Developing Agricultural Curriculum for Betty Memorial Institute, a Rural High School in Liberia

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Developing Agricultural Curriculum for Betty Memorial Institute, 
a Rural High School in Liberia

by

Corey Hartbecke

A creative component submitted 
in partial fulfillment of the requirements for the degree of

Master of Science

Major: Agronomy

Program of Study Committee:
Dr. Mark Westgate, Major Professor
Dr. Mary Wiedenhoeft
Dr. Andrew Lenssen

Iowa State University

Ames, Iowa

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Acknowledgement and Dedications

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I would like to dedicate this paper to the teachers and staff at Betty Memorial Institute. You are the ones molding minds and shaping futures of the young people of Grand Cape Mound County, Liberia. Your dedication is inspiring. Your strength and perseverance are inspiring. Your love for your neighbor is inspiring.
Abstract

This paper will explore how a collaborative process for developing high school agriculture curriculum was developed between American partners and teachers at Betty Memorial Institute in the rural Tewar District, Grand Cape Mount County, in the Republic of Liberia. The process used is a multidisciplinary approach, where American contributors are researching areas of culture, history and local influences on agriculture in order to become informed partners. The methods introduced provide for curriculum that will fit a complex environment that exists in rural Liberia. Also, this approach allows for relevant contribution to the Liberian teachers, who are the primary developers of the curriculum.
Introduction

Very often we will hear discussion about the rate of population growth and the strain that the expected growth will place on society. The growth in population by the year 2050 will approach 11.2 billion, up from the current 7.3 billion. The rate of increase in developing countries is from approximately one billion to 1.9 billion in the same time frame (UN DESA, 2017). Developing countries face a multitude of challenges amongst which is the population increases. Increases of population place heavy burdens on fragile social and institutional structures. Specifically, the task of food production to cover the increase. In 2012, I was listening to NPR when I learned of the food security challenges that are pressing on certain regions of Africa (NPR, 2012). The report discussed the complexity of Africa and why food security there is such a challenge. The idea of increasing food production was overwhelming to me, but the idea of contributing to the task seemed a worthy cause to take on. This report was a significant prompt for me to go back to school in the Masters of Agronomy Program at Iowa State University.

Knowing that I wanted to contribute to issues like food security required that I think about an approach to work on the problem. Does a person pick a region? A country? What approach should be taken in assisting? Do I work with government programs? Multi-national agencies? Multi-national companies? Individual farmers? The approach taken in this paper to help with the food security challenge facing Africa was to partner with a group of teachers at a rural school in Liberia, Betty Memorial Institute (BMI).

The approach in partnering with the teachers at BMI is a multi-disciplinary and collaborative approach. The objective of the multidisciplinary and collaborative process is addressing the food security challenges of the Liberians near Betty Memorial Institute, by
partnering with Liberian teachers to develop agronomy curriculum. As collaborators, American technical experts that participate are required to be aware of the unique history, climate, crops and culture of the people of Liberia. Being knowledgeable in areas outside of agronomy are critical components to this program because it allows us to be effective partners with the teachers at BMI. The teachers at BMI are the primary planners, organizers, writers and implementers of the vocational curriculum. The process includes input from technical experts, including methods to equip teachers as better educators and help researching areas of knowledge. Through collaborative process, portions of an agricultural curriculum have been developed.
Background

Liberia has a varied history, culture, and different style of local governance, along with different food and agriculture needs from my own. The combination of all these factors have informed the American participants of a key approach to the co-development of the agriculture curriculum for Betty Memorial Institute. The key to our approach is to have the Liberian teachers be the primary learners, developers, modifiers and implementers of the agriculture curriculum. Because of the differences between Americans and Liberians in the areas listed above, it is more appropriate for Liberians to be the primary educators of the students at BMI. American participants focused on providing support to the Liberian teachers.

The American Technical Experts are not afforded the opportunity to be ignorant of the differences, and knowledge of many areas relevant to Liberia need to be kept in mind as the project is implemented. Many areas that will require a greater understanding will be far outside the scope of agronomy. Areas of preparation for our work in Liberia that have been researched are listed below. At the beginning of each section, a sentence or two is devoted to why knowledge in this area is pertinent to the development of agricultural curriculum with the staff at Betty Memorial Institute.

Climate and Geography: As inhabitants of a region of the world that is significantly different from the agricultural areas of the United States, there will be a need for the Liberians to take the lead selecting, learning about and developing curriculum that is appropriate to their region. As a partner in the project, understanding the difference in climate and geography will allow for more relevant input. Liberia is a sub-Saharan country on the west coast of Africa. The climate is tropical, ranging from African bush to tropical
rain forest to mountainous regions (Jones, 2018). In Grand Cape Mound County, the geography is primarily bush. The weather is typically warm (less than 86 F) to hot year (up to 104 F), but the weather pattern alternates between a warm rainy season and a hot dry season (Climate Liberia, 2019). The primary cropping season begins at the end of the rainy season and progresses through the dry season. In Liberia there are four predominate groups of soils: Latosols (Oxisols), Lithosols (Entisols), Regosols (Entisols) and alluvial soils. (Jones, 2018). The Latosols, or as I will refer to them going forward as Oxisols, are the most dominate soil type in Liberia, accounting for 75% of the soil. These soils are highly leached, with low pH, have low soil carbon content and are very fragile once the native vegetation is removed. Due to the soils being leached they have limited productivity for food production. These soils are then also very difficult to restore (Stocking, 2013). These soils are best kept under native vegetation and limited in their agricultural use.

However, Liberian’s have innate agricultural practices that show an ability to maintaining soil health, even encouraging soil development. In the article “Indigenous African soil enrichment as a climate-smart sustainable agriculture alternative”, Dawit Solomon and others, describe the phenomena of “African Dark Earths”, which are young, 115 – 692 years old, soil types that are developed through human action. These soils are high in organic matter, have more conducive pHs to plant growth, higher CECs and higher soil nutrients. (Solomon, 2016). African Dark Soils are more fertile and produce more food than unaltered soils. In surveys done in villages, the researchers found that 26% of produce came from African Dark soils, which accounts for only 5.6% of the area surrounding the villages. The contrast between African Dark Soils and unaltered soil types are significant
and already existing cultural practices allow for the formation and acceptance of the use of these soil types.

There is a wealth of possibility in Liberia that the teachers at BMI can use for encouraging agriculture interests in their students. The teachers at BMI have much to offer to their fellow citizens and they have asked for specific, supplemental help to what they are already doing; yet the foreign partners need to respect the insights of the Liberian teachers. Stocking states clearly,

“Many farmers in the tropics are willing to invest in the future, protecting important public goods such as soils, and are often the best arbiters of choice when it comes to technologies. Science does not always get it right and does not necessarily provide workable or acceptable solutions.” (Stocking, 2003). This speaks to the core of why we have taken the approach of co-developing agricultural curriculum with the staff at Betty Memorial Institute. The teachers at BMI are the best arbiters of choice on the direction of the curriculum.

**History of the Liberian Civil War:** The Civil War is a symptom of the complex history of Liberia, and from those dark years a lot of further complexity has arisen. It is important to understand that a school in rural Liberia is part of the way forward for the country because prior to the civil war, there was a pronounced rural/urban split in the country (Konneth, 2009). The rural parts of Liberia were neglected and now the mistreatment will be counteracted through informed, collaborative development. As we undertake the work at Betty Memorial Institute, we will primarily work on the area of redressing the years of poor education to the rural areas.

The Civil War, from 1989-2003, has many contributing factors and some of the factors inform the approach taken at Betty Memorial Institute. A key factor to the Civil War
in Liberia revolves around the formation of the country in 1822 (Kieh, 2004). Liberia’s founding was to form a place where freed slaves in America could be repatriated to Africa. With the arrival of the freed slaves to Liberia, the prior existing system of tribal life was disrupted. In the beginning these disruptions were not violent in nature, but thru the years the tension between the freed slaves, called Americo-Liberians, and the indigenous peoples began to build. This was due to neglect of the indigenous people in the political structure of the Liberian government. The Liberian government, fashioned after the government of the United States, never functioned as planned because of gross abuses of power. Examples of abuses of power include the President of Liberia picking legislators, judges and cabinet members without legislative review. A common point of protest would be for citizens of the rural areas objecting to a recently granted government contract to a company that would infringe on the local property rights and customs. The abuses of power also include the use of the military to put down protests. The tension between the Americo-Liberians and the rural peoples took on many different descriptions such as urban vs. rural, educated vs. non-educated, native vs. repatriated, tribal vs. elected government, and tragically even lighter vs. darker because the people that often were granted posts in government would be of a lighter skin complexion (Kieh, 2004).

There were numerous protests and attempts at reform through the 20th century, but the challenges kept being amplified through mismanagement of government by successive presidents. In 1980, Samuel Doe lead the initial coup d’état to over throw the elected President William Tolbert. President Tolbert was assassinated in the coup d’état. Most of Samuel Doe’s supporters were from the tribal group he associated with. Years later in 1989 a former follower of Samuel Doe, Charles Taylor, launched another coup d’état. Charles
Taylor had a large following amongst ethnic groups that had been marginalized under both the True Whig Party of President Tolbert and the government of Samuel Doe. Charles Taylor went on to completely destabilize the country and instigate a 14-year civil war (2005. Frontline/World – Liberia), which only ended with international intervention and with Charles Taylor being convicted of war crimes and sentenced in 2013 to 50 years in a British prison (Bowcott, 2013).

Below is a list of the keys to peace for Liberia according to Kieh (2004) report “Irregular Warfare and Liberia's First Civil War”.

1) Disarming of the combatants. This has largely been done as the country has not had shots fired related to the civil war in years.

