

COMBATTING MALNUTRITION IN NIGER THROUGH COURTYARD GARDENS

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## **Abstract**

We live on a planet where every three point six seconds, a life is taken from starvation or malnutrition (Millennium Development Goals, 2005). One epicenter of this tragedy is Kwara Tagi, Niger in Africa. Superficial fixes seem to leave the infrastructure of such a place in greater shambles than the original condition. The focus of this work addresses the question, “What is the potential for significantly reducing malnutrition in Kwara Tagi through sustainable intervention using Moringa trees in courtyard gardens in a manner accessible to all, without dependence on outside resources, while providing an outlet for new economic opportunity?” Rather than artificially attempting to sustain life, this work researches, articulates and suggests the potential found in a simple and strategic path of implementing Moringa trees in courtyards for the purpose of eradicating malnutrition and providing new economic opportunities. Requiring little initial funding and using resources that already exist and are not currently being utilized, this approach empowers the local people without creating any dependency on outside intervention. Furthermore, this plan would provide an economic boost to families, increase community capital, begin the reversal of desertification, work towards eradicating malnutrition, all while engaging youth in envisioning the possibilities surrounding them.

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## **Dedication**

This report is dedicated to the children of Kwara Tagi who often feel invisible, but are priceless treasures packed with potential. This study took place because you aren't invisible, but of infinite value in God's eyes and ours.

## Prologue

Malnutrition, street life, human trafficking, labor, abuse, war, and countless other dangers and atrocities face the children of this world. Growing up in Senegal, West Africa (where my parents worked), I was confronted with the plight of underprivileged children and communities. At the age of sixteen, a question became evident in my thoughts. Will I turn my back on the countless lives whose potential goes unnoticed or invest my life and studies into seeing the status quo of children changed for the better and the bridge from reality to their potential built established. From that moment, I began traveling around the world to learn from existing initiatives, working at orphanages, and gaining insight from those with experience. A college degree later, my bags were packed and I was headed for the Middle East to work full-time with refugees, street children, and youth in difficult predicaments.

At the age of twenty-two, I founded a non-profit organization called ROCK International ([www.rockintl.org](http://www.rockintl.org)) with the objective to see relief, opportunity and care infused into the lives of hurting youth, particularly street children in the Middle East. After six years of being based in that region, my journey continued to Niger, Africa where ROCK International began work in Kwara Tagi, the place of this study and research. This Master's degree from Kansas State University was sought for the purpose of equipping myself and others with various tools which might help us harvest the potential of youth for the sake of long-term community change.

After moving into the village of Kwara Tagi, Niger in 2012, the process of building relationships, visualizing the potential, and understanding the culture unfolded. It was in this process that the destruction malnutrition was wreaking came to the forefront of my thoughts and this particular research was born.

# 1.

## Introduction

How often do we focus on the needs and problems of a community, rather than the very opportunities that will begin the process of eradicating the obstacles we confront. Rather than maximizing the rich earth we have been given, we try to survive using the bare necessities thinking they are all we have. Niger, a West African nation twice the size of Texas has been ravaged for years by malnutrition and long been a humanitarian hotspot for food donations and outside intervention. Over forty-percent of children in this nation suffer from malnutrition and nearly every family feels its effects, but what if the solution to this nation's health crisis was in everyone's courtyard (Niger Overview, 2015)?

What if the solution to significantly reducing malnutrition in one of the world's poorest countries was not an issue of fixing a problem or increased financial intervention from Western nations, but rather, a new approach to using the soil in a sustainable way which not only maximizes, but increases, the natural capital of the community? Thus, this became the main question of this research. What is the potential for significantly reducing malnutrition in Kwara Tagi through sustainable intervention using Moringa trees in courtyard gardens in a manner accessible to all, without dependence on outside resources, while providing an outlet for new economic opportunity? Looking beyond the mere opportunities of society, what ought to be the approach towards capitalizing on these opportunities? This pursuit of sustainable development must not breed dependency, but rather, empowerment. Thus, the approach adopted is Appreciative Inquiry. Rather than merely choosing a course of action through which to enact change, a community or family comes together with the resources available and moves towards



what is possible in an incremental, intentional, and empowered way. What potential might be discovered when the focus shifts from solving problems to capitalizing on opportunity?

### **The Reality of Niger's Crisis**

According to the most recent United Nations Human Development Index release, Niger is the world's least developed nation. In comparison, the USA is ranked 3<sup>rd</sup> from the top, behind Norway and Australia (Khalid, 2014). The human development index tries to create a comprehensive overview of nations by computing their educational, health, economical, and political realities. Though this does not tell the full story, it does give an indication of the need and opportunity. Such rankings are generally not the result of mere natural resources, but decisions and mindsets that have been established over decades (or longer).

### **Worst Country to be a Mother**

According to the British Broadcasting Corporation, Niger has been labeled "The Worst Country in the World to Be a 'Mother'" (2012). In a place where one in eight children will not see their fifth birthday due to malnutrition and malaria, girls are sold for dowry money, and nearly half are malnourished, life is often held lightly and children are often discarded as commodities rather than treasures to nurture. Compounded with this reality, Niger has the highest birth rate in the world by a large margin with an average of 6.89 babies per woman. The United States, in comparison has a mere average of 2.01 children per woman. In the light of the previous statistic, it may come as no shock that Niger is the second-youngest country in the world with a mean age of 15.1 years of age. To put that data in perspective, the average age in the USA is 37.6 (The World Factbook: Niger, 2014). With one million orphans among this

population, the streets are filled with children who spend their days outside of classrooms and outside the home (United Nations Children's Education Fund, 2012). Though many attend school periodically, the national literacy rate is below thirty-percent with women's literacy a startling fifteen percent (The World Factbook: Niger, 2014).

Despite being a nation full of natural resources from uranium to oil to gold, the World Bank's most recent data listed Niger's GDP per capita is among the world's lowest at \$415.42/person. To put that in another light the United States' GDP per capita lies in the top-15 worldwide at \$53,042 (GDP per Capita, 2015). These may be realities, but they are only shared to note the perspective most notice when gazing on this land. In the pages to follow, keep in mind the reality, but recognize the reality of the crisis does not define the reality of the potential.

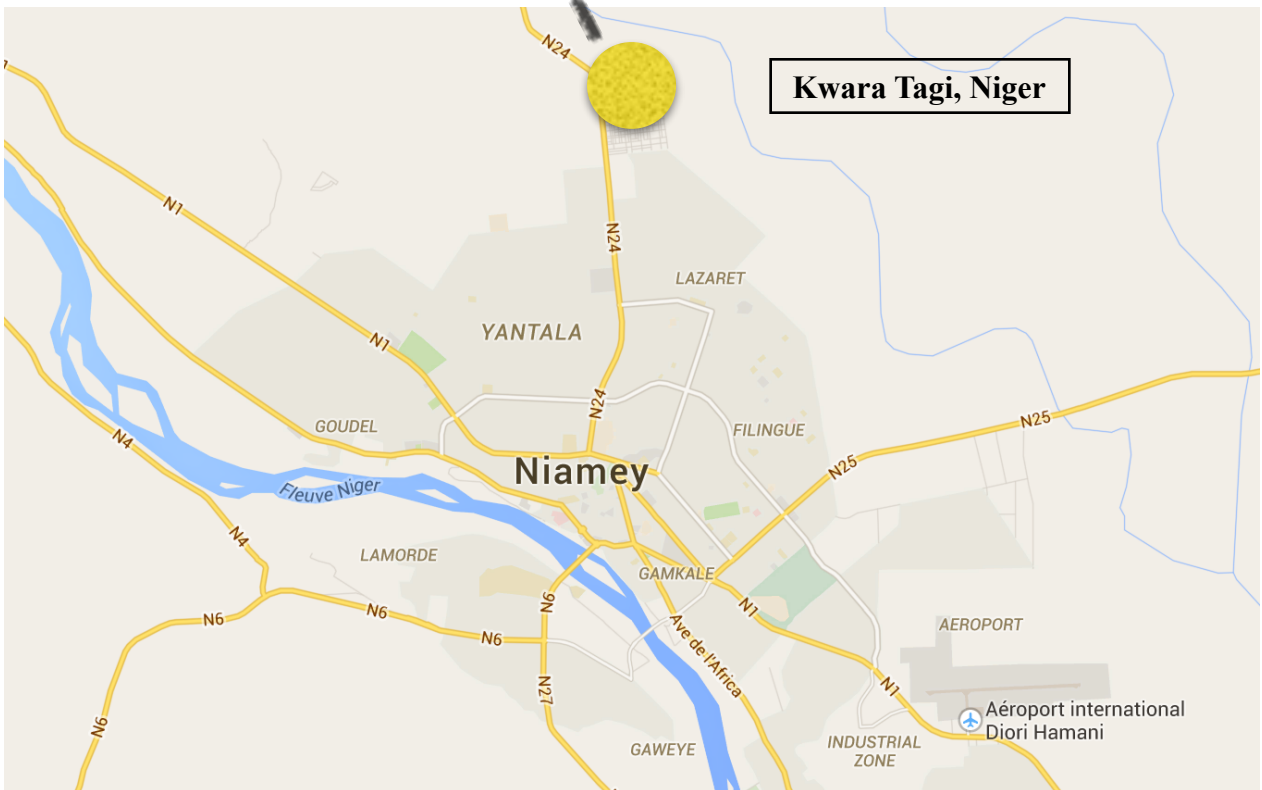
### **The Village of Kwara Tagi**

The particular community of interest is Kwara Tagi. There is little printed or electronic media pertaining to this community. Once a community located in Central Niamey, Niger's capital and most populous city, they were relocated to the outskirts of town for the construction of the national football (soccer) stadium (Figure 1.1). This area is home to approximately 60,000 residents. The majority of the neighborhood is unemployed, but small commerce (selling vegetables in the market, individuals on the corner selling food, etc), construction workers, and farmers make up the majority of its residents. Furthermore, this neighborhood is often regarded as a red light district of Niamey, along with being an outlet for thieves, criminals and the poor (M.D. Biramou, personal communication, December 1, 2013). Not necessarily fair labels, but certainly the perception of others when considering Kwara Tagi.

