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PALM TO PALM: SUSTAINABLE DEVELOPMENT IN SIERRA LEONE AND THE IMPACT OF THE EBOLA OUTBREAK

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ABSTRACT

Palm to Palm (P2P) is an economic development project that aims to put the people of Kono District to work by producing products (palm oil and palm kernel soap) that are used by the residents of Kono. P2P's slogan "By the people of Kono, for the people of Kono" therefore reflects the project's multiple goals: producing products the residents of Kono use daily in a sustainable manner. Producing these products in a sustainable fashion will help build an economy in Kono (and Sierra Leone) that is based on the extraction of renewable products. In 2014, the production of palm kernel soap gained increased importance due to the Ebola outbreak and the potential link between soap production and health.

Sustainable supply chain, palm kernel soap, Sierra Leone, Ebola

INRODUCTION

The Palm to Palm project (P2P) began in 2010 as a micro-scale economic development project in Koidu Town, the capital of the Kono district of Sierra Leone. The project employs local residents to transform the fruit of the oil palm tree into palm oil and palm kernel soap to be sold in the surrounding region. The twin goals of P2P are:

1. Produce products in a sustainable fashion that can be used by the people of Kono and Sierra Leone.
2. To provide for the employment and self-determination of the people of Kono.

These twin goals lead to P2P's slogan: "By the people of Kono, for the people of Kono". By producing and marketing palm kernel soap P2P helps the people of Kono maintain proper hygiene and therefore may help reduce disease. This paper documents progress on the project in 2014, a year that saw an Ebola outbreak ravage Sierra Leone and nearby countries and

significantly impact P2P. The paper is organized as follows: This introduction will review related literature on sustainable economic development in West Africa and the corresponding challenges and opportunities. The second section will outline progress and the impediments thereto experienced in 2014. The third section will look at definitions of sustainability and how they fit this project. The fourth section will briefly discuss the impact of the Ebola outbreak on the project, and the conclusion will review lessons learned in 2014 and possibilities for future work.

A century after the “Scramble for Africa” saw Europe’s major powers annex large tracts of the African continent and implement policies that resulted in peasant formation, “...the imposition of structural adjustment programs (SAP) from the mid-1980s to the mid-1990s amounted to a drastic undermining of most peasants’ capitalized production through the removal of subsidies on improved inputs such as fertilizers, seeds and pesticides.” [1] This further exacerbated the deagrarianization that had begun with the Industrial Revolution. [1] Before we further investigate the impact of structural adjustment programs, let us review the four main characteristics of peasantries, as identified by Shanin and relayed by Bryceson [1]:

“First, [peasantries] share the pursuit of an agricultural livelihood combining subsistence and commodity production. Second, their internal social organization revolves around the family as the primary unit of production, consumption, socialization, welfare and risk-spreading. Third, they are externally subordinated to state authorities and regional or international markets that involve class differentiation and transfers of tax and profit. Fourth, they reside in rural settlements, be they widely dispersed or nuclear villages, and they are often identified with a traditional conformist attitudinal outlook relative to more urbanized populations.”

Why are the characteristics of peasants important? After nearly a century of deagrarianization, structural adjustment programs brought depeasantization to Africa. Depeasantization represents “...a specific form of deagrarianization in which peasantries lose their economic capacity and social coherence, and shrink in demographic size relative to non-peasant population.” [1] Since peasantries, as indicated above, are largely organized around the family model, structural adjustment programs have had a significant social impact while simultaneously drastically changing the economic viability of smallholder agrarian enterprises (i.e., family farms). The result was that peasants have gravitated to activities that “...are highly opportunistic in nature, involving quick responses to market demand and supply.” [1] Another result was that family members’ ability and willingness to make decisions in the long-term strategic interests of the familial economy was reduced. This exacerbated income and wealth stratification among peasant populations in the affected countries, thereby compounding depeasantization without moving to a more sustainable model. [1] Simultaneously, SAPs heavily benefited large-scale operations whose (mostly male) owners were enticed to ensure the receipt of large government benefits via bribes and other corruption. Since the dawn of the 21st century, therefore, there has been a distinct shift away from SAP programs. The new policies that have been adopted have been based on the work of people like Bryceson [1], whose policy suggestions include:

- (a) *Retaining agricultural foundations*: Support for agricultural policies that encourage food self-provisioning vs. export production, as the ability for Africa’s export production to compete against the new low-cost producers (e.g., in Asia), is very questionable. Such policies would also support the peasant/familial

economic unit through the return of input subsidies, so the lion's share of benefits from such "food-first" policies will not flow to larger-scale farmers.