2) Reconstruction of the military and security forces. Rather than having armed militias roving the country side or armed forces that will impose the wishes of a solitary person, the army needs to be about defense of peace. This point as well has been implemented.

3) Free and fair National elections. The development of multi-party governance and elections that have not been rigged have been very successful in Liberia. There have been 2 elections since the end of the civil war and a peaceful change of administration.

4) Address the underlying factors. This is the most daunting challenge of the 4 areas that need to be addressed. There were many factors that led to the war. Here again is a brief list. ethnic tensions, racial tensions, poor distribution of government services including education and health care, corruption, and abuse of power.
Effects of Ebola: The Civil War would not be the only challenge to this cohort of Liberians. In March of 2014 the first diagnosed case of Ebola was reported in Liberia. The disease would go on to ravage the country for two years. In total 10,678 people were infected and 4,810 people died from the disease in Liberia (CDC, 2017). The disease made a devastated country by civil war worse and challenged all the societal cohesion. Strained medical and political systems were pushed to the breaking point and resources were taken from other sectors so that people would have the chance to survive.

Local Tribal Governance: Local governing practices in Liberia vary significantly from the USA in practice but will give similar results for the control of property, maintenance of civil harmony and settling of disputes. As outsiders to local civil governance process in rural Liberia, it again enforces the approach of having the Liberians serve as the primary implementers of new curriculum at Betty Memorial Institute. However, as regular visitors to the school, an understanding of local practices and authority figures will be critical to the partnership. Here are some specifics about the local governance of Grand Cape Mound County, Liberia, where Betty Memorial Institute is located. Grand Cape Mound County, Liberia is defined as a governing unit by the federal government of Liberia and it
does operate as such to an extent. However, much of the land usage is governed under tribal code and many new policies that are enacted in the region can be approved by the federal authorities, but not have any clout with the local tribal leaders and vice versa. The challenge is more complicated than getting approval from one government organization or government official but failing to get approval from tribal leaders can often doom projects and cause unneeded suspicion of foreigners, corruption and violence (Maconachie, 2018). The research conducted by Maconachie in the eastern and southern areas of Sierra Leone, which is a geopolitical neighbor to Liberia.

Maconachie’s work was studying the effectiveness of expanding rice production in the inland wetlands of Sierra Leone and all the tribal processes that have been unnoticed in prior government programs. Maconachie researched how the misunderstandings of tribal code can foil even the best of intentions. This is particularly interesting work describing the nuances of tribal life in a geopolitical neighbor; but it is especially relevant when considering the primary ethnic group of Grand Cape Mound County are the Vai people, and the Vai transect
the border of Liberia and Sierra Leone. Figures 1 and 2 above from Ethnologue.com show how the Vai people are represented in both countries. The stars on the map of Sierra Leone are the locations where Maconachie’s group conducted their research amongst the Mande people group. The work of Maconachie is significant because the Vai people are considered a subgroup of the Mande people group, so this common heritage can show proximity in cultural workings (Britannica, 2012). The areas that are highlighted in red on the map in Liberia and Sierra Leone are the areas that the Vai people are predominate.

**Culture:** As mentioned in the section above, Liberian’s have a different cultural expectation regarding governance than Americans; yet this is not the full extent of the cultural differences that need to be understood. We need a more nuanced understanding of the differences between cultures in order to start a vocational education program. The culture of Liberia is very diverse with many different ethnic groups forming the population. Per the website Ethnologue, there are 31 different languages spoken in Liberia. (Ethnologue, 2019). The different languages all stem from different ethnic groups and each group have aspects in common as well as unique cultural variations. Erin Meyer in her book “Culture Map” (2014) catalogs an extensive amount of data from different cultures and compares them against one another. Meyer’s work is not meant to rank one culture as superior or inferior to another, but to form a reference point for which different cultures can begin to understand one another. For example, Figure 3, is a chart that compares a few criteria of how different cultures interact with other one another (Meyer, The Personal Bundle Solution,
2019). The countries being compared are the United States, Ghana and Nigeria. Unfortunately, Erin Meyer and her colleagues have not done cultural research yet in Liberia. Ghana and Nigeria are both West African countries in Sub Saharan Africa and can be used as indicators of culture. Liberia will undoubtedly be different from these two countries in some respects. A further explanation of each criteria of communication is presented later in the paper but the main point that I wish to make is that these countries (Liberia included) will have different cultural expectations than what my culture maintains. For example, the communicating styles vary extremely for the countries compared in the chart, and from my observation, Liberia is similar to Ghana and Nigeria (C. Hartbecke, personal observation, 2018).

Different expectations involving styles of communication will show up in the educational setting. That is why we have chosen the approach of being removed from the day to day education of the students at Betty Memorial Institute. The educational needs of the students will be best suited to be left in the hands of the people that can navigate the differences most adeptly, mainly the teachers at Betty Memorial Institute.

**State of Liberian Education:** After the civil war the country began the process of rebuilding, and several of the important economic markers showed improvement such as

![Diagram showing communication styles comparison]
GDP, per capita income, exports etc, however, there were a few challenges. A very high child birth rate combined with an already depleted adult population from the civil war led to strain on many government services. The high birth rate leads to a youth dependency ratio of 0.82 (Central Intelligence Agency, 2018). This is a slightly obscure statistic stating the ratio of citizens under the age of 15 versus the number over 15. So, for every 100 adults over 15 years, there are 82 under 15 years of age. The United States is dependency ratio is 0.29. The comparatively low number of adults leads to severe strain on all services involved in bringing up the next generation.

Due to the high youth dependence ratio of Liberia, the schools are overwhelmed with young people, combined with how depleted the adult population with a low number of people proficient in teaching. The statistics from UNICEF’s website for Liberia give clear indication of how heavy a burden this is on the education system of Liberia. The literacy rates for men and women are 63.5% and 37.2%, respectively. Primary school participation for men and women is 31.5% and 28.4% respectively. With so many young people and a society that has been damaged from the civil war and Ebola, the default approach to teaching tends to be lecture only. There is not enough staff to allow for creative learning opportunities and hands on experiences.

To continue to frame the need for quality education resources of Liberians, a look into the Human Development Index (HDI) can give a lot of insight. The HDI is a matrix for comparing a country’s life expectancy, the average of years in school completed by the age of 25, and the Gross National Income per capita. These three areas access a citizen’s likeliness to live a long life, receive a quality education and finally, to have a decent standard of living. Values are assigned to the three areas mentioned above and an aggregate range is
given from 0 – 1. The UN Human Development Index for Liberia is 0.435 which is 181 out of 189 countries in the world. The factors that combine to give Liberia this rank are: 1) Liberian’s life expectancy is 63 years, 2) Liberians on average have completed 4.7 years of school by the time they turn 25, and 4) the gross national income per capita is $667. There are many initiatives in Liberia to raise the education level of the citizens, and the project with Betty Memorial Institute is congruent with these initiatives (Ministry of Education, 2016).

Education, specifically in the field of Agriculture, poses a great possibility to the people of Liberia in many ways beyond food security and export revenues. The Ministry of Education sees a need to provide young people with skills to participate in the market place. Through vocational skills training they think that livelihoods of the students will be significantly improved. (Getting to Best Education Sector Plan 2017-2021, 2016). The Ministry of Education of Liberia is seeking to expand the level of vocational education in the field of agronomy for this reason. However, there is a stigma held by Liberians that agriculture is a low skill and low paying profession, with few opportunities. In interviews with ex-combatants from the civil war regarding their aspirations in the coming peace, many respondents did not see agriculture as having enough potential. (Kieh, 2004). Whereas at the time, given how depleted the nation was, there were few options in any fields but agriculture, and even then, respondents could not overcome the mental hurdle of the field (Tefft, 2005). Showing young people the possibilities of Agriculture will be a critical part of the curriculum at Betty Memorial Institute.

Education in a rural school in Liberia is necessary because the rural and tribal regions of Liberia were the most neglected prior to the civil war. This negligence festered and, in the rural areas, opportunistic leaders preyed on this sense of neglect and native tribal peoples put
in with leaders like Samuel Doe and Charles Taylor. Building into these communities will help overcome some of the hurdles of this neglected regions improve opportunities for a peaceful life. (Tefft. 2005).

In addition to the historical slights that led to the Civil War, there is need in working with institutions like Betty Memorial Institute because it is difficult for schools to operate in rural Liberia. This is due to the poverty and poor infrastructure of the rural areas. (Getting to Best Education Sector Plan 2017-2021, 2016). Betty Memorial Institutes teachers generally fall in to two groups. A group of teachers that are 40 year of age or older. These teachers have typically received teacher trainings through local colleges and workshops. The other group of teachers at BMI are former students that have been educated at BMI and have remained to help teach younger students. As BMI has never had a cohort of student s go through all grades yet, these former students are typically highly motivated individuals, but needing refinement in their craft as teachers (C. Hartbecke, personal observation, 2018)

**State of Agriculture in Liberia:** Many crops and industrial products that can be grown in Liberia. Currently, the most common crops grown for food are: rice, cassava, and bananas. For commercial crops the following are produced: rubber, coffee, cocoa, palm oil, sugar cane and timber (World Fact Book, Liberia, 2018). Liberia is a net importer of food. In 2007, 60% of the rice consumed in Liberia was imported; this is despite of over 70% of households involved in agriculture growing rice. (Country Programming Framework Liberia, 2012). In addition to having so many households associated in food production, significant amounts of foreign aid are required to help the poorest in the country obtain the required food (ReliefWeb, 2018). Foreign Food Aid has a mixed history of success, and the
benefits are harder to obtain when the recipient government cannot provide effective
distribution and management of the aid (Srinivasan, 1989).