**Figure 1.1: Mapping Kwara Tagi  
(Google Maps, 2015)**



**Kwara Tagi, Niger**





**Figure 1.2: Arial View of Northern Kwara Tagi  
(Google Maps, 2015)**

## 2.

# Background

## How We Arrived Here

For Niger, it is not merely about the lack of resources in their underdeveloped, struggling nation, but the neglect of building sustainable, local infrastructure. Currently, only eleven-percent of Niger's soil is arable despite 90% of their workforce being farmers (The World Factbook: Niger, 2014). Is this an issue of a lack of potential or a deficiency of understanding? Within this report, the suggestion is made that change happens on the community level through incremental changes using existing resources. As it pertains to historical research on the agricultural and environmental landscape of Niger, minimal data is available. Still, through various means of intertwining history, previous endeavors, and cultural practices that have developed over time, a baseline understanding of the context for Niger's agricultural and environmental background can be grasped. Though it may not be place-based historical elements that actually brought on the crisis of Niger's food shortages, there are some basic factors that initiated the process.

Since a primary objective is to discover the baseline and foundation of Niger's malnourished situation, this research led to identifying the major famines in the past decade that Niger has experienced along with the degree of their severity. With harsh famines in 2004, 2005, 2010, and 2012, both foliage and ground fertility has decreased. But is this problem merely a result of natural weather conditions or a combination coupled with land management?

It has been estimated that ninety-seven percent of Nigeriens use wood to meet their energy needs as it pertains to cooking (Abdou, 1999). To meet Niger's energy demands, live

trees are often removed. Some ten to twenty years ago, the primary source of firewood was dead trees or branches. Originally, these trees were harvested to meet societal necessities, but as the economic benefit was discovered, villagers soon embraced tree harvesting as a more lucrative option of familial provision than traditional forms of agriculture or rearing of livestock (Abdou, 1999). This reality only further pushed the issue of deforestation and desertification.

### **Concern over Forestry**

There has been a concern in Niger over the crisis of trees and deforestation. Going back in time for a history lesson, Niger passed rules and regulation in 1961 (one year after independence) which set a northern limit for cultivation, thus defining the pastoral zone (Jamart, 2010). This was the beginning of an emphasis on protecting the nation's forest capital. One solid step Niger took to seeing this change occur was the establishment of the "Domestic Energy Strategy" (DES) which was implemented in 1989 (Abdou, 1999). Ultimately, the idea behind this initiative was to equip and empower villagers to manage the forest capital and receive a portion of the income generated from these trees. In theory, DES sought to ensure that the wood would be coming from controlled production and not from areas at the point of depletion.

Behind this so-called progress, another concept was put in motion called "The Rural Code". In the early 1980s, national conferences and debates regarding intervention strategies, stopping desertification, livestock breeding, and the management of natural resources were held throughout the country. Finally in 1986, an ad hoc committee was placed in charge of drafting a rural code. Though the code was not passed until 1993, this code placed value on the fight against destroying Niger's landscape and soil. The four objectives which guide the rural code is to provide land tenure security for rural stakeholders, to organize the rural world, to promote

sustainable management of natural resources, and to enforce land-use management and planning (Jamart, 2010). These objectives were in mind as this research unfolded. This defining and registering of land rights and natural resources while monitoring all land transactions and rights transfers increased the awareness to focus on resource management. It also served as a mediator in disputes over land and natural resources governance. The presence of the Rural Code tends to indicate a general concern from authority over land usage, but little data was found to measure its effectiveness.

### **Defining Malnutrition**

When discussing malnutrition, we must not be confused with starvation, or the absence of food. Malnutrition comes as a result of improper nutrition in a diet, whether due to a lack of food, the lack of access to the right nutrients, or being unable to properly utilize the food one does eat. Since this research is focused on the pursuit of “significantly” reducing malnutrition, a bar needs to be set and terms need to be defined. Thus, a significant reduction in malnutrition for the purpose of this study would be to cut the medical expenditures and deaths due to malnutrition in half in villages which have implemented the *Moringa oleifera*. This would be measured by child mortality rates and a survey of medical expenditures in proportion to the GDP per capita and would be carried out through a follow-up survey five years in the future (since child mortality rates are measured by children under five). This study does not measure the effectiveness of any proposal, but studies the realistic possibility of the impact of the Moringa tree in courtyard gardens in addressing the question, “What is the potential for significantly reducing malnutrition in Kwara Tagi through sustainable intervention using Moringa trees in

courtyard gardens in a manner accessible to all, without dependence on outside resources, while providing an outlet for new economic opportunity?”

Ultimately, this project needs to be sustainable within the economic, culture, and human capital Niger has to offer. It is vital the progress and growth experienced be maintained, developed, and grow without the intervention of outside forces, organizations, or resources.

## **The Moringa Tree**

### **Environmental Benefit of the Moringa Tree**

One great benefit of the Moringa is in its potential to change the agricultural makeup of a desert land. From acting as a natural fertilizer to a plant growth enhancer, it carries properties that have the potential to change the landscape of the region (Nouman, Siddiqui, Maqsood, Basra, Afzal, and Rehman, 2011). The great advantage of the Moringa is its tolerance to high temperatures and drought making it ideal for the Sahara and Sahel region, specifically Niger.

The Moringa has the ability to fertilize the soil and be grown in previously deemed un-arable land making it a great boundary tree. The Sahara desert of Niger offers a prime example of the increasing problem of desertification with the desert expanding South at a pace of 48km/year (Mandal, 1990). Trees and plants which thrive in the Sahel (transition zone between the Sahara and Africa’s tropics) are vital to reversing this dangerous trend on our planet.

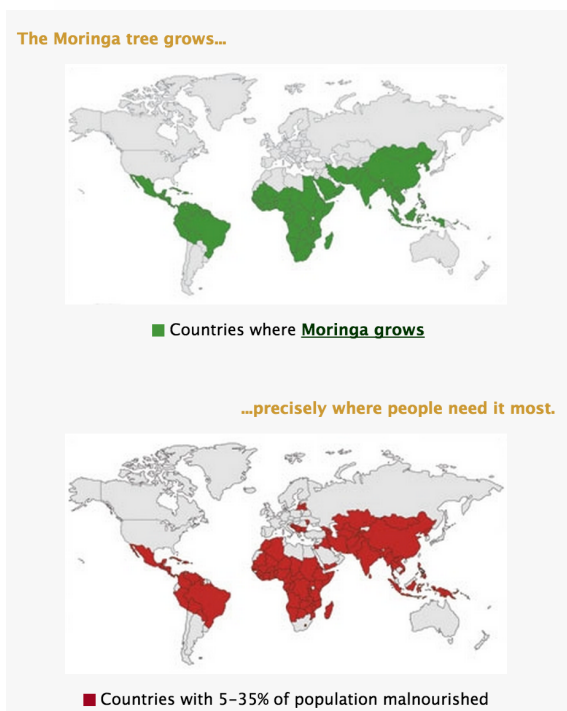
Nigeriens refer to this tree as “The tree which never dies” due to its drought tolerant capabilities. Furthermore, it grows in very poor soil and produces an abundance of edible leaves giving it value for survival and quality of life. Despite these raving reviews, few farmers grow



Moringas and even fewer take advantage of their commercial value. As this study will reveal, only one participating household grew Moringa in their courtyard (see page 37).

### **Nutritional Properties of the Moringa Tree**

The realization that an environmental crisis is on Niger's hands with the consumption of firewood and fodder for animals, but how can this critical issue be dealt with in a way which does not compromise the population's need for sustenance? When considering the vulnerabilities associated with malnutrition and the onslaught of diseases caused by these conditions, the Moringa is nearly the perfect combatant. The benefits of this tree go beyond the sphere of the environmental to the social and ultimately offer a chance at life for the earth and its humans. Only when one dives into the nutritional value of this tree do the attributes of this leaf shine. Combined with the reality that the Moringa grows best in the areas of the world most plagued by malnutrition (Figure 2.1), its value is compounded.



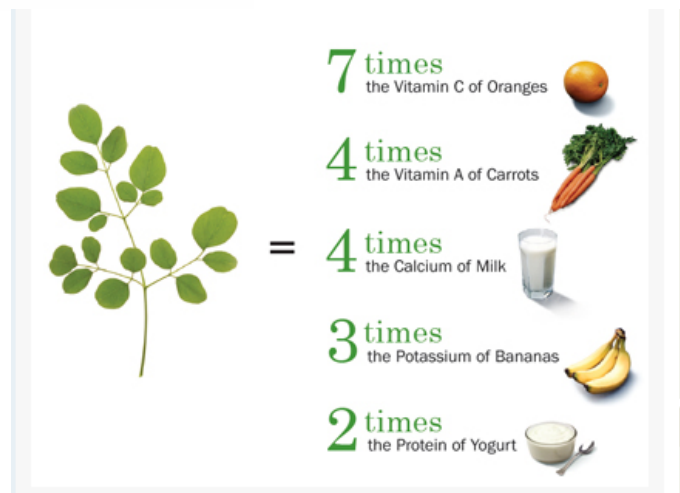
**Figure 2.1 Putting Moringa on the Map  
(Gopalan, 2011)**

One prominent relief organization working in West Africa described Moringa the following way.

Moringa can rebuild weak bones, enrich anaemic blood and enable a malnourished mother to nurse her starving baby. Ounce for ounce, it has the calcium of four glasses of milk, the Vitamin C of seven oranges and the potassium of three bananas. A dash of Moringa can make dirty water drinkable. Doctors use it to treat diabetes and high blood pressure. Not only can it staunch a skin infection, Moringa makes an efficient fuel, fertilizer and livestock feed. Moringa has triple the iron of spinach and more impressive attributes than olive oil (Rinaudo & Yaou, 2009, p. 8).

With all parts of the tree edible and useful, it is a wise investment for farmers and communities to implement the usage of the Moringa. Few natural resources provide the wealth of nutritional components that this tree provides (see Figure 2.2). From vitamins A, B, and C along with calcium, potassium, iron, magnesium, potassium, protein, fiber, iron, and more, this is the ideal choice to combat malnutrition and aid healthy pregnancies (Comparore, Nikiema, Bassole, Savadogo, Mouecoucou, Hounhouigan, and Traore, 2011).

**Figure 2.2 Nutritional Value of the Moringa Leaf (Gopalan, 2011)**



## **Medicinal Values of the Moringa Tree**

Studies in Pakistan have shown that the *Moringa oleifera* also provides cardiac and circulatory treatments (Anwar & Bhanger, 2003). Its benefits extend beyond prevention, however, as it currently provides malaria treatments in parts of West Africa, which coupled with malnutrition and AIDS are Africa's big killers (Hermans, Akoegninou, and van der Maesen, 2004).