- (b) *Unscrambling and improving current livelihoods*: Given the relatively small amount of resources devoted to maintaining and improving the lot of peasants through the 1980s and 1990s, any progress that did occur during this time tended to be the result of trial-and-error approaches, which are costly in time and money. Better and more efficient methods of identifying and promulgating advances need to be identified. Such advances will allow peasants to envision and develop careers instead of pursuing short-term cash-generating activities that are detrimental to the long-term health of the peasant/familial economic model.
- (c) *Heading for the future*: Bryceson identifies the following areas where long-term decisions and/or investments should be made: primary and secondary education, assessing geographical comparative advantage in the search for local specializations, rural land tenure, and infrastructure improvements in the rural regions where peasants are found.

Additional resources concerning the rethinking of structural adjustment programs include [2], [3], and [4].

Why the focus on sustainability? Why the focus on the smallholder model? The focus on sustainability arises from dual concerns about the welfare of the residents of Kono and the regional environment. The focus on the smallholder model is for two reasons:

1. Rural population: Even with urbanization, more than 60% of Africa's residents live in rural areas. [5]
2. Smallholder dominance: "The bulk of farms are both physically small – of less than two hectares of good arable land, or its equivalent – and operated at the household level using for the most part family labor." [5] One study found that "...small private farms produce about 80% of the crop." [7]

Given the disappointing record of African agricultural development over the last 30+ years, doubts have been expressed "...about the ability of the predominantly smallholder structure of farming across the continent to deliver agricultural development." [5] In fact, "...in conditions of low development with relatively cheap labour, small units may have advantages over larger ones." [5] Working with smallholder oil palm farms in the Kono District, P2P offers the possibility for the products of these farms to be sustainably processed in a locally owned and operated facility. By doing this P2P hopes to achieve its twin objectives of providing employment and self-determination in a sustainable manner to the people of Kono.

The objective of the P2P project, as with similar sustainable economic development projects, is to create or improve a system that allows for a significant proportion of residents to survive or prosper within the confines of a system that is environmentally sustainable. This project can therefore benefit from a livelihoods perspective. As outlined by Scoones [6], "...a re-energised livelihoods perspective thus requires, first, a basic recognition of cross-scale dynamic change

and, second, a more central place for considerations of knowledge, power, values and political change.” These issues need to be added to the traditional livelihoods perspectives focus on “locally-embedded contexts, place-based analysis and poor people’s perspectives...”. This recent literature on livelihoods perspectives therefore expresses exactly the same sentiment that recent exploratory research on oil palm production in Ghana [7][8] has expressed: creating a sustainable smallholder palm oil production model will require changes at levels above the smallholder enterprise.

Moving on to the products of oil palm farms in particular, several barriers have been identified that prevent the smallholder model from experiencing the success and profitability of large-scale models. Adjei-Nsiah et al. [8] suggest that “...to improve the income of small processors, there is the need to help the processors change their practices through research but at the same time it also requires work to create entry into the existing value chains through policy.” These current practices produce low-quality palm oil that is unsuitable for use by the industrial and export markets due to high free fatty acid content, high moisture content, and the presence of impurities. [8] Addressing these issues requires state-level policy changes, farm-level process changes, and the introduction of new and better technologies that are appropriate and profitable in the smallholder model. Examples of required farm-level process changes include: “...[T]he use of hybrid [high-yielding] seedlings, optimal plant spacing, mineral fertilizers and cover crops for soil fertility improvement and herbicides for weed control...”. [7] The use of all these technical innovations was found to be below optimal in several regions in Ghana except where introduced and/or supported by a government entity. [7] Related research found that “...activities involved in small scale processing as well as the profitability of their operations are not known. Information related to processing activities and profitability of small scale palm oil processing may form a basis for designing more appropriate and cost effective processing technologies for the production of good quality palm oil to feed the local industry.” [8] Section 2 of this paper helps address this gap in the literature by addressing the question of profitability for one smallholder enterprise and in pointing out issues related to the development and/or acquisition of technology in the sustainable growing and processing of palm fruit.