The agricultural statistics are dominated by the rubber and palm oil production in
Liberia, which does provide a significant export income (World Fact Book, Liberia, 2018).
However, these crops do not provide nutrition for the masses. The agriculture sector for food
production is dominated by smallholder producers who practice subsistence farming.
Liberia’s subsistence farmers are often focused solely on raising just enough food for their
The dichotomy of the two versions of agriculture in Liberia, large plantation and small stake
holder, indicates how much opportunity there are for the small stake holders. This is because
once the limitations are determined, the smaller producers will have paths forward to increase
their own production, expand capacity and potentially begin to have surplus for cash sales.
Most potential for growth will come from these small stake holders because large plantations,
where as they serve a purpose, typically do not lead to sustainable production nor provide
enough income to all parties involved, especially the common laborers (Tefft. 2005).

The root causes for the limits on agricultural production from the small stake holders
includes: limited access to land, productive inputs like fertilizers, credit, training including
the participation of the Liberians in decisions, poor infrastructure, storage, processing and
transportation, high costs of production, and absences of quality control systems. (Country

Programs highlighted by the Ministry of Agriculture that can be used as a guide at
Betty Memorial Institute could include cassava and vegetable production. The program of
the Ministry of Agriculture shows the possibility of equipping rural areas of Liberia with
knowledge and raising food security levels. Here is a quote from the Ministry of
Agricultures website relating to the Smallholder Agricultural Productivity Enhancement &
Commercialization (SAPEC) program:

“Small holder farming households will their transformed Upland rain-fed farms from
subsistence to commercially oriented agriculture through improved crop varieties
with extension services made available. Increase in the formation of farmers base
organization into commercial base organization in managing and producing quality
goods as an enterprise including women, and rural youth in selected crop enterprises
in the target counties.” (Smallholder Agricultural Productivity Enhancement &
Commercialization (SAPEC). 2013)

Additionally, BMI spends a significant amount of money on purchasing food for the
students and staff. In conversations that the visiting team had in August 2018, being able to
raise more of the vegetables, rice and cassava on campus, will lower the financial toll of
providing the nutritional needs of the students. The combination of food production with
education is seen as a possibility for Betty Memorial Institute as the curriculum develops. (E.
Dorley, personal communication, 2019)

Other crops will be assessed and if the staff at Betty Memorial Institute approve of
the implementation of these areas of focus, we can begin developing models for hands-on
learning for any of the areas. An already agreed upon area of focus for Betty Memorial
Institute is cocoa production. The production of cocoa on land surrounding the campus is
projected by the administration to be able to make the school financially sustainable. See the
proposal in Appendix VII. (V. Freeman, personal communication, 2019).

Another agriculture project that Betty Memorial is seeking to work on is raising
coffee. From conversations that a visit group had in January 2019, there are 2 types of coffee
plants that could grow in the soils and climate near Betty Memorial Institute. The local
cultivar names are Liberica and Robusto. Research into best practices for coffee production
and processing will commence. If the administration of Betty Memorial Institute does begin a coffee initiative, the curriculum of the school will be supportive of the project. (E. Dorley, personal communication, 2019)

As Liberia transitions out of emergency relief from the Civil War and Ebola, the country’s natural capacity for food production from the rural elements of Liberia will need to be increased. In the region around Betty Memorial Institute, it is hoped these increases in food production will come about as the teachers at Betty Memorial Institute take on the task of learning and developing curriculum suited for their region and students. The partnership provided will supplement when and where the Liberians choose, with the direction they wish to go.

**Background Conclusion**

The information about how the climate, culture, governance, agricultural practices, and Liberia’s education system brings to the forefront how different this country is compared to the daily life in my home country of America. Without some realization of the difference in culture, climate and geography, any collaborator would be tempted to bring an idea that works well in their home country but could be ill-suited for Liberia. This is the primary reason for the approach that will be taken in this project. The approach will be highly collaborative with the Liberians at Betty Memorial Institute having the approval on curriculum and implementation. It is the Liberians that will know how to navigate the culture and the difficult national history in order to encourage youth of the worthiness of a vocation in agriculture. The Liberians will also understand the crops and the direction that the vocation education should take.
The People Involved

**Varney Freeman:** Varney is native to Grand Cape Mound County. He is from the Vai people group and is a nephew of the local village chief. He is the Senior Pastor of First Baptist Church Mambo and started the boarding school, Betty Memorial Institute in the fall of 2011.

**Queeta Freeman:** Queeta’s work with educating the local youth began before Betty Memorial Institute was officially started. She worked with many of the children in the area giving them lessons in reading and writing. As the need for education was realized, Queeta encouraged the founding of Betty Memorial Institute.

**Cliff and Betty Hobbs:** The Hobbs were missionaries to the village that Varney grew up in during 1980s. Through the work of Betty Hobbs, Varney began to appreciate the significance of education. Betty had a profound influence on Varney for the need of quality education. It is Betty Hobbs that Betty Memorial Institute, is named after. Also through the work of Cliff Hobbs, who has a PhD in Plant Pathology from Texas A & M University, Varney saw the possibility of vocational education.

**Bruce Gregory:** Bruce’s background is manufacturing engineering technology and a Master’s in Career and Technical Education from Ferris State University. With both specialties Bruce also taught at Ferris State University before retiring. Bruce has always had an interest in work on the continent of Africa and spent some time drilling wells in Angola and on a separate project in Liberia in 2013 where he met Varney Freeman. Varney asked Bruce to help organize experts from America in key vocations and bring them to Betty Memorial Institute to work with the teachers as the school expanded.
Matt Wissink: A former student of Bruce Gregory at Ferris State and now a manufacturing/machining engineer at John Deere in Dubuque, Iowa. Matt has often sought out ways to use his technical skills to help others and will be leading the way on the electrical and any mechanical related vocations for BMI.

Bram Ritsema: Another former student of Bruce Gregory at Ferris State University, and currently full time at Mayville Engineering Company as a Tool Build Manager and Welding Engineer. Like Matt Wissink, Bram’s interests include being able to teach manufacturing and electrical skills.

Josh Miller: Graduate of the U.S. Naval Academy where he received a Bachelor of Science in Systems Engineering. His service time highlighted a need for the creation of and aiding of technical education institutes in developing regions. Josh is seeking to pursue a master’s in education policy and leadership while continuing the initiatives started at Betty Memorial Institute.

Corey Hartbecke: Graduate of University of Northern Iowa with a Bachelor of Arts in Bio-Technology. He has worked for a private seed corn company since 2011 in the Quality Control Department. He has been interested in rural development for some time and desires to use skills learned while at Iowa State University to continue to discover how Agriculture can impower people and communities. Currently, Corey’s role is the American lead for agronomy curriculum development.

William B. Brown: Graduate of LISSCOSES Teacher’s College in Monrovia, Liberia with and Associates Degree in Mathematics in 2004. Since 2001, Mr. Brown has been involved in educating young people as a teacher and coordinator.
**Edwin Dorley:** Received a Bachelor’s from Baptist Theology Seminary in 1999 and a Master’s in 2008 from Cuttinton University. Mr. Dorley has been involved in education since 2005.

Here is a time line of events as it relates to developing a vocational education program at Betty Memorial Institute.

![Timeline of Events Between Betty Memorial Institute and American collaborators](image)
Methods and Approach

The process of starting vocation education programs begins with the staff at Betty Memorial Institute. Betty Memorial Institute started in the fall of 2011 but has taken a unique approach to expanding the services provided to students. The first year BMI was operating, the school only had classes for students that were in 1st grade. Upon completion of that school year they kept 1st grade in their offering but expanded to 2nd grade. They have kept adding grades in this incremental fashion ever since. They currently have classes from 1st to 10th grade. All the work being done in vocational curriculum development is for the 11th grade, which will start in the fall of 2019. When the 11th grade begins in fall 2019, the participants will be developing specifics of the 12th grade level for agriculture curriculum, which will start in fall 2020. Betty Memorial Institutes approach to vocational education is approved by the Ministry of Education (MoE) and the MoE has encouraged partnerships with other schools as well (V. Freeman, personal communication, email, 2018). Here are the expected outcomes of curriculum development.

1) Impart practical skills that the young people can use to find immediate employment. Whereas there are some concerns that focusing too much on vocational education at the expense of general education (McMahon, 1988). Betty Memorial Institute has functioned as a learning center since Fall 2011. The past 8 years BMI has focused on general education such as reading, writing, math, literature and critical thinking. After equipping the students in these areas, the staff has decided to prepare their students for the region where the student reside, vocational education will be the best path. This decision is not without its costs.
Vocational education tends to be a more expensive education model than lecture based education because the inputs for the classroom tend to be more expensive as equipment and tools are required for the students to use. Teachers also are typically more expensive to pay because they can work in an industry with their skill (McMahon, 1988). Even with the additional costs, BMI will work towards providing the needed agricultural training that is acknowledged, by the Food and Agriculture Organization of the United Nations, as a critical need for the continued development of Liberia (Country Programming Framework for Republic of Liberia, 2015).

2) Need for keeping the learning modules as hands-on as possible and to not solely rely on lecture. The staff at Betty Memorial Institute is committed to giving an educational experience that allows the students to learn and practice what they are learning. Research has suggested that this method allows students to acquire the following skills in experiential environments: hard work, team skills, personal initiative, communication skills, research and decision making (Reeve, et al 2014). Since Betty Memorial Institute will have hands-on agricultural curriculum, the students will learn practices and procedures but will also be part of the food production for the school. There is a dual reward with these kinds of experiential learning environments. In the case of BMI students, they will learn the requisite skills and also begin to develop a source for the school’s food supply. These locally grown foods will greatly increase the nutritional diversity of the students and alleviate the financial toll of feeding so many students (Reeve, et al 2014).
Currently, Betty Memorial Institute’s largest single cost is providing food for the students.