## **Miscellaneous Other Uses of the Moringa Tree**

The Moringa can be used for animal fodder, its sap as a leather tanner, and its roots as absorption outlets for drought conditions, not to mention a myriad of other possibilities (Morton, 1991). The possibilities of this tree at times seem unrealistic and mythical, yet have been proven in many contexts. From water purification, to soil enrichment, to food production, the *Moringa oleifera* opens new doors for any community willing to test its power. These various attributes of the tree are all components that contribute to fighting malnutrition (Leavitt, Vanarase, A. Kumar, and T. Kumar, 2005). Even the cultural capitals are tapped through the Moringa in the "flavor, tang and spice" it adds to the local diet (Leavitt et al., 2005). One reality that needs to be emphasized is the need to establish the Moringa as a staple in diets if the myriad of health benefits aforementioned would be capitalized upon (Comparore et al., 2011).

From the perspective of the sphere of economic capital, the potential for producing oils opens up new doors (Anwar & Bhanger, 2003). At over twenty times the cost of vegetable oil, Moringa oil is ideal for moisturizing skin in extremely dry climates and its usage goes back to the early Roman and Egyptian days where it was used for perfumes and lotions (Miracle Oil,

2015). Perhaps even more than that, the untapped potential of the Moringa involving the production of moisturizers from using the sap as an emulsifier, dried leaves and pods for nutritional supplements, wood for energy, fodder for animals, and even medicinal elements for local doctors make the economic building capacity is nearly limitless.

## **Breaking Mindsets**

The reality of Niger, however, is not the absence of food (though there are food security issues on a regular basis), nor is it primarily the lack of access to food (even the right foods). Rather, it is seemingly based on a cultural value system that discourages certain practices that other areas of the world (with good nutrition) take for granted. A few common excuses to this report's basic premise that courtyard gardens bring new opportunities and vitality are as follows:

1) **Trees are a waste of space.** This is a common reflection when the topic of planting trees arises. The area in courtyards is rarely used for merely lounging, and furthermore, the Moringa trees can be grown less than a foot from the wall due to a root structure that goes directly down. An additional advantage of such tree placement is the cooling effect it has on the compound walls which typically radiate the desert heat. These trees produce shade eliminating the direct sunlight on the cement, and thus, enhance the very area one might suggest be used for social purposes.

2) **If I do not personally own the property, I will not plant a tree because a tree is permanent and this land is not permanently mine.** The Moringa tree can be planted and producing within three months. Seeds begin sprouting in pods after approximately nine months and the tree will then produce edible leaves nearly year-round making the

argument of property ownership virtually worthless when considering the long-term implications. Even if one was to move shortly after planting (a year or so), the benefits would have been greatly felt and seeds can be taken for the next venture.

**3) It is better to spend money on starches that make one feel full, rather than leaves, vegetables, and fruit that are more costly and less filling.** Due to the rising costs of doctor visits and medicines which result from poor nutrition, this tree will save costs in other areas of life allowing for the starches they love yet providing the nutrition they need. Coupled with the fact that this initiative requires minimal investment and no purchasing of leaves, this mindset is proven invalid.

**4) If something has value today, it would be poor stewardship to let it lie.** The common practice in Niger is to excavate their fields completely leaving no mulch, poop, or roots because everything has a value in the marketplace. Naturally, the soil suffers from the cleansing and much less production ensues. Sadly, value is often only equated with the physical monetary agent (Aaron Thatcher, personal communication, 2013). The benefit with the Moringa tree is its minimal trunk and branch system which produces little wood for burning making the leaves more valuable for consumption than the energy that could be garnered for fuel.

The lack of nutrition in diets is a vastly broad topic that will not be solved by one action plan, yet with the right approach, the financial success of families (and ultimately, a nation) could be altered through a plan which provides comprehensive success in different spheres of society. Good ideas may produce a desired effect, but what is their collateral damage in other

areas of society? Thus, the various capitals of a community must equally be considered when change is being sought in one particular aspect.

### **Alternatives to the Moringa**

Alternatives to the *Moringa oleifera* in the context of courtyard gardens do exist. Reasonable success has been achieved through the incorporation of other agricultural possibilities with high nutritional value. A few examples in Niger would be the Acacia, Nim, *Panicum turgidum* which is commonly called Markouba, the *Maerua crassifolia*, or Jiga, and *Ziziphus spina-christae*, also known as Christ's thorn (Eden Foundation, 1989). For the sake of this study, the alternatives are not focused upon for the purpose of limiting the breadth of this research.

The challenge is multi-faceted as we look into the potential of seeing trends reversed and lives changed. "How does one address nutrition in an experiential way where it becomes their own thoughts and initiative, yet poses no threat nor creates fear as it pertains to their daily survival? How can we use community involvement to create an environment of creativity and risk, but with the excitement of high dividends? Can this be a process where they are not pressured to play a part, but where they are invited to be a voice and an active participant on the level in which they choose?"

### 3.

## Methods

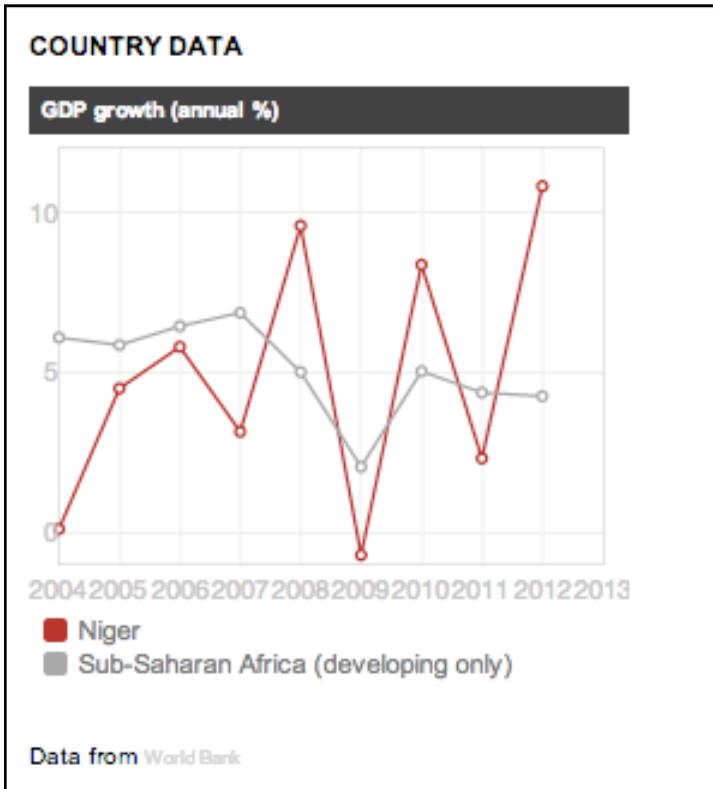
### Choosing an Approach

The danger commonly practiced among community developers, primarily in third-world nations, is to have the focus on fixing problems rather than on maximizing resources in a sustainable way. With that in mind, a method was pursued which would view the community for the potential it possessed instead of what needed to change. It is with this target in mind that Appreciative Inquiry was chosen as the model through which to approach the community of Kwara Tagi.

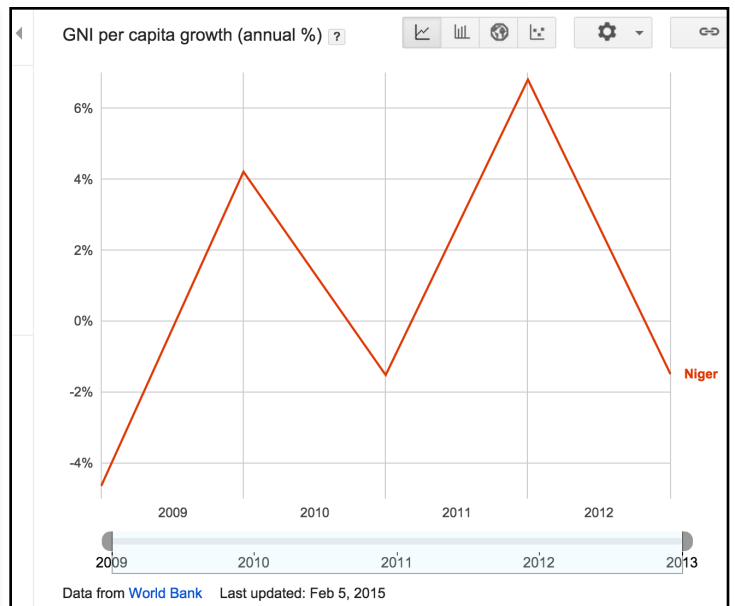
This approach is based on a collaborative effort. Primarily, this is utilized when finding what works best or what could work period if used properly and not predominantly in problem-solving. Furthermore, Appreciative Inquiry offers a refreshing perspective when looking at Niger as a nation inundated with non-profit organizations seeking to solve the problems of the world yet failing to capitalize on unmet opportunity. Thus, this study focuses on potential.

Jackie Kelm described Appreciative Inquiry as “a positive, strength-based approach to change, finds the best in people and the world around us, co-creates inspiring future images, focuses on what we want more of, and finds and unleashes the positive core” (Kelm, 2005, p. 1). We must dispel the notion that this method is merely a psychological tool to manipulate minds into finding beauty in the design of a coffin. On the contrary, Appreciative Inquiry is a tool that transforms the limitations we often consider to be barriers and exposes the opportunities previously missed.

In Niger, so-called economic success has often been the result of outside nations pouring money into a project that superficially makes certain individuals rich while leaving the rest clamoring for their portion of the distribution. Figure 3.1 illustrates the GDP growth in Niger year-by-year by percentage. This is very telling when you consider the millions invested through aid. Notice the bi-polar nature of the figure. It would seem every other year brings about a superficial gain or shift in income which cannot be sustained and drops the subsequent year. Figure 3.2 illustrates the bi-polar nature of the gross national income (GNI), a common barometer of a nation's economic success and specifically, a measurement of the income earned by Nigerien residents. Both measurements tell the same story. Niger's economy and Nigerien's income has been supported, and often times, resuscitated through artificial means promoting



**Figure 3.1 GDP Growth of Niger (Annual Percentage)**



**Figure 3.2 GNI Per Capital Growth in Niger (Annual Percentage)**



dependence and an absence of empowerment. This is the advantage of seeing Niger, and specifically Kwara Tagi in the light of Appreciative Inquiry. There are four core reasons behind the choice of Appreciative Inquiry as it pertains to the circumstances of a village such as Kwara Tagi, Niger. Four reasons making it a favorable approach for addressing the issue of malnutrition and capital management are to understand the potential of a community, empower the local people, provide clear direction, and to facilitate community participation. This research focuses on understanding the potential that exists in the community.

a) **Understanding Potential** – Currently there exists a mindset in Niger that is often labeled in our development community as a "Poverty Mentality." This is the concept, "We are the poor and you must help us." Rather than seeing the possibilities of their existence and resources, we foster dependency. Thus, when outside "help" comes, it is seen as a handout and not collaboration and any economic activity is a supplement rather than a solution. Appreciative Inquiry is a process that draws on their thoughts, ideas, and actions and thus forms protocol and projects which have the stamp of their ingenuity, culture, and optimism.

b) **Empowerment** – Clearly, this goes along with the previous point, but in a more articulated way, it goes beyond breaking a mindset and shows the possibilities surrounding each life. What stops individuals from taking initiative? Far too often, it is the lack of empowerment, education, fear of losing what they have, or at times, simply a lack of motivation due to not understanding the potential benefits. With clear guidance, permission, and involvement from the community, this report dives into the legitimacy and opportunity of

empowering a village to see their courtyard, neighborhood, and nation through the lens of opportunity.

c) **Direction** – With the process of Appreciative Inquiry being implemented, not only is empowerment realized, but direction emerges. The direction comes directly from recognizing these strengths and opportunities and heading in a constructive course of action using these elements brought to the table. We aren't left wondering where to begin. Using this approach, we bring to the table all the resources we currently possess or can find and it is with these building blocks, we begin.