The P2P project self-identifies as a “sustainable economic development project”. Under what definition(s) of sustainability does the P2P project fall? On what basis does P2P make this claim? After all, “‘Sustainability’ is an inherently dynamic, indefinite and contested concept.” [9] Some reasons others [9] have offered as to why this is so include:

1. Highly dynamic—as a result of constantly seeking balance in the face of shifting background conditions
2. Largely indefinite—as a result of being based on necessarily abstract, context-specific, and very long-term goals
3. Highly contested—as a result of the many human values, perceptions and competing political interests evoked by the concept

Two components of sustainable development projects, Mog [9] continues, are:

1. Process orientation: “A sustainable approach must be one based upon continuous learning and adaptation if the participants of development are to have any success in a world where conditions-e.g., environmental health, resource constraints, policies, technologies, markets, etc.-are in constant flux”
2. Participatory processes and community organizing: It has been stated that “the central tenet of sustainable development is that poor people should be given the opportunity to create their own solutions to the problems they face.”

Concerning palm oil specifically, the Round Table on Sustainable Palm Oil (RSPO) was created to remedy the negative impacts of the sector (mostly created by large-scale operations in Asia) and developed eight principles and related criteria under which organizations in the sector should seek to operate. [10] Some of the RSPO related criteria that are a good fit for P2P are:

- Socio-economic well-being of small-scale farmers
- Use (or non-use) of chemical fertilizers
- Methane capture from wastewater treatment systems
- Preserving local ecosystems and their resources
- Protected areas for biodiversity

It is reasonable to think that P2P will work towards these principles as the operation grows and develops. However, a significant question remains: “Why should local residents, workers, managers, and owners embrace sustainability?” The authors provide a plausible reason when they state “...for smallholders the connection to their land can act as a motive to preserve local ecosystems...” [10]

Mog [9] has constructed a comparative framework for evaluating sustainable development programs. Using Mog’s framework and other resources we will attempt to determine whether P2P can be considered a “sustainable development program.”

The information published to date about the economic impact (both forecast and realized) of the 2014-2015 Ebola outbreak in West Africa has concerned industry-level or higher (national or regional) economic impacts. [11][12][13] This paper will present economic experiences during the Ebola outbreak at a firm and local level, with the hope that such information can be useful during the formulation of economic recovery plans.

2014: PROGRESS AND IMPEDIMENTS

During the eighteen months beginning in the fall of 2013, P2P made progress in two significant areas but suffered two significant setbacks, from which it has not yet recovered. The two areas in which progress was made were a reformulation of the recipe for palm kernel soap and

improvements in operational efficiency in soap production. The two major setbacks were the decision to stop producing palm oil due to the inability to do so profitably and the cessation of operations due to the Ebola outbreak.

In the fall of 2013, the recipe for palm kernel soap was reformulated using a combination of local knowledge and the assistance of an outside expert from a developed country. The new formulation has the following characteristics:

1. Acceptable to local population: The new formulation, with considerable input of local knowledge, results in a product to which the locals can relate.
2. All-natural/minimally processed: The new formula uses local, all-natural raw materials and is produced with minimal processing. This again results in a product similar to that which the locals have historically produced.
3. Variety: The reformulation included the development of additional varieties of product, giving consumers additional choices in their purchasing.

In June 2014, with the arrival of one of the authors in Koidu Town, new production equipment (soap trays, soap stamps, soap cutter) was designed and placed into production. In addition, several process improvements were implemented. Taken together, these two improvements (equipment and process changes) increased daily soap output from approximately 250-300 units per day to approximately 750-850 units per day. The new equipment was designed using a combination of local knowledge and the expertise of the visiting author, and produced locally by the village metalsmith. The process improvements were developed and implemented jointly by the local manager and the visiting author. When these changes were introduced, production gains of approximately 300% were achieved with a minimal decline in product quality. The new soap was produced and sold for Le1,000. Virtually all soap produced could easily be sold at this price. Unfortunately, selling at this price did not allow the project to operate profitably while paying wages to the P2P employees (~18). By June 2014, the operating subsidy historically provided by the project's main benefactor had been discontinued and the employees threatened a work stoppage. The solution devised was for the visiting author to purchase ingredients in the local market and the employees to prepare a daily meal using the purchased ingredients. The daily meal was shared among employees and the visiting author. The employees were satisfied enough with this arrangement that they were willing to continue working. The local project manager and visiting author have indicated that in order for soap production to simultaneously operate profitably and pay wages additional production efficiencies are required. The most readily available solution is to purchase two pieces of equipment (palm nut cracker and palm nut oil presser) to automate the process of shelling and pressing palm kernels to produce palm kernel oil ("Nut Oil"). This equipment is produced in Asia. An alternate solution has also been identified: There are simple machines for palm kernel processing in use in Ecuador that P2P may be able to replicate. [14] While the potential replication of equipment used elsewhere (Ecuador) still needs to be investigated, this would be a preferred solution as it would allow P2P to build social capital in Kono.