**Collaborative Development of Agriculture Curriculum Outline:** The approach chosen is one of mutual collaboration on development of curriculum, but only the Liberians will teach the agricultural curriculum. The reason that we see the co-development as so critical is because the Liberians at BMI are highly capable and see the most possibility in their area of work. It is our understanding that the people native to the area are the most adept and skilled at implementation of any project. With this in mind the process for collaboration on the 11th grade curriculum took the following steps. 1) I took the opportunity to formulate a first draft of the outline for the 11th grade school year. See Appendix II. The approach taking in developing the first draft of the outline was primarily one of fostering engagement from the Liberians. The topics initially proposed were not meant to be a completed list but a start of dialogue knowing that the outline needs to be developed primarily but the Liberian teachers.

The outline was shared with the staff at BMI and they acknowledge the receipt of the outline (V. Freeman, personal communication, email, 2018). 2) They kept many of the items on my original outline and then offered their input so that the curriculum will meet their local cultural needs and expectations. The outline which I received back was very impressive, including having been placed onto a template with Betty Memorial Institute’s letterhead (V. Freeman, personal communication, email, 2018). See Appendix III. In the second addition of the outline, the Liberians added many critical areas that I would not have thought of including. Also, the breadth of topics that they wish to offer their students is significant. All these areas show the high commitment to the success of the program. 3) After receipt of the outline I reviewed and found a few more topics that would fit into the course objectives (See
Appendix IV). Receipt of this third outline was acknowledged and is considered the working draft going forward (C. Hartbecke, personal communication, 2018).

Providing Primary Source Materials: After completing the outline, the next step in the process will be to find primary source materials to supplement the teacher’s knowledge. Primary source material was determined to be a key component because teachers stated the difficulty in researching topics in rural Liberia. Cliff Hobbs has provided many peer reviewed scientific agriculture articles, and those have been sent to BMI for the staff to begin reviewing. I have also found several possible textbooks that we are exploring the rights to use them. These materials will help the teachers begin to expand the knowledge that they have.

In searching for articles and textbooks it was important to find authors, research and books that were relevant to the climate of Liberia. It has not always been possible to find articles about Liberian agriculture, but common searches used were “West Africa”, “Tropical Agriculture” and “Sub-Saharan Africa”. It has been important to go to these sources because the material involve crops that are more common to Liberia, practices that are more common and new ideas that can be an improvement to the farming practices in Liberia. Three examples of articles provided that are appropriate to the region are:


Frausin, V., J.A. Fraser, W. Narmah, M.K. Lahai, T.R.A. Winnebah, J. Fairhead, and M. Leach. 2014. God Made the Soil, but We Made It Fertile: Gender, Knowledge, and


After the teachers have reviewed the materials, we will begin the process of filling in the outline with learning objectives following the example of Bloom’s Taxonomy. See Appendix V for discussion of Bloom’s Taxonomy. The learning objectives will give specific direction to teachers about what the students will need to accomplish or demonstrate knowledge of upon completion of each section.

**Bi-monthly Check-in:** To continue the process of developing the curriculum beyond the outline, we have proposed to the Liberians bi-monthly check-ins. This step is still waiting approval from the Administration at Betty Memorial Institute. The goal of these is to systematically go through the outline that has been agreed upon and begin working on learning objectives. The learning objectives will be written over the spring and summer of 2019, to build the agriculture curriculum that will be deployed in fall 2019. The bi-monthly challenges will be conducted through email. The Liberians would initiate writing learning objectives for the first section of the outline and submit them for review. As the process of completing the outline is undertaken, if there are areas that need supplemental research done, the technical experts will contribute their time in order to provide quality primary source materials to help the staff at BMI. The same process of collaborative outline development and bi-monthly challenge, if successful, will be used to develop the 12th grade curriculum, which will be launched in fall 2020.
The Role of the Teacher’s Institutes: The continued refinement of the agriculture curriculum will be done in what we have called Institutes. These are 10-14 day increments where technical experts in the vocational areas visit Betty Memorial Institute and provide intensive learning time. These Institutes are critical components to the collaborative development of curriculum because this time allows technical experts opportunity to work extensively with teachers of the subject matter. Help is provided in navigating the literature about the topic, allowing for questions relating to the field, and sharing career experiences from the technical experts. At the close of the Institute, the teachers can start the process of taking the knowledge that they have acquired and begin lesson planning.

The main parts of the teacher’s institutes are the following:

- Review Bloom’s Taxonomy
  - Bloom’s Taxonomy is the primary method for equipping the teachers at BMI in lesson planning and curriculum development
- Review course outlines
- Write learning objectives for the courses and fill in course outlines
- Perform research on any areas that teachers need additional help in
- Develop homework assignments for the students
- Roll play teaching lessons
- Explore ways to make lessons interactive for the students

There is a current proposed modification to the Teacher’s Institutes that is awaiting Liberian approval. The new process includes a scenario where the American technical experts will research an area in the vocational curriculum. The research can only be conducted while visiting in Liberia. The intent of adding a step like this is to build greater
understanding amongst the technical experts of the means and methods available in rural Liberia for research and self-education. Internet is available in many parts of Liberia, but not readily available at Betty Memorial Institute. This will help calibrate expectations and build greater understanding.

**Sustainable Livelihoods Approach to Measure Outcomes:** As the Agriculture Vocation Education program and Betty Memorial Institute begins to have graduates, a framework to rate effectiveness that we will use is the Sustainable Livelihoods Approach. This method suggests that interplay between different assets that people have can lead to a sustained livelihood. By livelihood, it is meant the capabilities, assets and activities required for a means of living (Serrat, 2017). The assets that are considered needed for a livelihood are:

1) Human capital which include themes like education, knowledge, job skills, health and nutrition.
2) Social capital which includes themes like family connections, friends, kinship. Any network or group of connections that share values and decision making.
3) Natural capital comprises access to land, water and other natural resources.
4) Physical capital incorporates tools, infrastructure, technology consumer products, industrial products, shelter and energy.
5) Financial capital includes saving, access to credit, and wages.

These five definitions of livelihood assets are taking from Chapter five of Knowledge Solutions by Oliver Serrat (Serrat, 2017). The technical experts from the US function predominantly at the Human capital level. Through our investments of time and knowledge, we attempt to raise the human capital of the teachers and students at Betty Memorial Institute by increasing their education and job skills. This needs to be clear in our decisions so that
we can remain focused on what we have been invited to participate in – the formation of a high school agricultural vocational curriculum. We are not able to provide shelter, credit, or wages, nor do we have any social capital in the area. However, it is key to remember that the investment in the human capital of the teachers and students at BMI can factor into lowering their vulnerability.

Vulnerability is defined as the ability of individuals, household and communities to respond to any change from the external environment. Vulnerability has two facets, which are external shocks and internal defenselessness. Internal defenselessness is a factor of how much capital an individual or community has built up in the five areas listed above (Serrat, 2017). If they have high capital in all areas, they will most likely continue to have a high livelihood given that the external shock is not too severe. Low capital in all the areas and even the smallest shock can disrupt their livelihood.

**Cultural Education of American Experts working with Liberian Teachers:** As a core element of this paper reinforces, it will be very difficult for any of the American technical experts to be fully competent on Liberian culture. Being non-experts on Liberian culture can lead to misunderstanding or cause confusion. Because of this, it has been determined that it will be important to limit time with the kids in the school and forgo active teaching. However, we will be working with teachers of a different culture and our time will be limited, and there will be opportunity to have cultural misunderstanding. Cultural sensitivity and awareness will need to be a requirement of any technical expert. In researching how to navigate the realm of culture and communication, we have discovered the work of Erin Meyer and her book and website called “Culture Map”. These tools explore the key areas of
culture as they relate to businesses that work in multiple countries. Erin Meyer defines a few key areas where cultural can be misinterpreted. Here are the areas and a brief description.

1) **Communicating** – Communicating varies widely across different regions of the world. Some societies (like America) prefer direct, clear and implicit communication and are considered to be low-context communicators. In other cultures, the communication is not as direct, and focus needs to be given for subtler cues from the speakers and deemed to be highly contextual. We will need to understand where the Liberians are on this spectrum. (Meyer, 2014, Chapter 1)

2) **Evaluating** – When people need to give or receive bad news, the pattern for how the news is communicated will be different. Some societies prefer to be very direct in giving negative feedback, and the directness will be received and not hurt a long-term friendship. Americans are typically direct in their communication, but often soften their words when given negative feedback. If we are working with a society that values direct negative feedback, by moderating our evaluations because of our American tendencies, our hearers might not think there is a problem. Conversely, we will need to brace ourselves for potentially harsher criticism than we would typically encounter in our American work places (Meyer, 2014, Chapter 2).

3) **Persuading** – Different people groups handle the computation of information differently, specifically as it relates to being persuaded and decision making. Americans, on the whole, are considered to be application based; we typically like to be told the best course of action and then have the arguments presented in support later. A principles-first society will want to see the methods and practices used to discover the facts, and then tie the facts into a course of action. As we work with the Liberians, it
will be critical to understand where they are at on this spectrum in relation to the American technical experts (Meyer, 2014, Chapter 3).