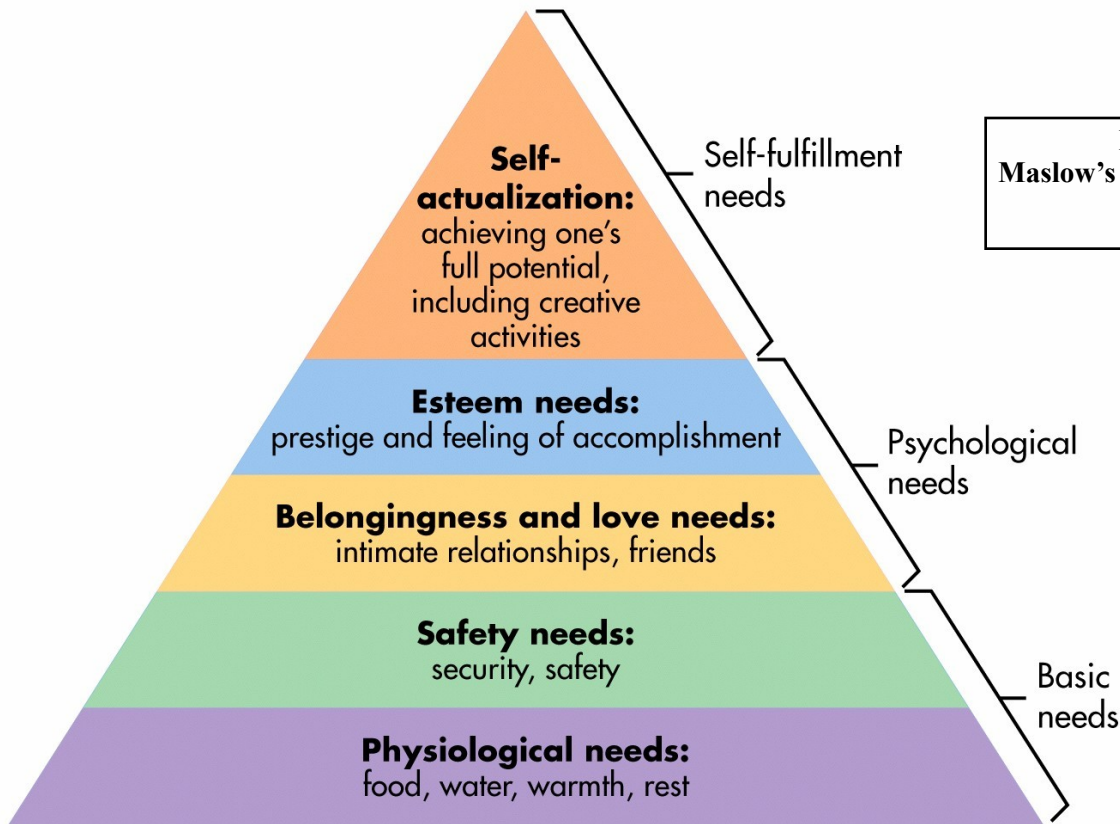
d) **Facilitation of Community Participation** – Community Participation (and specifically, Participative Action Research) could easily be a tricky theory when carried cross-culturally, but through Appreciative Inquiry, it gives a clear starting point (through the discussion of the strengths of the community and through identifying available resources) and direction in which to head. There is a deeper vitality to this approach, however, in a culture where certain voices are not heard. Women and children are commonly silenced in Niger. Their contribution to society is one of silence and submission. Appreciative Inquiry does not consolidate power to a certain demographic, but allows each life to explore the strengths they see using the resources available and then taking incremental steps forward.

David Cooperrider made the comment, “The key, early on, is to prioritize several areas where there will be a high value-added contribution and, in those areas, take the appreciative approach to the hilt” (Cooperrider & Whitney, 2008, p. 392). Thus, this is exactly the foundation off which this project was birthed. We looked for a resource nearly everyone possessed but was

not being utilized (to any significant degree). In that search, the courtyards of homes were blatantly discovered. With our focus in the nation on the development of children, it was only natural to then begin asking questions. How can children use their courtyard to create opportunity? How can the courtyard eliminate malnutrition? Is there a way that an approach could be accessible to the entire population? The last question reminded us that while putting certain resources on the table, we would have to take other resources off the table to make this initiative truly accessible to all.

There is a systematic approach to this process. Steps must be taken in order even if the desired outcome is achievable through shortcuts because sustainability and true development must be built through empowering and enlightening a community to change. Not forcing or implementing the change via an outside force. If the process is not treated as a journey with the local community but only as a destination with a specific result, the solution will likely temporarily achieved and the beneficiaries few. Though children are the focus of this suggested community initiative, the objective is to see what potential exists in this generation and culture for impacting generations to come.

Though his method and pyramid may have its flaws, Maslow considered food, water, shelter, and warmth to be a few necessities of the human existence. In Maslow's pyramid (Figure 3.3) coined "Hierarchy of Needs", he placed the pursuit of self-actualization as the pinnacle of man's existence, but noted that end is a result of a deeper foundation built through other essentials being first addressed. To bring this concept to the village of Kwara Tagi, we may want



**Figure 3.3**  
**Maslow's Hierarchy of Needs**  
 (2011)

to see this least developed country catch up to the rest of the world in many facets of life, but until the basic needs of life are addressed and met, the other details of life are irrelevant to many.

Economic freedom for local residents will begin by eradicating their concerns of survival and health (Maslow's bottom layer) as it opens the door for making wise and safe decisions along with economic risk-taking by venturing into new areas without the fear of neglecting life's basic needs and the welfare of their family. Maslow suggested one build upward which may particularly be called for when dealing with extreme circumstances. Another thinker, Max-Neef, introduced a complimentary thought, however, sometimes viewed as contrary.

In his Matrix of Human Needs, Max-Neef introduced the thought that many of these components necessary for life and fulness are interrelated and occur simultaneously (Daly &

Farley, 2004). Whether this truth is simply a by-product of healthy growth or whether a developer should think through how she or he can simultaneously address various spheres of the human interest, this concept brings out the paradigm and philosophy of thought being employed by this particular endeavor to implement courtyard gardens. As Nigeriens are empowered through knowledge and experience, the change they are capable of engineering will impact multiple levels of their hierarchy of needs. Max-Neef's suggestion and thought-process will become a mere by-product of this transformation and not the focus of the work.

The incorporation of Appreciate Inquiry in the course of this research is embedded in the mindset controlling each phase of the process. Rather than focusing on problem solving, the interviews targeted life's potential and emphasized empowerment rather than need. Instead of dire circumstances (which may be the harsh reality of life in Kwara Tagi), the questions chosen aimed at exposing unmet potential.

## **Asking the Right Questions**

### **The Background Questions**

The main question being targeted in this research is, "What is the potential for significantly reducing malnutrition in Kwara Tagi through sustainable intervention using Moringa trees in courtyard gardens in a manner accessible to all, without dependence on outside resources, while providing an outlet for new economic opportunity?" Still, with Appreciative Inquiry in mind, there are background questions that prompted and formed the thought process of this report, research, and initiative.

- *What building blocks do members of our community possess and share?*
- *What prevents the communities in Niger from using these building blocks they possess for constructive change in a sustainable way?*

A key component in this thought process was an approach that any income level could capitalize upon and any age or family size could incorporate. Sustainable has been defined as “able to be maintained at a certain rate,” but the concept desired went beyond such a definition (Oxford English Dictionary Online, 2015). Going beyond mere maintenance, the pursuit became a search for an option that left more opportunity and resources, rather than less (or the same), for the future.

The untapped resources of this neighborhood began to seemingly jump on the table. From empty courtyards, children with time on their hands, Moringa trees which thrive in the nation (but are uncommon in Kwara Tagi), to water being dumped on the street daily after serving its initial use, ideas seemed to simply appear.

- *Would it be possible to see courtyards eradicate malnutrition and provide an economic base for families without any risk?*
- *Could such an initiative be carried out in a sustainable, empowering sort of way where the people’s ideas are incorporated and they claim ownership of the project?*

With this concept in mind, it was time to face the community and see if the vision imagined aligned with reality. Furthermore, was this truly an approach that would be embraced

or simply considered an expatriate's ideal? The survey was aimed at recognizing the opportunity in courtyards and families, and garnering an idea of the impact such a courtyard garden could have in the lives of Kwara Tagi's residents. The questions selected were tailored to expose elements of life that could change should the Moringa tree be implemented in courtyard gardens and into a daily diet.

### **The Interview Questions**

Seven questions (or sets of questions) were formed with the mindset of gathering clues that might help identify opportunities to bring about practical change through courtyard gardens. A few of the questions proved to be of little help, but those explanations will follow the results. The questions formulated were intended to paint a picture of someone's courtyard, daily diet, and daily life circumstances.

1. How many children eat in this home? (With many children wandering the streets during the day, it is not assumed that all children sleeping in a house eat in that particular house.)

2. Do you have city water or do you purchase water daily? How much do spend daily on water? (As a village on the outskirts of the capital, we have access to piped water, but most of the neighborhood buys their water from local sources/wells on a daily basis.)

3. What animals live in your courtyard and what benefit do they bring to your daily living? (Our streets are filled with donkeys, chickens, sheep, rabbits, and goats.)

4. What have you planted in your courtyard? What inhibits you from planting more things? What is the size of your property? (At first glance, it has always been astounding to see how little is being cultivated in courtyards. Thus, this is a vital question to understand the

mindset behind the apparent reality.)

5. What fruits and vegetables do you feed your children and how much is spent on these healthy foods? What is the daily diet of your child (under three years old)? (With the first few years in life being a foundation for future health, these questions targeted the younger population.)

