, either live in the Kabwe community, teach at the Nabasunga Primary School, or have a student at the Nabasunga Primary School, and understand your right to terminate participation at any point and for any reason. For other information, you may contact Chileshe

Kabwe, Day by De's local project manager, via email at c\*\*\*\*gmail.com or phone +260 \*\*  
\*\*\*\*\*00.”

***Message Over Social Media to Qualifying Survey Participants (4th Identification Method):***

“Hello. My name is Anika Bernstein. I’m assessing the impacts that the Nabasunga Primary School garden has had on the community for a research study (IRB Protocol Number 18-0685). I’m looking for individuals who either live in the Nabasunga community, teach at the Nabasunga Primary School, or have a student at the Nabasunga Primary School. This study is completely optional and will only be conducted with individuals who verify their consent. You have the right to withdraw from this study, at any point and for any reason without prejudice. If you fit any of these descriptions, would you mind if I ask you a few questions about Nabasunga Primary School’s garden and how it has affected you personally and your community? By emailing me directly at a\*\*\*\*colorado.edu or sending me a direct message, you are acknowledging that you are at least 18 years of age, speak English, either live in the Kabwe community, teach at the Nabasunga Primary School, or have a student at the Nabasunga Primary School, and understand your right to terminate participation at any point and for any reason. For other information, you may contact Chileshe Kabwe, Day by De’s local project manager, via email at c\*\*\*\*gmail.com or phone +260 \*\* \*\*\*\*\*00.”



## **Appendix B: Survey Questions**

### ***Teachers/Administrators at Nabasunga Primary School:***

1. Please rank the following by level of importance:
  - a. Student's health (1-10)
  - b. Student's education (1-10)
  - c. Your health (1-10)
  - d. Your education (1-10)
  - e. Your relationship with your students (1-10)
  - f. Your income (1-10)
- 2a. What is your position at Nabasunga Primary School?
- 2b. Did you know about Nabasunga School's garden before the land was cultivated (January to February, 2017)?
3. When you first heard about Nabasunga School's garden, what changes did you expect as a direct result of this project?
4. How often are you in the Nabasunga School's garden?
5. What impacts, if any, have you noticed for you and your family as a direct result of the Nabasunga School's garden?
6. What changes have there been in your community since the start of the Nabasunga School garden (post May, 2017)?
7. Which of these changes are specifically attributable to the Nabasunga School garden?
8. How much money has this garden earned the school?
9. How is this money spent?
10. What would you like to see happen with the Nabasunga School garden in the near or far future?

***Parents from Nabasunga School:***

1. Please rank the following by level of importance:
  - a. Children's health (1-10)
  - b. Children's education (1-10)
  - c. Your health (1-10)
  - d. Your education (1-10)
  - e. Your relationship with your spouse (1-10)
  - f. Your income (1-10)
  - g. Your independence (1-10)
2. Did you know about Nabasunga School's garden before the land was cultivated (January to February, 2017)?
3. When you first heard about Nabasunga School's garden, what changes did you expect as a direct result of this project?
4. What impacts, if any, have you noticed for you and your family as a direct result of the Nabasunga School's garden?
5. What changes have there been in your community since the start of the Nabasunga School garden (post May, 2017)?
6. Which of these changes are specifically attributable to the Nabasunga School garden?
7. What would you like to see happen with the Nabasunga School garden in the near or far future?

## Appendix C: Themes Reported in Priorities, Expectations and Revealed Outcomes

Numbered Participants	Priorities	Expectations	Revealed Outcomes
1	Health, education, relationship	skills	emulation, skills, income
2	relationships/engagement	health	skills, emulation
3	-	academic performance/attendance, participation, income, skills, environment	-
4	health, education, relationship, and income	health	health, access, emulation
5	health, relationships/engagement	skills	skills, access, emulation
6	health, relationships/engagement	skills	access, emulation
7	health, relationships/engagement	skills	skills, access, health, emulation
8	health, education	skills	skills, access
9	health, education, relationship, and income	environment	participation, access, health, emulation
10	health, education, relationship, and income	health, academic performance/attendance	access, health, emulation
11	health, education, relationship, and income	skills	access, participation, income,
12	health, education	skills	skills, health, access, emulation, interest, skills
13	health education	skills	interest, emulation, self-reliance
14	health education	health	skills, emulation, income
15	engagement	skills	health, participation, income, health, access