4) **Leading** – Different cultures have varying philosophies of what makes a good leader. Some prefer their leaders to be very egalitarian, meaning deeply involved and personable to their subordinates. Other cultures are more hierarchical and would not think anything at all of a leader that gives direction but then would not contribute to the tasks, leaving the work to subordinates. As we attempt the development of the vocational modules, we cannot ignore that our understanding of what makes a good leader is probably different than the Liberians. We need to develop the type of leadership skills that can be effective in our target culture for the launch of the initiatives to be successful, even if this forces us to lead in a way that is not our normal approach (Meyer, 2014, Chapter 4).

5) **Deciding** – This speaks to how a group of people work to build consensus. Some groups are comfortable with a single person making a decision without any input from the team. Other groups of people would prefer that the decision process include all the members that will be affected by the decision. The buyin from the team will come from having all voices and objections heard and weighed as progress is made toward the final decision (Meyer, 2014, Chapter 5).

6) **Trusting** – This parameter of culture attempts to shed light on how trust is built and fostered. Some societies have a very task-focused form of building trust that revolves around the themes of: Is your work good? Do you contribute? Are you timely in the work? Do you deliver what is promised? After successful contributions, trust is built and maintained; if the work begins to lack, then trust can be lost. However, other societies build trust through personal relationships, and this kind of trust is best
developed outside of the work environment. Sharing stories about family and friends, as well as letting your guard down, are essential ways to build trust. For a task-oriented society, building trust through socializing might seem to blur the lines between the task at hand and personal life, but withholding this time from a relationship-based society can founder the work (Meyer, 2014, Chapter 6).

7) **Disagreeing** – Cultures will disagree in different ways. Some cultures are comfortable disagreeing openly in public and continuing to maintain close ties of trust and rapport. However, other cultures will see a public disagreement as being very offensive towards the accused party, and irreparable harm can be done to the relationship. Yet the inverse can be true that if team members do not raise their concerns in a society that values direct confrontation, they can be perceived as apathetic (Meyer, 2014, Chapter 7).

As mentioned in the background section, Erin Meyer has not done research in Liberia, but it will be helpful for the team members to make observations of Liberian interactions in these areas. We want to see if any challenge in implementing the program, beyond individual miscommunication, indicates a cultural difference. We will also need to take care in making any cultural differences into caricatures. Erin Meyer provides many examples of how cultural hurdles can be identified and how both sides can work through these differences in ways that do not compromise the integrity of either side.

**Process Improvement:** Any iterations of the vocational education will need to be refined and improved. A mechanism for how to improve is being formulated. Key areas to capture feedback will be from the following.
1) We plan on having a feedback session at the end of every Institute where the teachers that are present can give input on the training and can rate the effectiveness of the Institutes.

2) Feedback from the students:
   a. Do they have any suggestions on areas or topics that need to be covered?
   b. Do they have a consistent pattern in which they did not test well that can show a deficient area in the content? As we will not be grading papers, exams or homework, this feedback will need to come from the teachers and their observations, who then can provide correction to the program.

3) Vocational Education Teachers – with their job being the daily challenge of implementing the program, the teachers can be the most sensitive to the needs and deficiencies of the curriculum and content.

4) Future Employers – for businesses that hire students for jobs in the field of agronomy, they can give insight into how the program has prepared the students for the jobs. In addition, having feedback from employers can build social capital between Betty Memorial Institute and these employers. Key questions to have answered from employers of graduates are:
   a. Did the educational background of the student help in selecting them for employment?
   b. Did the student arrive on the job better prepared to execute the tasks of the job, as they relate to agronomy, then other hires without vocational training?
   c. Did the students arrive deficient in a topic that the employer would have expected to be covered in an agricultural vocational education program?
5) Cultural – Evaluation on the effectiveness of how cultural differences are being managed needs to be an active portion of our assessments. Review of the seven areas listed above should be common place so that any new interactions can be properly interpreted, and time can best be used in working respectfully toward our goals of quality vocational education.

6) Sustainable livelihoods approaches – Reviewing the effectiveness in raising the human capital of the students will be measured in many of the categories listed prior. We will also need to measure our effectiveness in staying on task and not accidently delving into other areas of assets and becoming distracted.
Preliminary Results

The partnership with Betty Memorial Institute has generated the following preliminary results:

1) Provided direction to Betty Memorial Institute to begin the vocational education with a section of core competencies in the 10th grade. The areas covered in this section of the curriculum includes measuring length, area, volume, time, speed, weight, temperature, electricity, light and sound. These core competencies are needed in all vocational areas that BMI would seek to operate in. These areas were proposed by Bruce Gregory and agreed upon by Varney Freeman at Betty Memorial (B. Gregory, personal communication, 2018).

2) The First Teacher’s Institute in August 2018 covered the measurement core competencies. The Institute ended with the development of the document called “Betty Memorial Institute – Vocational Educational Module: Measurements”. The structure of this document was provided by Bruce Gregory. During the Institute, the teachers at Betty Memorial were given tools, literature and time to prepare learning objectives for sections 1.E – 1.H and 2.B – 2.H. The outline finalized during this Institute is currently being used for the 10th grade at BMI. The teachers also developed sample assignment sheets consistent with the learning objectives they wrote. See Appendix VI. (B. Gregory, personal communication, 2019)

3) The Second Teacher’s Institute in January 2019 covered additional areas of core competency. The areas covered were: entrepreneurship, safety, 5S and first aid. There were outlines developed similar to “Betty Memorial Institute – Vocational Educational Module: Measurements”. There was also a guided exercise relating to
wiring, where the teachers had to practice self-education to install a water pump in a well. The purposes of this exercise were to show how interactive exercises can be developed.

4) Feedback from Matt Wissink and Bruce Gregory from their time in Liberia in January 2019 indicate that there are some challenges that need to be diagnosed and root problems determined. Feedback on the effectiveness of the August 2018 Institute is suggesting the approaches taken in that Institute did not bring about the goals desired. For example, the August 2018 Institute delved into the area of Core Competencies, such as how to measure length, area, weight, density, etc. As part of the review done in January 2019, students were asked to demonstrate their working knowledge of how to use several of the instruments provided by the school to measure the before mentioned competencies. Students showed little to no working knowledge of how to use the required tools. Moreover, the Liberian teachers are defaulting to a lecture-based model of teaching, despite the clear preference from their administration to use alternative methods.

5) Other findings from interactions with the teachers suggest that Liberians and Americans differ in the areas of trust and evaluation, which impacts communication and implementation of new processes.

a. Trusting – Liberians are very relational and in order to foster trust with the Liberian teachers, American teams might need to seek more relational, non-teaching time in order to build trust. Evidence for this claim was observed during the Teacher’s Institute in 2018 when I would spend time with the teachers either running, watching soccer games or observing them play...
board games. After a few days of spending time outside of the classroom, a teacher commented to me how they liked me more than another member of the team because “he was not around much”. The other member of the team was around just as much but was more often involved in activities relating directly to matters of the Institute. (C. Hartbecke, personal observation, 2018)

b. Evaluating – Liberians, when correcting a fellow Liberian, have demonstrated a more direct approach of evaluation when giving negative feedback than Americans. Evidence of this style of direct evaluation was seen during the Teacher’s Institute in August 2018. Liberian participants were asked to role play how they would teach subjects. Upon completion of the demonstration, feedback from their peers was provided. The Liberians were often direct and animated in their feedback to one another, whereas Americans are more prone to being soft while correcting and typically give a few compliments in areas to encourage the work (C. Hartbecke, personal observation, 2018).

c. Other areas of communication differences are being considered and a more formal undertaking to map the different cultures relative to one another are being explored.

6) The development of the 11th grade outline indicates working through email can be a viable method for collaboration on the curriculum. The dialogue between both parties has been consistent and the progress shown is promising. The whole process of developing the outline took four weeks and three emails. There are also
limitations to email due to limited internet at Betty Memorial Institute. At times in
the planning of the Teacher’s Institutes, emails were not returned promptly as
critical decisions were pending. At these times, phone calls were made between
both parties and decisions were made that way.
Discussion

After 16 months of partnership with Betty Memorial Institute, progress has been made in developing agricultural vocational education. The efforts of the Liberians have been significant to overcome many hurdles. The challenging history of the country pose obstacles, but the staff remain committed to educating the young people of the area. Combined with the incremental approach that Betty Memorial Institute has in adding grades, there is promise that the staff will be able to handle the added logistics of running a vocational program. The combined efforts in developing the 11th grade agronomy outline indicate that a co-development process can work. The original approach to completing the outline was to use a Teacher’s Institute to finish the outline with learning objectives, develop assignment sheets and brainstorm classroom activities. However, there are challenges to the original approach. Time constraints of the American partners, overscheduling tasks in Teachers Institutes, the need to foster year-round learning amongst all parties, and the low effectiveness of the August 2018 Institute need to be readdressed in future efforts. These challenges have informed the proposed change in methodology called the “Bi-Monthly Check In”. This change in approach is attempting to overcome several of the challenges just listed. By exchanging correspondence every two weeks to complete the outline, it is expected to foster year-round learning and activity. This continual engagement with the collaborative development will reduce the tasks needing attention in future Teacher’s Institutes. The reduction in tasks at Teacher’s Institutes will focus the time towards developing hands-on activities, which will reduce the amount of lecture-only lessons, a priority to Betty Memorial
Institut. With simplified goals for Teacher’s Institutes, this can allow for more flexibility relating to the American contributor’s time spent travelling.

The Bi-Monthly Challenge is being proposed in good faith of its success. The correspondence to develop the 11th grade outline is an indication of the possibility. If the proposed change does not completely address the curriculum development challenges above, we will seek new methods to keep making progress.

Greater understanding amongst the American participants is needed in the areas of culture, history, local governance climate, geography, and local crops. These areas are just as critical as outlines, Teacher’s Institutes and Bi-Monthly Challenges. Without sensitivity to the Liberians, the American participants can become ineffective. Work might proceed in inappropriate directions that ignore the local participants. Potentially the process of developing curriculum would manufacture a program that is alien and unimplementable by the Liberian teachers.