6. How much money is invested into medical visits (traditional medicine, pharmacies, hospitals, or clinics)? What are common physical ailments among your children? (This question was poorly phrased and created problems which will later be discussed.)

7. What is your average income (household) per day? (With full confidentiality, the thought behind this question was to understand how much of a family's income goes to food and health-related causes and what kind of stimulus would it provide a home if malnutrition was eradicated.)

### **The Interview Process**

These seven inquiries formed the survey which was then taken to ten homes throughout this village. All of the surveys were administered orally since most of Kwara Tagi is illiterate (over seventy percent) and many of those who can read would struggle expressing their thoughts on paper (M.D. Biramou, personal communication, December 1, 2013). Two men from the community, one researcher and a witness to the answers, carried out the recording of the responses. It was decided by the author that these interviews should be conducted by a local researcher. He was requested to choose ten homes of residents he knew personally who were willing to sit down, have a round of tea, and discuss life in some depth. Another local man was



brought along to assist the head researcher and verify that the facts were heard and recorded accurately . The researcher was compensated for his work, though no compensation was given to survey participants except the tea served during the administrating of the interview. Each participant's identity was protected by simply labeling the homes visited 1-10 and keeping their specific location, names, and family details anonymous.

A Kwara Tagi native was employed to assist in the interview process for a few reasons. The first was his access into lives presented no abnormality or cultural awkwardness for those participating in the survey. Secondly, it minimized the incentive of participants to exaggerate the facts or opinions in order to receive a handout, since their identity would not be revealed to the researchers who would compile and analyze the data. Finally, in using a third-party representative, it enabled a high-degree of privacy for the participants.

Details about the length of time it took to conduct each interview and the persuasion (if any) needed to obtain cooperation was not collected. Because the data was collected by outside sources, meetings were held with the head researcher and his assistant after every couple homes to discuss their interview, how it went, difficulties that ensued, and an evaluation of how to improve the process in the next home. There was no change in the questions asked or in the format of the interview, but solely an evaluation and improvement of the recording methods.

### **Weaknesses in the Approach**

There were still some weaknesses in this approach. In administrating a survey of such length in a cultural and educational context such as Niger allows for a blatant opportunity for a

misunderstanding of the questions. This is said for a variety of reasons since critical thinking is not taught in schools (rather, rote memorization is the norm), rarely practiced, and the mother tongues of participants varies greatly (we have four major languages in our neighborhood). Due to the content of the survey involving financial details and health concerns, some concerns of privacy may be reflected in the responses (lack of detail), even though full privacy was ensured to all participating parties. Finances and numbers are not clearly documented in most lives in a majority illiterate culture. Therefore, a few of the questions revealed responses that seemed far-fetched, misunderstood, or simply astounding. Most of the data is accurate and obvious, but in some cases, it may be unwise to meticulously analyze the numbers for their economic benefit due to the lack of education of those participating in the surveys.

In addition, the small sample [ten households] is a concern when generalizing from this dataset to a broader population. However, within the ten homes presented, major consistencies between households emerged providing a solid basis for analysis. These patterns present opportunities and identify challenges. Opportunities arise within the realm of unused resources, yet challenges are present in the fear of the unknown and the loss of the few resources they already possess. It is within the paradigm of these opportunities and fears that this study was birthed so that opportunities were targeted while minimizing the potential of these fears to be realized.

There were assumptions made pertaining to vital indicators of the source of both the problem and solution of malnutrition plaguing Kwara Tagi and Niger. The questions asked were chosen to expose the reality of Kwara Tagi's life and offer insight into the potential and

opportunities available coupled with the community's perspective on this potential. Every aspect of the preconceived perceptions were on the table as the research was conducted.

## 4. Findings

The survey questions were not intended to bring specific answers, but expose certain realities and reveal potential. Realities such as, “What does the ingestion life of a Kwara Tagi child look like and what nutrients are they taking in during a normal day? What resources are currently being capitalized upon and how would incorporating the Moringa into their daily life ameliorate their diet and quality of life, eradicate malnutrition in the home, drastically provide financial relief, facilitate an avenue of community investment that transcends religious and ethnic boundaries, and create new opportunities of investment for days to come?”

### The Results of the Research

The beauty of the results which emerged from the survey was consistency. Though certain financial figures needed to be somewhat disregarded as they were distanced from the mean, many facets of the survey provided an alarmingly similar picture indicating a common denominator on how life is being lived and the possibility of a monumental impact with the incorporation of courtyard gardens.

### Consistent Findings

#### Children Present

**How many children eat in the home.** Results from the first question asked showed every home had a minimum of six children with the majority of homes having eight or more children in the household. Niger has the highest birth rate in the world as aforementioned, and this particular neighborhood on the outskirts of Niamey (Niger’s capital city) is known for its

many children. Thus, there was little surprise to see the average participating home surveyed had 10.4 children. Now we must consider a couple variables which the survey did not consider. The normal practice for Nigerien families who live in village-like compounds commonly will not move out from their parents' roof until there are children to care for or necessity demands it. There is also the component of twenty children being in a home, but three wives being responsible for the births as polygamy is not only accepted, but encouraged in Islam, the practicing faith of more than 98% of Nigeriens (Niger Executive Summary, 2011). Regardless, these variables do not change the reality that these are many young mouths to feed with generally little income. The government of Niger does provide the opportunity for any mother with an identity card to claim 3000 CFA/monthly (approximately \$5.45) per child to care for the basic needs of her children and offset the financial difficulty that could be presented with large families (Philip Adams, personal communication, February 20, 2014).

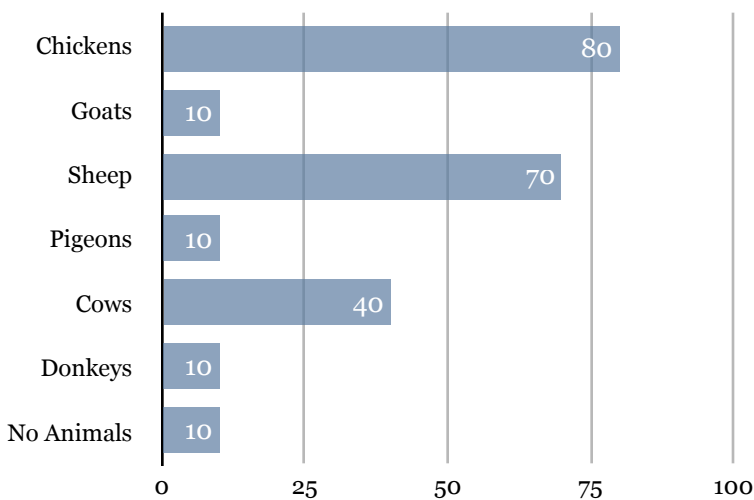
### **Source and Disposal of Water**

**Do you have city water or do you purchase water daily? How much do you spend daily on water?** The cost of water per household is a shocking reality. Though the homes varied in their daily water expenditures, the average cost of water per household was 950 CFA (\$1.73) daily. When you consider these household live below the global poverty line (\$2/person), the reality of exorbitant water costs becomes a life and death issue. Despite the preciousness of water, every home recorded throwing their dirty water in the street in front of their house after its primary usage.

Another commonality was discovered as all ten courtyards noted the absence of running water. Though the city of Niamey does have pipelines to Kwara Tagi, few residents have paid for the installation, or live in huts which do not allow for piping. Thus, daily trips to the well (also requiring payment) or purchases from the watermen (young men who circulate the neighborhood with carts of five gallon water jugs selling this quantity for 300 CFA (approximately \$.55), though the rate is negotiable. All families also shared their practice of purchasing “pure water” which is a small plastic bag (500cl) of drinking water, which in theory is filtered.

### Animals Present

**What animals live in your courtyard and what benefit do they bring to your daily living?** As illustrated by the Figure 4.1, most homes had animals and the majority had a least a few varieties. The most commonly found courtyard livestock were chickens, sheep, and cows. The interesting aspect of the animals on family’s property was their purpose. Multiple answers for the animal’s purpose was permitted, yet the over half the families (60% of the families) noted their animals were used as insurance to cover emergency expenses (notably, medical).



**Figure 4.1: Animals per Courtyard (% of homes)**

A few raised them as an additional income source (30%), a couple for food or religious purposes (both at 20%), and one used their animals for work in the fields.

## **Land Usage**

**What have you planted in your courtyard? What inhibits you from planting more things? What is the size of your property?** There were no homes with a courtyard of less than 200 square meters (20 x 10) and some that measured up to 400 square meters (20 x 20). Let it be noted this does not exclude the possibility that the family owns more farmland in the country. This is simply their place of dwelling.

In many of the homes, something was growing in their courtyard. For eight of the ten homes, it was a Nim tree. Primarily grown for shade in this culture, it has incredible medicinal value, but few (based on questions and experience in the community) use it for more than shade and fodder for animals. Only one home had vegetables growing (salad and tomatoes) and two had acacia trees. No courtyard that participated was growing the Moringa tree, though one household did mention it in their diet.

In every home questioned, the participants made note that the primary (and in many cases, the only) reason they do not plant more gardens or trees is due to financial restrictions. Still, there was one who also cited a lack of space, or others who mentioned the land not being theirs as an additional factor for not developing the area.

## **Dietary Practices**

**What fruits and vegetables do you feed your children and how much is spent on these healthy foods? What is the daily diet of your child (under three years old)?** Most families purchased a variety of fruits and vegetables for their family at an enormous cost. In Niger, fruits and vegetables are bought in their season, but mangoes, bananas, oranges, pineapples, apples, lettuce, okra and tomatoes were the ones mentioned by multiple homes. This indicated the desire to provide a healthy environment even if it meant cutting back in other aspects of living. Not one home mentioned the purchase of Moringa (one courtyard did mention growing Moringa), though it is sold in the market place at a high cost (1000 CFA [\$1.82]/per 100mg). The average home expended 2200 CFA (\$4) daily on vegetables and another 2000 CFA (\$3.64) daily on fruits.

What was alarming and very telling, however, was the dietary offering for their little ones (under three years of age). During this vital stage of growth and development where many are vulnerable to illness and malnutrition, the majority had a high carb diet with very few fruits and vegetables included in their regular routine. Almost every list included millet, couscous, broth from the millet stalk, beignets, (a local donut served each morning on the street) white rice, black beans, yoghurt, and potatoes. Out of the ten homes, only few noted their young children were provided with fruits and vegetables. Three homes reported salad as a food fed to their toddlers, while two mentioned corn, and one noted bananas. Interestingly, one home specifically shared that aside from eating the regular food the family was served, their toddler was served candy and chocolate.