The above two examples illustrate the progress possible when solutions can be devised using “...more effective and creative interactions between indigenous knowledge and scientific knowledge systems.” [15] Ideally, the needed efficiencies mentioned above would result from a combination of indigenous and scientific knowledge to design sustainable technology appropriate for a smallholder oil processing operation. The production of such technology would ideally occur indigenously, thereby allowing indigenous ownership of any intellectual property. Unfortunately the authors have not presently established any partnerships that would allow this ideal solution to be implemented. Given the need to restart production for the benefit of the community it is not guaranteed that P2P can hold out for an ideal solution.

The first of the two impediments experienced during the period covered was that the P2P project significantly reduced the production and sale of palm oil due to market conditions that prevented profitable production to occur. P2P faces a market price set by the Yele Palm Oil Press built and operated by Nedoil, Ltd. [16] The scale and production of the Yele mill is several orders of magnitude, at a minimum, larger than the P2P operation. The price at which the Yele mill sells its palm oil is below the price at which P2P can profitably sell palm oil it produces. As discussed above, the traditional route to implement production efficiencies is the importation of scientific technology solutions produced elsewhere. Unfortunately such a solution does not allow for the same growth in levels of social capital that jointly-designed and indigenously produced technology solutions generate. Currently the only technology solution identified to date available to P2P is the importation of scientific solutions produced elsewhere.

The second impediment was the forced closure of the P2P operation due to the Ebola epidemic. With the Ebola quarantines in place and a general level of fear in the population, P2P’s sellers (salespeople) were unable to travel throughout the region selling soap. The result was a drastic decline in sales (from ~35 units/day to ~10 units/day/seller), so production was halted. [17] It is currently unknown when or if production over either soap or palm oil will resume due to efficiency and profitability issues.

P2P SUSTAINABILITY

As stated in the introduction, Mog [9] has identified a framework for evaluating sustainable development projects in which the evaluation process focuses on *process-oriented criteria* and *outcome-oriented criteria*. We now investigate how the P2P process measures up against Mog’s framework. It should be noted that, just as Mog’s framework is based on continuous improvement in a project, the project’s external stakeholders continuously strive to lead the P2P project to adopt more sustainable practices.

The six process-oriented criteria identified by Mog [9] are:

1. Character of participation

2. Success and nature of institution- and capacity-building efforts
3. Diversity, multiplicity and adaptability of ideas promoted by the program
4. Accounting for heterogeneity, diversity and dynamism
5. Understanding and use of local knowledge, skills, initiative and constraints
6. Recognizing the influence of external conditions, markets and policies

Local influence in project decision-making, local control, and the fostering of local problem-solving abilities are the three characteristics Mog's framework evaluates participation. Since late 2013 P2P has been a Sierra Leone-registered entity controlled by the local manager. As relayed in the previous section, the two significant improvements implemented during the period covered were accomplished with a combination of local and scientific knowledge, so it is clear that there is indigenous input into decision-making. With local management of the project, the ability of the local manager and his employees has been fostered. But the Ebola outbreak has been an obstacle that simply overwhelmed local abilities. As far as institution- and capacity-building, progress has been slow. P2P, like many sustainable development projects, is starved for resources. But efforts have been made in this area. Most notably, because of the external stakeholders' trust in the local manager, he has been provided alternate employment since production was halted due to the Ebola outbreak. It is the authors' hope that this arrangement is short-term in nature, with the local manager resuming management of P2P when production resumes. Mog's third process-oriented criteria stresses "...the type of approach a sustainable development program takes in selecting the ideas it will promote." The importance the project's key stakeholders place on investigating numerous alternative means of developing efficient production equipment instead of simply choosing the readily-available externally-developed and -produced solution illustrates the project's focus on a diversity of ideas. P2P partially meets the fourth criteria because it opens up the possibility of differential employment for residents of Koidu Town. Some residents may wish to work for P2P, focusing either on production or selling. Those who wish to remain farmers, however, may hopefully do so by profitably selling their output to P2P. Local residents also benefit in that they have a direct connection to the project and its products as customers. In this way P2P seeks to "...increase the program's impact by appealing to the greatest possible number of people." Understanding and use of local knowledge, skills, initiative and constraints—the fifth criteria—is demonstrated by the collaborative process by which the two significant improvements during the period covered were implemented. Similar collaboration has taken place on other issues during the period covered. The last criteria is a recognition of external conditions, which was demonstrated when the project decided not to attempt to sell P2P palm oil above the market price set by the Yele Palm Oil Press.