This is the primary reason that the multi-disciplinary approach is being taken. The areas that American Technical experts are to be aware of are the history of Liberia, climate, geography, Liberia’s educational system, local governance, agricultural practices, and Liberian culture. Being knowledgeable in these areas will increase the effectiveness in American partners to see and understand the proposals of their Liberian colleagues. With the greater understanding of the Liberian partners, the contributions of the American technical experts will have more relevance.

With the initial preliminary results, the members are committed to developing relevant agricultural curriculum with Betty Memorial Institute and will continue to adjust and make improvements to the program. The opportunity that the Liberians see in their future with
vocational education in general, and Agricultural Vocation Education specifically; is reinforced by many voices (Tefft, 2005; Konneh, 2009). Others see the education of the rural elements of Liberia as a critical component to the healing of the past wounds that lead to the Civil War (Kieh, 2004). Additionally, the population growth in Liberia is going to bring about needed increases to food supply. To increase the food security of Liberia, programs that involve Liberians are essential (Stockings, 2003; Ministry of Agriculture 2014).

The approaches taken at Betty Memorial Institute, if time proves them to be successful, have larger implications beyond just rural Liberia. Raising the human capital of the youth can impact the nation, the region, and the continent of Africa in the next 30 years. The population increases that the continent will experience may require multidisciplinary and collaborative approaches to be replicated in many regions of the continent. Other regions of the world also have challenging histories like Liberia. Histories of civil war and epidemics challenge societies like Syria, Cambodia, the Democratic Republic of the Congo and Somalia, to name a few. Partnerships that seek to understand the local voices, experiences, history and cultures could benefit agriculture education programs in these countries as well.
Conclusions

The goal of the project is to develop an 11th and 12th grade vocational education curriculum at Betty Memorial Institute. In developing this paper, I have delved into many areas beyond agronomy. These areas have included history, tribal governance, culture, education, climate, geography and education. All these areas inform the holistic and collaborative approaches being taken in the work at Betty Memorial Institute. The literature reviews clearly recognize that educational approaches which integrate, respect and value indigenous African input are the path forward for the continent (Stocking, 2003). In working towards the goal of developing the agriculture curriculum I have contributed research time to topics of culture, finding scientific articles that can help build knowledge of tropical agriculture and I have contributed to the development to the 11th grade agronomy outline. In learning methods that are holistic, I have researched development practices such as the Sustainable Livelihoods approach and will work for their implementation at Betty Memorial Institute. Pursuing the goal has required both a multidisciplinary and collaborative approach with the Liberian teachers. Our partnership with Betty Memorial Institute will be far more effective and successful by understanding and respecting the local historical, cultural nuances and meeting the educational goals of the country while fostering the developing the agronomy curriculum.

Through successful collaborative partnership, the rural elements of Liberia can have years of educational neglect remedied (Kiek, 2004). The remedying of the neglect can give the youth of this rural portion of Liberia another tool for a sustainable life (Serrat, 2017). The young people educated in relevant agriculture practices can become contributors to their communities and to the larger society as Liberia seeks to foster food security and end the
need for foreign food aid (Ministry of Agriculture, 2014). These achievements of addressing education neglect while raising human capital by educating youth, are a long-term strategy for addressing food security
References


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World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100 | UN DESA
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Permission to use an image
3 messages

Corey Hartbecke contact@yourculturemap.com
Wed, Feb 27, 2019 at 6:53 PM

Good evening,

About a month ago I created a culture map between the United States, Nigeria and Ghana. I saved the image for use in dissertation, which is about starting a vocational education program in a rural school in Liberia. I mean to use the image as a reference on how understanding cultural interactions will be critical in the work of developing our curriculum.

Let me know your answer.

Corey Hartbecke

Eric Meyer
To: Corey Hartbecke
Thu, Feb 28, 2019 at 2:33 AM

Hello Corey,

You are more than welcome to use the map as long as you make mention of where it came from.

Good luck with your dissertation!

Regards,

Eric Meyer
The Culture Map
Appendix II

From: Corey Hartbecke  
Subject: Draft outline for BMI Ag Vocation training  
Date: October 14, 2019 at 10:31 AM  
To: Varney Freeman  
Cc: Matt Wasink; Bruce Gregory

Varney,

See below a sample outline for the Ag Vocation Education. Please review it and see if the topics covered will be relevant. Can you copy in an teachers that will be going through the material as well so I can get their feed back? Once you have a chance to review and share your thoughts, I have a few follow up questions.

Corey Hartbecke

1) 11th grade curriculum

   a. Understanding of Liberian Climate

      i. Review of wet season

         1. Cover temperatures, rainfall amounts and dates
         2. Go over crops that grow well during this season

      ii. Review of dry season

         1. Cover temperatures, rainfall amounts and dates
         2. Go over crops that grow well during this season

      iii. Cover the effects of temperature, moisture and light on seedlings and young plants

      iv. Plants different crops in cups and place cups in areas of darkness and monitor response

      v. Plant different crops in cups and over water to the point of soil saturation and monitor response

      vi. Place different crops in cups and place areas of different temperature and monitor response.

      vii. Introduce the idea the plants are photosynthetic

         1. Plants are using light, water and CO2 to produce sugars
         2. Most of the mass of a plant comes from where? The atmosphere!

   b. Introduce the basics of soils and types

      i. Clay, loam and sand

         1. Have the students find areas at BMI that might have one or 2 of these types

      ii. Components of soils

         1. Organic matter, parent material, minerals, air and water

      iii. Define saturated soils regarding water

         1. Be able to answer the following ideas

            a. What happens to the space between soil particles?
            b. What happens to the amount of water in the soil?
            c. What happens to the amount of oxygen in the soil?

   c. Overview of what crops can be grown in Liberia

      i. Coco, coffee, bananas, palm trees, vegetables, cassava, rice

      ii. Introduce the idea of meeting needs

         1. What crops are needed in your area and what obstacles are present to growing?

   d. Geography of Liberia
i. General review of the regions of Liberia
   1. Jungle, bush, coastal areas, mountains
   2. Describe subtle differences in how soils, climate and crops vary in each region.

ii. Given what we have learned about climate, the native crops and soils are their regions of Liberia that are good for growing a crop.

iii. Think critically about why these regions are suited for such a crop.

iv. Threats to crops
   i. Weeds, Insects and disease
   ii. Understand the vectors and sources of each
   iii. Understand the means to control each.
      1. Control including chemical but also beyond chemical control.
   iv. Provide a list of common insects with pictures
   v. Provide a list of common weeds with pictures
   vi. Provide a list of common plant diseases for the primary crops with pictures
      1. Mosaic viruses, rusts, stalk/stem rots, root blights etc.
Appendix III

PLANT SCIENCE
I. Introduction
II. Ecological Requirement
   a. Climate
   b. Latitude / Attitude
   c. Soil Requirement

III. Economic importance of crops
   a. Crops as a source of food
   b. Crops as source of Revenue
   c. Agricultural and industrial development

IV. Agricultural system
   a. Shifting cultural System
   b. Crops Rotation
   c. Mixed Farming

V. Identification of various crops
   a. Vegetable crops
   b. Leguminous crops
   c. Tree crops
   d. Others crops

VI. Principles of crop production
   a. Seed selection
   b. Quality of a good seed
   c. See storage
   d. Sowing of seeds
   e. Vegetable Propagation

VII. Management/Maintenance Practices
   a. Weed and control
   b. Fertilizer Application
   c. Pest and Disease control
   d. Other management/ maintenance

SOIL SCIENCE
I. Introduction
   a. Historical Highlight

II. Composition of soils
   a. Inorganic material
   b. Organic material
   c. Water
   d. Rock formation
      ➢ Sedimentary rock
      ➢ Igneous rock
      ➢ Metamorphic rock

III. Soil Formation
   a. Factors of soil formation
      ➢ Parents material
      ➢ Climate
      ➢ Organism
b. Weathering
   ➢ Physical
   ➢ Chemical
   ➢ Biological

c. Soil profile
d. Soil Physical and Chemical properties
   ➢ Horizon
   ➢ Soil characteristics
   ➢ Color
   ➢ Texture
   ➢ Soil structure
   ➢ Consistence
   ➢ Bulk density

e. Soil chemical properties
   ➢ Cat ion Exchangeable capacity (CEC)
   ➢ Oil Reaction (PH)

IV. Methods of replenishing lost nutrient in the soil
Factors affecting nutrients availability in the soil
   ➢ Organic Agriculture

➢ Organic farming, it’s importance

V. Irrigation
a. Surface irrigation
b. Overhead irrigation
c. Underground irrigation
d. Importance of irrigation etc.

VI. Soil Uses
a. Erosion
   ➢ Soil conservation
   ➢ Soil management

VII. Maintenance of organic matter
   ➢ Nutrient supply
   ➢ Soil pollution
   ➢ Pesticide residues
   ➢ Soil acidity adjustment

viii. Mechanical control of Erosion
   a. Plant Nutrition
   b. Essential Nutrient in plant
   c. Soil nitrogen

ix. Fertilizers
   a. Calculating nutrient requirement
   b. Selecting fertilizer types, timing and methods of application
   c. Materials in fertilizers mixture
Appendix IV