## **High Cost of Survival**

**How much money is invested into medical visits (traditional medicine, pharmacies, hospitals, or clinics)? What are common physical ailments among your children?** From traditional medicine, to clinic visits, to hospital stays, all ten families shared the reality of high medical costs in their life coupled with the prices of water and food. In many cases, the figures thrown out nearly equaled or exceeded their entire income. Only one household made mention that they simply do not receive medical care because they have no money.

Due to a lack of accounting, the financial figures they shared with the researcher were incident-based rather than monthly figures. Rather than estimating the expenses that incurred each month, they did a walk-through of each ailment making time periods virtually obsolete. When the data came to me, I simply had many numbers (varying sums) to go with each incident involving pharmacies, traditional medicine, clinics, or hospitals. Rather than completely discarding this data, the visits were broken down to discover what the mean trip would cost since ninety-percent of the families made mention of trips to medical facilities on a regular basis.

For the average clinic [private care facility with specialized testing, etc] visit, the mean expense was 24,000 CFA (\$43.64). For a hospital visit, the tab averaged, 22,500 CFA (\$40.91). Pharmacy trips are usually required after any hospital or clinic visit. In fact, even a regular injection requires a pharmacy visit to buy the syringe and medicine. If you want a body embalmed after death, you must buy the formaldehyde at the pharmacy and deliver it to the morgue. It is common that the pharmacies simply look at the lists sent from doctors and tell the patients the most vital elements for a particular sickness. Frequently, pain medicine is the first

item removed. The pharmacy bill averaged 21,550 CFA (\$39.18). Coupled with traditional medicines which averaged around 10,000 CFA (\$18.18) per home (often for cases of infertility, protection from evil spirits, or other animistic practices). Regardless of the number's precise accuracy, the point is made. Health needs consume a great portion of a family's financial resources.

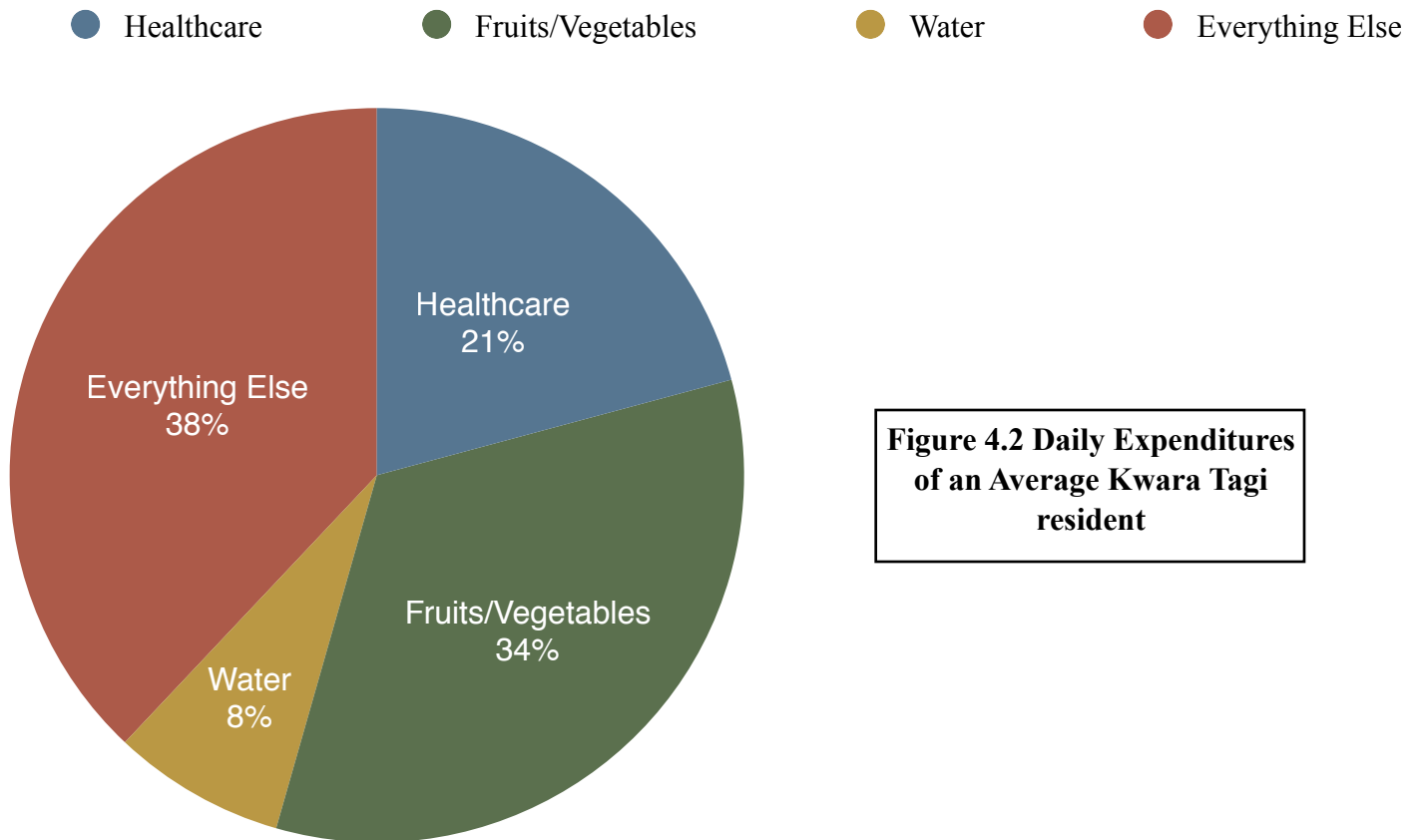
The ailments plaguing families, the most common complaints were yellow fever, malaria, chronic diarrhea (which is a symptom of malnutrition), cholera, and along with dysentery and its side effects (fever, abdominal pain, etc). The responses to these questions may suggest malnutrition (as many of these symptoms accompany malnutrition), but do not clearly make the correlation between the disease and malnutrition. They are, however, a contributing factor to the high medical costs in the daily lives of Kwara Tagi's residents.

## **The Big Picture**

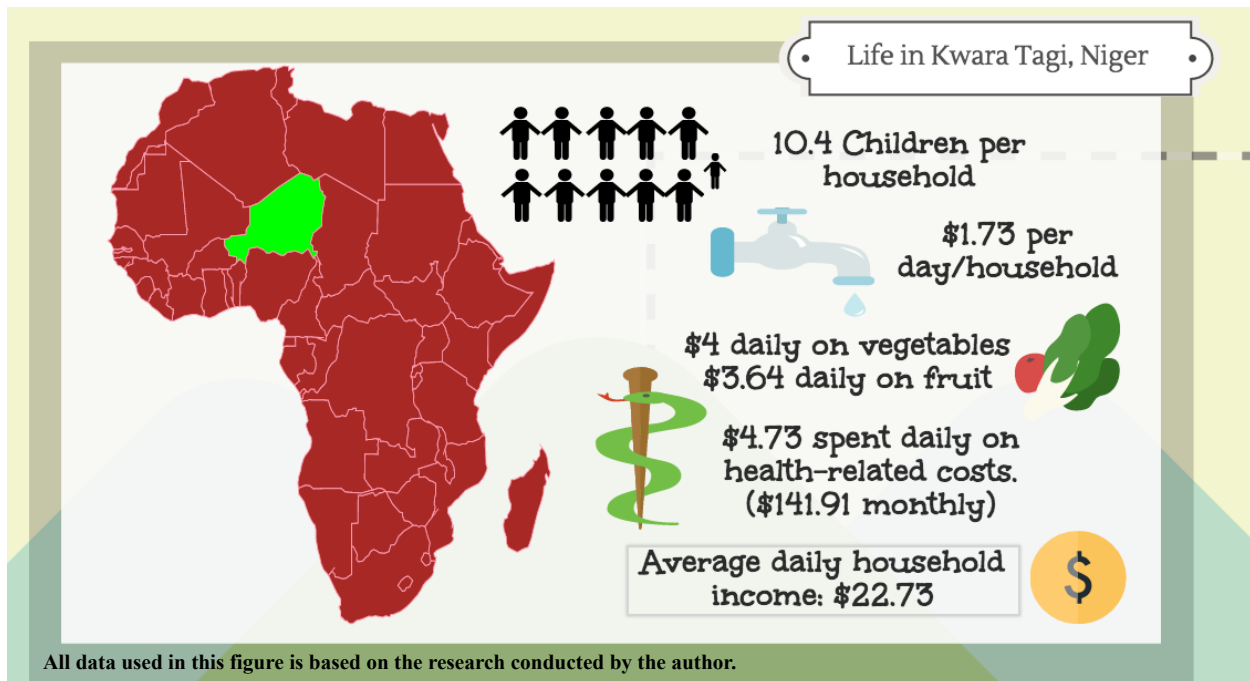
**What is your average income (household) per day?** The numbers varied, but not extravagantly. The numbers calculated were for the household, as living and expenses are very communal. If a child earns 1000 CFA (\$1.82) for a day's work, he or she will generally contribute that sum to "the family pot." Thus, it was estimated by these various households that their average income ranged from 5,000-20,000 CFA/daily (\$9.09-\$36.36/daily). Remember, the average participating home had over ten children to feed. Thus, when dividing these totals by 12, it puts a bit different of a perspective on the situation.

The data collected gives us a clearer understanding of the expenditures required when combatting malnutrition in the average villager's life. Figure 4.2 provides an idea of where the

money of Kwara Tagi goes. Though the figure is most likely slightly inaccurate due to the participating population (illiterate, greatly uneducated, and not time-oriented), it is obvious that malnutrition and its effects rob this village of the opportunity to thrive. Figure 4.3 gives an idea of what the average household might resemble in their expenditures. Both of these charts were compiled through taking the means of the figures shared by the participants and compiling a sample household.



**Figure 4.2 Daily Expenditures of an Average Kwara Tagi resident**



**Figure 4.3 The Average Household in Kwara Tagi**

## Hope in the Research

The commonalities in these surveys brought light to the reality, but also a recognition of the hope. The very barriers being cited as obstacles are merely the lenses being chosen through which to see the community, but what if there is another way to view the same situation, but this time, coupled with capital potential? What if none of these problems that rose up in the research are actually obstacles and the remedy isn't in focusing on the problems as it is in finding the opportunities?

## 5.

## Discussion

### Moving Forward From Here

As we understand the background to the Nigerien situation, the research conducted, and the hypotheses suggested, where do we go from here? What did we learn? Perhaps, more importantly, what questions, mindsets or ideas have changed in the process and what is the first step towards understanding the potential of coming together as a community to initiate a positive journey towards the eradication of malnutrition in Kwara Tagi in a sustainable way?

Rather than dive into all the possibilities involving potential, we will take a look at the objectives being sought as an end goal, one initiative that has already been launched to pursue that very end, and a glance at the true sustainability of the suggestion. This endeavor was the result of discussing options with the Kwara Tagi community coupled with the experiences of my own gardens starting in early 2014.

### Objectives of the Initiative

Thus, the clear objectives for this research and initiative are as follows:

- *Community building and information sharing through involvement and investment in this courtyard gardens.*
- *Change nutritional intake within families while lowering medical expenses and the cost of groceries.*
- *Beautify and bring a sense of ownership to the neighborhood.*

- *Provide safe, sustainable, and intellectually stimulating activities for youth.*
- *Educate youth about human-earth environmental stewardship.*
- *Provide means of economic empowerment and income generation for youth and their families.*

## **From Idea to Action**

### **The Simple Plan**

In its raw form, the concept was drawn up to educate, equip, and empower children to begin growing Moringa trees in their courtyards in a completely sustainable way with no dependence on outside intervention nor at any cost to their family. The plan took eight simple steps, but with proper education along the way has the potential to impact the entire nation, eradicate malnutrition, reverse desertification and deforestation, and restore environmental beauty to this desert land.

There is a proverb in the Hausa culture which says, “The one who plants a tree will never be hungry” (Bahnon & Wirzba, 2012, p. 99). Embedded in Nigerian tradition is the vitality of this practice. Thus, as a contributor to their society, it is important to not come as implementers of Western tradition, but rather, see this journey of mutual learning as a further construction on what they know and what has been and could be again.

### **The Process**

The implementation process for these courtyard gardens include nine simple steps:

### **1) Familial Permission**

Before beginning this process of initiating a courtyard garden, there is an issue of access into lives which must be addressed. Usually, it begins with a complaint from parents concerning the health of their children or the difficulty of their financial status (they come asking for money or some sort of handout). It is these discussions that prompt the explanation and dialogue of a courtyard garden. We do not want to foster dependency, but rather, see lives changed for the long-term. Furthermore, with this initiative being geared towards and operated by youth, it is important to have the parents on board every step of the way and transparency evident in every sphere.

### **2) Orientation on the Moringa Tree**

An important element in this journey is a proper orientation of the locals on the Moringa trees and their benefits. They are introduced to the Moringa by visiting a garden or courtyard where these trees are grown, including my own courtyard. This enables the residents to understand that the change being suggested isn't simply grown for a survival capacity situation, but rather, it is a tree useful for every stage of life. Moreover, it is important that the participants understand the implementation of this tree into daily diets is not merely a concept adopted by economically struggling families, but all walks of life.

### **3) Preparation of soil**

Once the family has agreed to give this idea a chance, they must choose the courtyard land wished to be designated for this venture. It is important to leave the choices in the hands of the

participants rather than suggest or hint at certain avenues of action. If villagers do not request direct assistance, no outside intervention takes place. It can be an open discussion if they so choose. After the location within the courtyard has been chosen, it is vital to clean out the soil freeing it from rocks and trash (which is inevitably buried deep within the soil) or any other foreign object not conducive to growing trees or plants.

In order to maintain the premise that everything needed for a thriving garden is directly before their eyes, the collection of fertilizer takes place on the streets or in their own courtyard. After finding a couple plastic trash bags lying on the street or a discarded cardboard box, a search begins for the collection of manure from animals (ideally, cattle droppings). After collecting the manure, it is worked into the soil using hands or a tool the home already possesses (no outside tools are brought in for the project).

#### **4) Protection of the Garden**

With animals (donkeys, sheep, goats, and chickens) roaming free within and without the courtyard, as is the typical Nigerien village setting, it proves vital to protect the young growth of these Moringa trees from predators. Thus, using various pieces of garbage, sticks, thorns, or broken bricks, barriers are created protecting the garden area. This enclosure isn't vital once the trees have reached young maturity.

#### **5) Planting of Seeds**

For this particular project, ten Moringa seeds are given to the participants. While the viability rate is high, planting ten trees virtually ensures the family a few successful trees and the



opportunity of many more once the trees begin budding pods. These seeds are planted approximately six inches apart and can be placed as close as a foot from a cement wall making them a great barrier for privacy and a coolant for hut or brick walls.

## **6) Watering of Trees**

When addressing the watering of trees, we deal with more than an issue of resource management, but moreover, an economic concern. In every participating home in the village of Kwara Tagi, we noticed water was purchased on a daily basis for the needs of the family. As a general rule, water is purchased for the cooking of meal, washing of dishes, baths, and for consumption by humans and animals. Despite the value of water, there was no family noted that did not take their used dish and bath water and toss it on the dirt street in front of the house. Though this common practice is understood, it is a waste of an available resource. Thus, it is strongly encouraged that every drop of water invested in watering the Moringa trees come from water that would have been otherwise thrown out. Despite this relatively free source of water, the Moringa is highly weather resistant and does not need daily watering. In fact, these trees thrive off of less water and much sunlight so youth are encouraged to water their courtyard Moringas every two days.

## **7) Monitoring of the Progress**

Over the course of the first growth period (three months), periodic visits are made to the home to monitor the tree's growth and productivity. Once leaves begin sprouting, instruction is

provided on pruning, harvesting, and ultimately, consuming the Moringa. The Moringa tree can easily grow over nine feet in the first year.

### **8) Incorporation into Diet**

The Moringa is already a common product in the marketplace, though many do not purchase it due to price (as previously mentioned, 1000 CFA [\$1.82] per 100 mg). Thus, many have heard or seen the Moringa leaves incorporated into culinary works making the process much simpler than trying to introduce a foreign ingredient into diets. This step is focused on coming alongside villagers to initiate discussion on ways of incorporating these leaves into their stews, millet, or tea. Rather than attempting to create new dishes, the idea is to add this leaf to traditional meals they are already preparing in ways which preserve the nutritional content of the Moringa leaf. Not only can the Moringa be harvested often, but it is strongly recommended to prune and use its leaves at least every 30-40 days making its leaves sufficient for daily consumption - particularly when drying the leaves becomes a common practice (see Figure 5.1).

### **9) Repetition of the Process**

Finally, as these trees begin yielding their own pods, the indicator of true sustainable development will be in the understanding of these youths to educate and equip others and ameliorate their own gardens. We could include the consideration of turning their Moringa production into a money-making venture, but great care must be taken in introducing such concepts as health can easily be sacrificed for a couple extra dollars in such cultural settings.

**Figure 5.1: Moringa in a Nigerien Garden  
(Samaritan's Purse, 2015)**



After approximately nine months, the *Moringa oleifera* tree begins producing pods with seeds within. There are three responsibilities with the new seeds being produced. First, to reimburse the donor with ten seeds so at the end of the day, there is no concept that they somehow are in debt to the original donor. This is their courtyard, their trees, and their income. Secondly, they have the responsibility to take ten seeds, teach, and help a friend or neighbor begin the process of Moringa implementation in her or his own life. Thirdly, they have the responsibility to plant more tree in their courtyard repeating the process.

### **The Road to Sustainability**

We refer to this process as “more than sustainable.” According to the Oxford Dictionary (2015), sustainability is merely “conserving an ecological balance by avoiding depletion of natural resources.” Our desire is not to merely conserve and avoid depletion but increase the

natural resources and capital of Kwara Tagi and eventually, beyond this village. Thus, from the beginning, bringing the resources and minds of Kwara Tagi's youth to the table of discussion was not an effort to merely eradicate or greatly reduce malnutrition but to empower these kids to change their nation and planet.

### **Sustainability in the Light of the Seven Community Capitals**

The road to sustainability, however, is not merely a focus on the building blocks of that particular project but on the impact they will play on all spheres of society. We must comprehensively consider the capitals affected, even if it would seem they are not directly involved in this initiative. In every case, there are threats and opportunities which it is wise to consider. The threats are warnings to notice but not intended to drive an apprehensive approach to growth. Sociologists Cornelia and Jan Flora suggested there are seven community capitals that should be considered with regards to sustainability in development (2008). The seven community capitals of natural, cultural, human, political, social, built, and financial capital give parameters through which to methodically assess sustainability in light of the big picture, rather than merely through a singular resource involved.

#### **Natural Capital**

Niger has a massive portion of unused soil which incrementally can be reclaimed for agriculture, and in the process, reverse desertification and cool the soil. Furthermore, this country is ideally suited for these agro-pursuits. We must be wise to remember our footprint and the entropy involved in any action which employs physical resources. The upside to the venture is

that little to no environmental pollution occurs through a courtyard garden. On the contrary, the negative effects of the environment are reversed in the practice. Limited access to water could be deemed a problem, but this particular proposal and project uses only water which already exists in the home, has been used for dishes, bathing, or another purpose and is then deposited in the soil to aid the growth of Moringa trees. Thus, natural capital is increased and protected through this concept.

### **Cultural Capital**

Niger is full of Nomadic and desert-based tribes such as the Fulfulde, Tamajeq, Fulani, Hausa, along with others which makes them well-suited for Sahelian life and agriculture. Notwithstanding, some obstacles have been observed by the author of this report which may be significant in the process of incorporating courtyard gardens into such a culture. A seemingly dominant issue is the need for local tribes to see this incorporation as an extension of their own culture instead of a foreign or other-tribe concept.

A “Colonial Mentality” is commonly carried in Niger which adheres to the idea, that anything the West does is an attempt to regain control of West Africa. Thus, many automatically reject the outside suggestions. This is a more common attitude among the educated, interestingly enough, since their studies emphasize the victimization which occurred under colonialism. Due to a heavy influence of folklore Islam (over 98% of Niger), fatalism is inbred in their way of thinking which greatly affects the way the environment is used (Niger Executive Summary, 2011). Their perspective of “Inshallah” (If God wills) often results in treating the eco-system and life as if there is no tomorrow and thus, the depletion of resources is rarely considered.

The family or tribal mentality is doing whatever might be necessary to provide for the needs and whims of those in their immediate family or tribe. This is a common complaint and burden on youth. Many leave their village, city, or country for this reason as they feel there will never be freedom to succeed until they are away from the constant demands of the household. Furthermore, the lack of individual property rights (they tend to be family owned and operated—shared plots) make it difficult to achieve economic efficiency or an incentive to develop the land since benefits have a tendency to be frivolously used rather than wisely invested.