PLANT SCIENCE
I. Introduction
   a. Importance of Agriculture
   b. Possibilities of Agriculture
II. Ecological Requirement
   a. Climate
   b. Latitude / Attitude
   c. Soil Requirement
III. Economic importance of crops
   a. Crops as a source of food
   b. Crops as source of Revenue
   c. Agricultural and industrial development
IV. Agricultural system
   a. Shifting cultural System
   b. Crops Rotation
   c. Mixed Farming
V. Identification of various crops
   a. Vegetable crops
   b. Leguminous crops
   c. Tree crops
   d. Others crops
VI. Principles of crop production
a. Seed selection
b. Quality of a good seed
c. See storage
d. Sowing of seeds
e. Vegetable Propagation
VII. Management/Maintenance Practices
   a. Weed and control
   b. Fertilizer Application
   c. Pest and Disease control
d. Other management/ maintenance

SOIL SCIENCE
I. Introduction
   a. Historical Highlight
II. Composition of soils
   a. Inorganic material
   b. Organic material
   c. Water
d. Rock formation
   ➢ Sedimentary rock
   ➢ Igneous rock
   ➢ Metamorphic rock
iii. Soil Formation
   a. Factors of soil formation
   ➢ Parents material
- Climate
- Organism
- Relief/ topography
- Time

b. **Weathering**
   - Physical
   - Chemical
   - Biological

c. **Soil profile**
d. **Soil Physical and Chemical properties**
   - Horizon
   - Soil characteristics
   - Color
   - Texture
   - Soil structure
   - Consistence
   - Bulk density

e. **Soil chemical properties**
   - Cation Exchangeable capacity (CEC)
   - Oil Reaction (PH)

**IV. Methods of replenishing lost nutrient in the soil**
Factors affecting nutrients availability in the soil
   - Organic Agriculture

- Organic farming, it’s importance

**V. Irrigation**
   a. Surface irrigation
   b. Overhead irrigation
   c. Underground irrigation
   d. Importance of irrigation etc.

**VI. Soil Uses**
   a. Erosion
   - Soil conservation
   - Soil management

**VII. Maintenance of organic matter**
   - Nutrient supply
   - Soil pollution
   - Pesticide residues
   - Soil acidity adjustment

**VIII. Mechanical control of Erosion**
   a. Plant Nutrition
   b. Essential Nutrient in plant
   c. Soil nitrogen

**IX. Fertilizers**
   a. Calculating nutrient requirement
   b. Selecting fertilizer types, timing and methods of application
   c. Materials in fertilizers mixture

**VII. Process improvement and research methods**
Appendix V

Blooms Taxonomy

There is a heavy focus on Bloom’s taxonomy and working the students through the Bloom’s levels in a systematic fashion. Bloom’s Taxonomy was originally developed by Benjamin S. Boom in the late 1940’s and early 1950’s but then revised in the early 2000’s (Krathwohl, 2002). The goal of Bloom’s Taxonomy is to organize learning into levels that can have specific learning objectives associated with the level. The original Bloom’s had six categories: 1) Knowledge, 2) Comprehension, 3) Application, 4) Analysis, 5) Synthesis, and 6) Evaluation. The revised approach kept these six cognitive categories but renamed them: 1) Remember, 2) Understand, 3) Apply, 4) Analyze, 5) Evaluate and 6) Create. In addition to these 6 cognitive categories, the revised Blooms added a Knowledge dimension with 4 areas: 1) Factual Knowledge, 2) Conceptual Knowledge, 3) Procedural Knowledge and 4) Metacognitive Knowledge (Krathwohl, 2002). Below is a chart that is used extensively in the Institutes to help refine the learning objectives that the teachers are writing. Each category in the Cognitive and Knowledge dimensions builds on the level below so that a student cannot have mastery of Cognitive level 3 “Apply”, without first having gone through Remember and Understand. An example would be that a student is not capable of knowing how to apply use of a hammer to drive a nail, without having gone through Cognitive level one “Remembering” what a hammer is and then subsequently Cognitive level 2 “Understanding” knowing what a hammer is used for. So once a student knows what a hammer is and what it is used for, can a student then be taught how to use a hammer.

This is a basic example and it shows how we are implementing this teaching plan because we intend to facilitate the transmission of vocational skills from technical experts, to
the teachers and ultimately to the students. During the Teachers Institutes, we spend a significant amount of time writing learning objectives for every Bloom’s level that we want students to have mastery in. These learning objectives seem to be tedious in writing and refining, but critical in setting the direction of the curriculum. Simply put, a learning objective is a statement that contains a noun relating to the subject matter and a verb stating what the student is to do with the noun. Another example is: A student will be able to define what soil organic matter is. The noun relating to the subject matter is soil organic matter, and the verb/action is that the student will be able to define what soil organic is.
A statement of a learning objective contains a verb (an action) and an object (usually a noun).

- The verb generally refers to [actions associated with] the intended cognitive process.
- The object generally describes the knowledge students are expected to acquire or construct. (Anderson and Krathwohl, 2001, pp. 4-5)

In this model, each of the colored blocks shows an example of a learning objective that generally corresponds with each of the various combinations of the cognitive process and knowledge dimensions.

Remember: these are learning objectives—not learning activities. It may be useful to think of preceding each objective with something like: “Students will be able to…”


Figure 5 Source - Revised Bloom’s Taxonomy, 2012.
Appendix VI

Shared with permission from Bruce Gregory (B. Gregory, personal communication, 2019)

COURSE OUTLINE
MEASUREMENTS

Vocational Education Learning Module: Measurements
Grade Level: Tenth
Prerequisite: Completion of 9th grade
Teacher (s): ____________________________

Description:
How big is the biggest thing? How small is the smallest thing? How far away is the farthest
away thing? How much water is in the ocean? How much water is in a bucket? How far is it
around the earth? How far is it to Monrovia? How would you answer these questions?
Measurement of course.
The next three marking periods explore the field of measurement. In order to understand
something, one must be able to measure it. All fields of study require measurement in some
form. The ability to quantify or qualify an outcome is vital to understanding. At the conclusion of
this course, students will be able to choose measuring tools and apply them correctly when
taking measurements related to Domestic Science, Agriculture, Electrical, Mechanics, and
Construction. Moreover, the student will be able to explain measured results to others in an
effective manner.

Resources:
• All measuring equipment and notebooks are provided by BMI

Class Structure:
• Lecture: 1 hour per day/ two days per week
• Hands on (Lab): 1 hour per day/ three days per week

Units of Study:
At the conclusion of this course the student will:

1. Base Measurements
   a. Understand the difference between Base Measurements and Derived Measurements
   b. Time
      i. Know the terms and units associated with the measurement of TIME.
      ii. Be familiar with common time measuring devices (e.g. the sun or a stopwatch).
      iii. Be able to set digital and analog countdown timers to a prescribed amount of time.
      iv. Be able to use a timepiece to measure the time duration of a task.
      v. Be able to estimate a ten second time interval to within +/- 1 second without the use
         of a timepiece.
      vi. Understand that errors in measurement will always exist.
      vii. Understand the importance of keeping track of units on all numbers.
c. Distance
   i. Know the common terms and units associated with the measurement of
      DISTANCE (large distances, small distances).
   ii. Understand the concept of distance and the importance of knowing how far or
      close things are.
   iii. Identify different distance measuring devices from an assortment of measuring
      instruments.
   iv. Be able to use a steel rule, tape measure, and flexible tape to determine the length
      or width or height of various objects and know the appropriate units for those
      measurements.
   v. Be able to estimate distances between objects and understand consequences that
      might be associated with poor estimation.
   vi. Be able to select the most appropriate measuring device for measuring the
diameter of a cylinder given an assortment of gauges that include a scale, transfer
   caliper, vernier caliper, dial caliper, digital caliper, and micrometer.
   vii. Select and use the most appropriate measuring device for determining the
diameter of a round hole.
   viii. Observe a demonstration by the teacher on the use of a Non-Contact Laser
      rangefinder to measure linear distance.
   ix. Understand that errors in measurement will always exist.
   x. Understand the importance of keeping track of units on all numbers.

d. Weight
   i. Know the definition of mass and how weight is related to it.
   ii. Know key terms related to weight.
   iii. Given an array of weighing devices, identify them by name.
   iv. Be able to make conversions between units within the metric system.
   v. Be able to make conversions between English and metric units of weight.
   vi. Be able to use various weighing devices as provided in class.
   vii. Be able to select the most appropriate weight measuring device from those
      available to complete a weight measuring task.
   viii. Understand that errors in measurement will always exist.
   ix. Understand the importance of keeping track of units on all numbers.