Division continues along the lines of tribalism, ethnicity, religion, language or dialect, along with societal classes, though this does not tend to be the greatest threat to the implementation of courtyard gardens. Let me make note that it is at no point the goal of this project to change cultural capital. Any change is a mere by-product effect of other endeavors. If we aim to change cultural capital, we will end up with an external change compounded by collateral damage in the form of prejudice, preconception, colonialism, and bias. How often is community development aimed at changing externalities rather than the core issues?

A male-centered society also poses a risk. Breast milk is the best baby food for newborns and in the early life of a child, but only nine-percent of mothers in Niger breastfeed exclusively over the first six months, and after that period, the rate drastically declines (Doutchi, 2011). This may be partially due to a poor production of breast milk as there is a cultural practice where the mother is often times the last one to eat leaving the starchy basics of the meal and perhaps few nutrients to provide for her needs when her baby's health is dependent on her body. In a society where so-called "baby food" is virtually non-existent (except for the rich), a mother's health

must take the forefront and the Moringa leaves address and confront this need as they provide as they nearly double the breast milk in a nursing mother (Estrella, Mantaring III, David, & Taup, 2000).

## **Human Capital**

Any region, nation, or community has human capital from which to draw on. In Niger's case, there is a limited quantity of educated personnel who can and are willing to impart knowledge to youth, but that does not negate the opportunity which does exist. Though a high unemployment rate might be viewed as negative, it can also be seen and classified as an opportunity for growth, skill acquisition, and for the realization of potential. Compounded by the fact that the mean age in the nation is a mere fifteen years of age, the energy and formational capacity of Niger is great (The World Factbook: Niger, 2014).

Due to the rapid growth of Niger's citizens, there is a danger of environmental, political, or an economic crisis depleting resources such as a famine (occurred last year) or flood (occurred this year), but as resilience is understood and practiced, these threats can become mere inconveniences to growth rather than showstoppers. A lack of developed leadership and critical thinking skills (which is absent in the school system due to a system of rote memorization) is vital to understand when considering the process of forming leaders, but not an obstacle too great to overcome. As one of the world's fastest growing countries, Nigerien growth must focus on developing human capital through participatory and inclusive leadership development. Courtyard gardens provide and make leadership opportunities accessible to young lives while incorporating critical thinking at a fundamental level.

## **Political Capital**

The strength of this initiative is in its lack of dependence on the political system and regional stability. Political instability is a threat to the stability of the region as multiple coup d'états have taken place over the past few years, terrorism (Boko Haram and Al-Qaeda) is rampant in the region, and elections inevitably bring instability. Still, Niger is regarded as a more stable nation in a region of turmoil. Government corruption remains a constant problem. Niger was ranked 103rd in the world by Transparency International with a corruption score of 35/100 indicating a low degree of governmental disclosure (Corruption Perceptions Index, 2014). Naturally, this is brought on by intense poverty and a lack of compensation by the government despite exorbitant amounts of aid coming into the nation.

As the famous idiom goes, “It’s not what you know, but who you know.” Sadly, this mentality is the foundation of corruption and Niger economics is based on this principle. We do not believe things should or must be this way. Yet another reason our push and persuasion is to work towards maximum micro-freedom and independence from political entities while creating sustenance that is largely unaffected by economic woes. The less higher powers and bureaucracy that have to be involved (in this case), the better.

Though this program and dialogue was initiated through ROCHE Niger (a French acronym which translates as “Relief, Opportunity, Care, and Hospitality for Children”), a fully-legal and registered local not-for-profit, the program itself is not threatened by political capital since it is based on empowering local communities at the familial level. The Nigerien government offers no incentives to be eco-friendly, nor imposes a heavy hand of taxation over



land usage. The working rules of organizations does not play an overwhelming factor in the formation, implementation, and expansion of these courtyard gardens, but there are a couple aspects to consider. Niger has a Rural Code which provides for the protection of trees, water sources, and grazing practices. Rules pertaining to cutting down trees, using water sources, et cetera are articulated in the code (Jamart, 2010). All aspects of this program only complement the preexisting codes.

### **Social Capital**

Social capital is easily built through strong relationships with those in authority or with those who know those in authority. Truly, it is all about two degrees of connection. The threat associated with such systems of operation is in this; the same favor one can bestow, another can remove. Thus, it is important to be transparent and deal with problems promptly and thoroughly in a culturally appropriate way. To maintain a high degree of social capital, open dialogue must be maintained with those in frequent contact with Niger's leaders of tomorrow (e.g. imams [Islamic religious leaders], pastors, social workers, business folk, university professors and high school teachers, along with village chiefs and government authorities). This enables and fosters empathy and understanding between these initiatives and the community, and creates an atmosphere of partnership dispelling any competition which might be assumed.

The beauty of this proposal, however, is the social capital it builds for individuals. Those focused on merely surviving rarely have much social capital to bring to the table. With an economic and sustenance base of living, individual can begin building credibility for themselves and their families. For the sake of this project, the social capital that is most essential is the trust

within a community to initiate dialogue and move forward with action. The broader scope of social capital gives a legal validity to the organization instigating action, but not necessary for the maintenance or operation of the courtyard gardens since it is operated home by home.

### **Built Capital**

Water works are now available in much of the country whether through wells or pipelines. Some may have to purchase their water from street vendors, others makes multiple daily treks to a well, and others have piped water, but regardless the circumstance, all within the area of Kwara Tagi have access to water. Paved roads connect most major cities making the possibility of broad distribution much more possible. Nationwide telecommunications also enhance the social capital that can be built both internally (Niger) and externally through the internet (global). This built capital was not available a decade ago. A lack of developed water sources serves as a limitation to this proposal nationwide, but in time, this is expected to dissipate due to underground water.

With the simplistic and grassroots approach of these courtyard gardens, very little built capital is required for the successful implementation of this program. Since some water is needed (though the Moringa portion of the program could operate solely off the annual rainy-season) for a constant production of the Moringa leaf, the water works infrastructure enlarges these courtyard garden's capacity to serve and meet needs, but dependence should not be established on any one source. Resilience requires alternative measures be incorporated to compensate for loss. Well-digging, collecting rain-run off, along with drought-resistant farming provide viable alternatives to consider.

## **Financial Capital**

Niger is consistently among the poorest nations in the world so when it comes to financial capital, this is a hot topic for the land. One strength is in Niger's access to international funding, though this creates a high level of dependence on foreign aid. This outside intervention often kills local incentive for economic stability. Many educated and qualified leaders in Niger can find much higher paying jobs working for NGOs who further the mindset of dependence rather than encouraging the pursuit of economic sustainability. Naturally, most Nigeriens have limited investment capital, but courtyard gardens require very little (if any) start-up capital making it an ideal program for youth to pursue.

Unless financial capital is invested into sustainable objectives that adhere and respect the laws of thermodynamics (ultimately ecological sustainability), the result of aid and investment can be more detrimental than helpful. Investing in non-sustainable (buildings, international employees, etc) ventures can ultimately push the pursuit of sustainability backwards and create an attitude of dependence rather than initiative. Therefore, this initiative seeks only to build financial capital in homes, not rely on it to get the work done.

## **Portal to a New Life**

### **Household Welfare**

One simple way of looking at this project's benefits from an economic perspective is through the current expenditures of the community and the transition in one's personal finances that could occur through the Moringa tree being incorporated into their life and diet. As the

surveys were compiled, it was discovered that families spent the majority of their finances on health needs (much stemming from malnutrition-related causes), water, and food. In many cases, even the animals they raise, were simply a sort of insurance fund for these financial expenditures.

Though the establishment of courtyard gardens requires a very minimal (solely the seeds) financial investment, it can not only yield economic opportunity, but nearly eliminate the diseases caused by malnutrition and the consumption of unclean water, not to mention drastically cut down on the costs of buying appropriate foods for the family's health.

### **Community Welfare**

The benefits of this proposal and initiative extend far beyond the lives of children to the welfare of a community and nation. In the planting of trees in each household, the effects of deforestation will begin to be reversed, new practices will be established that extend beyond the courtyard into farms and communities (schools, mosques, churches, government establishments, etc), and in the process, desertification itself will slowly be turned backwards. This may sound idealistic, but it begins with an understanding of the power that exists before our eyes with the only obstacle being our will, not our pocketbook.

### **Conclusion**

#### **Questions to Ask**

This report was launched on the basis of asking questions. One specific question drove the discussion of recognizing the potential of Kwara Tagi and Niger. "What if the solution to

significantly reducing malnutrition in one of the world's poorest countries was not an issue of fixing a problem or increased financial intervention from Western nations, but rather, a new approach to using the soil in a sustainable way which not only maximizes, but increases, the natural capital of the community?" Over the course of our research, analysis, and implementation, it has been seen that this is one possibility of orchestrating change without the need of outside resources or finances. Still, there remains some variables that raise further questions.

### **Further Research to Pursue**

If a follow-up report were to be done off these studies, my encouragement would lie in understanding the complimentary courtyard plants and trees that could facilitate other areas of life, or provide new opportunities when combined with the various properties of the Moringa. Based on the surveys conducted, it became clear that a great portion of life's expenses in Kwara Tagi are invested in sustaining the bare necessities of life. Thus, it would be worth the study to see a developed, organized academic program which takes this concept into the Nigerian public schools and equips and empowers children to begin a journey of being more than agronomists, but vital players in the conservation of our planet.

Additionally, an in-depth research on the effects of water quality on Moringa growth would be useful. We seek to only use water that would be thrown out, but are there adverse effects on *Moringa oleifera* trees when using water that has been contaminated by soap and other detergents? Finally, it would be advantageous to delve deeper into questioning the community concerning community gardens (introducing the concept) versus courtyard gardens. With a tribal split in many communities, it could prove complicated, but in homes where a lack of motivation

is found, community gardens could initiate and demonstrate the effectiveness, thus becoming a catalyst for action. Additionally, community gardens could create a deeper sense of ownership and pride for this land, consequently, promoting social action.

### **Closing Thoughts**

Though the discussion of moving from malnutrition to courtyard gardens has focused on potential, this has been as much a lesson in community involvement and dialogue. The research indicated the presence of unused resources in courtyards, the wasting of resources in water disposal and manure usage, along with an abuse of resources through the neglect of the soil of Kwara Tagi. Furthermore, this study exposed the costly reality that much of life would exponentially change as minds are opened towards the vast opportunities available through the maximization of existing resources and the incorporation of community knowledge. Lasting change cannot be imposed, but rather, chosen. As we progress into the future, may we never lose sight of the individual in the light of an idea nor the impact of participation in the face of a problem. Sometimes it all begins with the potential of a child and a Moringa seed.

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# Appendix A

Figure A.1: Mind Mapping the Journey

## MIND-MAPPING (Nathan Bramsen)