e. Temperature
   i. Know the concepts related to heat.
   ii. Know the three scales, Kelvin, Celsius (centigrade), and Fahrenheit, used to
      quantify the amount of heat present.
   iii. Compare the three scales at the points where water freezes or boils.
   iv. Be able to convert temperature measurements from one scale to another.
   v. Given an array of temperature measuring devices, identify them by name and type,
      whether analog or digital.
   vi. Check temperature measuring device calibration following the process instructions
      provided by instructor:
      1. At freezing point of water
         a. NOTE: it may not be possible to check both points on the same gauge.
2. At boiling point of water
vi. Be aware of risks in various industries associated with temperatures that are too high or too low.
vii. Understand that errors in measurement will always exist.
ix. Understand the importance of keeping track of units on all numbers.
f. Electricity
i. Know common uses of electricity in construction, agriculture, domestic science, mechanics and electrical fields.
ii. Know the symbols for voltage, resistance, and current.
iii. Be familiar with ohm’s law.
iv. Identify common tools used for measuring electricity and the individual components of an electric circuit.
v. Be able to determine if an electrical circuit has continuity using a Volt-Ohm-Meter (VOM).
vi. Be able to measure current flow through an electrical conductor using a clamp style ampere meter.
vii. Determine the voltage output of a typical generator.
viii. Be able to explain the purpose of a non-contact voltage sensor.
ix. Understand that errors in measurement will always exist.
x. Understand the importance of keeping track of units on all numbers.
g. Light
i. Know the concepts related to light
ii. Know the units associated with measuring light intensity
iii. Be able to measure light intensity from a variety of light sources using a digital light meter.
iv. Recognize hazards associated with light intensity.
v. Understand that errors in measurement will always exist.
vi. Understand the importance of keeping track of units on all numbers.
h. Orientation/Direction
i. Define orientation (as it relates to measurement)
ii. Know and understand the units of orientation measurement (degrees)
iii. Identify devices used for determining orientation of an object as being level or plumb (horizontal or vertical).
iv. Identify devices used for determining the angular relationship between two objects.
v. Understand the concepts of:
   1. Relationship to Horizontal (level)
   2. Relationship to Vertical (plumb)
   3. Bubble levels
   4. Digital levels
vi. Be able to measure the angle between fixed, rigid and straight objects to within +/- 2 degrees using a digital level.
vii. Be able to measure the angle between two straight, rigid objects using a protractor to within +/- 2 degrees.
viii. Understand that errors in measurement will always exist.
ix. Understand the importance of keeping track of units on all numbers.
x. Recognize an ordinary compass when seen
xi. Understand the purpose of a compass
xii. Be able to orient a compass to magnetic north
xiii. Be able to point out the North Star on a clear evening in the Northern Hemisphere
xiv. Understand why magnetic north and the north star do not line up in Liberia.
xv. Be able to correct for magnetic declination in Liberia
xvi. Be able to navigate a 4-point course on BMI campus using a compass
xvii. Understand that errors in measurement will always exist.
xviii. Understand the importance of keeping track of units on all numbers.

2. Derived Measurements
   a. Area
      i. Know what area is, (meaning/definition)
      ii. Define area as it relates to squares, triangles, rectangles and circles (known as regular shapes)
      iii. Be aware that area is a derived measurement
      iv. Identify squares, triangles, rectangles and circles
      v. Name three units of area in both the metric and English Systems.
      vi. Be familiar with measuring instruments used to determine area.
      vii. Be able to calculate the area of a given triangle, rectangle and circle.
      viii. Be able to calculate the area of a given irregular shape:
         1. That can be divided into exact regular shapes
         2. That cannot be divide into exact regular shapes
   ix. Understand that errors in measurement will always exist.
   x. Understand the importance of keeping track of units on all numbers.
   b. Volume
      i. Define volume as it relates to three dimensional shapes.
      ii. Identify the difference between regular and irregular three-dimensional shapes.
      iii. Determine the appropriate units of volume measurement for regular and irregular shapes of volume
      iv. Given a variety of instruments, identify instruments used to measure regular volume
      v. Given a variety of instruments, identify instruments used to measure irregular volume
      vi. Be able to solve volume problems related to regular and irregular shapes as discussed in class.
      vii. Understand that errors in measurement will always exist.
      viii. Understand the importance of keeping track of units on all numbers.
c. Density
   i. Know what is meant by the term DENSITY.
   ii. Know the terms and units associated with density.
   iii. Recognize the formula and units for density.
   iv. Be able to calculate the density of a substance given its mass and volume.
   v. Recognize the general expression for density regardless of units.
   vi. Changes in density
      1. Understand material density can change
      2. Be able to evaluate density differences between various materials. (high density materials, low density materials)
      3. Be able to change the density of a given material provided by the instructor.
   vii. Be able to state why density is important in various industries, including agriculture, mechanics, construction, electrical and domestic science.
   viii. Understand that errors in measurement will always exist.
   ix. Understand the importance of keeping track of units on all numbers.

d. Speed
   i. Define speed and identify the units for speed as it relates to a moving object
   ii. Observe a demonstration of speed given a defined distance in a specified walking time
   iii. Be familiar with the formula for calculating speed.
   iv. Recognize that any distance divided by time represents speed, regardless of units.
   v. Be able to calculate the proper speed of a given problem/object
   vi. Understand that errors in measurement will always exist.
   vii. Understand the importance of keeping track of units on all numbers.

e. Torque
   i. Define torque with respect to common fasteners used in the fields of agriculture, construction, domestic science, electrical and mechanical fields
   ii. Be able to explain why an understanding of torque is important in mechanics, agriculture, construction, electrical, and domestic science.
   iii. Be familiar with the terms, units and formula associated with torque.
   iv. Identify torque measuring devices from amongst an assortment of measuring tools
   v. Understand that different fasteners of different sizes and materials having different torque specifications
   vi. Be able to use various torque setting tools to set torque on threaded fasteners commonly found in the agriculture, construction, domestic science, electrical and mechanical fields.
   vii. Understand that errors in measurement will always exist.
   viii. Understand the importance of keeping track of units on all numbers.

f. Sound
i. Know the unit of sound is the decibel, dB
ii. Be able to reference sound intensity standards for safe usage of noisy equipment used in construction, agriculture, mechanics, electrical, and domestic science.
iii. Be able to measure sound intensity of a variety of sources, using a digital sound meter.
iv. Understand that errors in measurement will always exist.
v. Understand the importance of keeping track of units on all numbers.
g. Revolutions per Minute (RPM)
i. Know what RPM means, (definition/meaning).
ii. Be able to identify the RPM of rotating objects.
iii. Be familiar with those instruments used to measure RPM.
iv. Be able to measure RPM using a laser tachometer.
v. Understand that errors in measurement will always exist.
vi. Understand the importance of keeping track of units on all numbers.
h. Pressure
i. Define pressure as it relates to construction, agriculture, domestic science, electrical and mechanical fields.
ii. Be familiar with different kinds of pressure such as:
   1. Atmospheric
   2. Human blood pressure
   3. Fluid pressure
iii. Be familiar with the formula for pressure
iv. Be able to measure pressure using provided pressure measuring instruments in all the related vocational disciplines at BMI.
v. Be able to measure the atmospheric pressure at BMI, using a barometer.
vi. Understand that errors in measurement will always exist.
vii. Understand the importance of keeping track of units on all numbers.
Appendix VII
Share with Permission from Varney Freeman (V. Freeman, personal communication, 2019)

Sustainability For Betty Memorial Institute

Ever since the idea of Betty Memorial Institute was conceived, there was also the concern about the sustainability of the operations and ministry at BMI. There could be several things we can do, but what seems to be suitable is the idea of planting the “Improved Cocoa Plant”. Betty Memorial Institute (BMI) owns 50 acres of land. Currently, the BMI facility occupies less than 10 acres. We can invest in Cocoa Plantation on twenty (20) acres of the BMI land. 20 acres will grow eight thousand, eight hundred and eighty cocoa trees (444 trees per acre). In about 3 years the improved cocoa begins to produce. The improved coco can produce or be harvested twice a year. Betty Memorial Institute could earn about US$20,000.00 to US$25,000.00 each year and 10% of intake from the Cocoa Plantation will go towards ministry work in Grand Cape Mount County to the glory of God.

God’s work in Grand Cape Mount County- Liberia is blessed with an elderly American (Earl Worthington). He always says (I am paraphrasing), “Varney- people get old and people die- what are you doing to sustain the work and ministry in Grand Cape Mount”. I strongly believe this statement, and already many of you have expressed your desire for sustainability for BMI and ministry work in Grand Cape Mount County. Therefore the responsibility is ours to participate towards that sustainability.

Early this year, we began speaking with several persons on the production of Cocoa. The improved cocoa plant is mainly from Ghana and farmers tell me we have to import it from Ghana. Recently, through the recommendation of my junior brother- Foday Freeman (Foday works for the Liberia Cooperative Development Agency (CDA) and they do a lot of work with farmers and agricultural groups.) I met with a cooperative group and through some interactions, the Betty Memorial Institute Cocoa Plantation have started. The Cooperative group is charging minimum costs and is pre-financing the work at BMI.

The Cooperative group had several cocoa seeding on nursery already, and was willing to give 200 of those seeding to BMI. They also have assigned a Manager to the BMI Cocoa plantation.

So far, the initial expenses incurred by the BMI Coco plantation is as follow:

1. 200 cocoa seeding @ $0.50 each ...................................................

2. Transportation of cocoa to BMI ...................................................

3. Clearing and pecking of soil for 200 coco plants ............... $210.00

4. Manager’s expertise and compensation for September ...... $70.00

Total ........ $435.00

Minus transportation ..... $55.00

Total Balance ........ $380.00

Again, this is a privilege that our faith could not allow to pass by. BMI cocoa plantation is up and going with 200 plants already in the field. $380 to be paid by the BMI Cocoa plantation.
As seen below, men at work clearing the area for 200 coco plants:

The transplanted cocoa plants already taking roots:

BMI Cocoa plantation prepares its Nursery Site

We are preparing a nursery site for 5000 cocoa seeding. These 5000 seeding will stay on the nursery between 4 to 6 months. Hopefully we will begin to transplant these in June 2016. Therefore for the next ten Months the BMI Cocoa plantation will incur the following expenses:

1. Clearing and preparing of Nursery site ................................................................. $65.00
2. 5000 Cocoa seeds (US$0.10 each) ................................................................. $500.00
3. Water supply machine for watering seeding at nursery .................................. $275.00
4. Monthly compensation for Manager for 10 Months (US$70 per month)........... $700.00
5. Preparing the site where seeding would be transported (January to April-Estimated 150 monthly ................................................................. $450.00
6. Initial Expenses to get the first 200 seeding planted .................................................. $380.00

| Total Cost | $2,370.00 |

Again, this is a step of faith. We are trusting that some of you will be led to join in establishing a cocoa plantation for the sustainability of Betty Memorial Institute and support to Ministry work in Grand Cape Mount County.