Mog's outcome-oriented criteria fall into three broad categories:

1. *Economic criteria*: Reduce inequality, reduce poverty, increase security of land tenure, increase access to credit, reduce dependency on external farm inputs, diversify farm operations and livelihood strategies, and increase access to efficiently functioning markets and market information.

2. *Socio-political*: Cultural acceptability, policy support, facilitate learning and knowledge-sharing, institutional flexibility/adaptability, facilitate a process of social change, minimize local growth in human population and consumption of non-renewable resources, and organize communities and mobilize local resources.
3. *Ecological criteria*: Maintain ecological integrity, protect and/or increase biological and genetic diversity (particularly of indigenous species), prevent land degradation, and protect air and water quality.

The above outcome-oriented criteria, Mog states, "...describe an overall direction of change in a process of sustainable rural development. We can consider a sustainable rural development project to be 'successful' if it helps create positive change without (intentionally or unintentionally) producing countervailing negative change within these realms." Rather than rating P2P on every criteria included in Mog's list, we evaluate P2P's performance on selected criteria as follows:

Economic criteria:

Reduce poverty: While P2P cannot make a strong claim for reducing poverty during the study period, the project, by facilitating the creation of daily meal for employees, did provide sustenance.

Increase access to efficiently functioning markets and market information: P2P's products (palm oil and palm kernel soap) were widely sold in the surrounding region during the study period, and decisions were made (e.g., almost abandoning, temporarily, the marketing of palm oil) based on the markets in which these products are sold.

Socio-political criteria:

Cultural acceptability: P2P's products and the production thereof are the result of a collaborative development process that included both indigenous and scientific input. Therefore, P2P's products are not just accepted, but are welcomed by the local community.

Facilitate learning and knowledge-sharing: As evidenced by the collaborative development of the two significant improvements during the study period, the P2P project is structured to transfer knowledge to the local community with the goal of creating a sustainable economy and allowing for the employment and self-determination.

Organize communities and mobilize local resources: Progress in this criterion can be measured by the fact that P2P has built two communities, its employees and family members and its customers. Both communities take pride in the fact that P2P products are produced by and for the people of Kono.

Ecological criteria:

Protect air and water quality: P2P's immediate goal in this arena is to implement a wastewater treatment solution to return water to the environment of the same quality, or better, than its original quality.

The above assessment indicates, quite clearly, that P2P currently possesses at least some attributes of a sustainable economic development project. Unfortunately, during the study period the Ebola outbreak presented P2P numerous obstacles to steady growth as a sustainable economic development project. While the authors hope that P2P will continue the sustainable trajectory pursued prior to the Ebola outbreak, at the time of writing it is uncertain if P2P will even survive difficulties related to the Ebola outbreak. The authors hope that the foundation built during four years of work prior to the outbreak will be sufficient for P2P to recover, and even thrive, as the outbreak winds down.

EBOLA IMPACT

Given P2P's location in the heart of the region in which the Ebola epidemic has been centered, the impact of the outbreak on P2P has been significant. This impact can be categorized as follows: Impact on the authors and their work and impact on the project itself.

The author who visited P2P in 2014 was impacted to the greatest extent among the authors. This author's original schedule called for traveling to Koidu Town in early April and returning to Philadelphia in early July. As initial reports of the outbreak surfaced throughout March, the author's trip was rescheduled. As the outbreak appeared to be petering out throughout May, it was decided that conditions were safe enough for the author's visit to occur. The author traveled to Koidu Town in early June and was scheduled to return in mid-September. As the outbreak worsened throughout June and July, regular conference calls occurred to determine if the author could remain in Koidu Town. At the end of July, with rumors of an impending quarantine for eastern Sierra Leone, the author left Koidu Town for Freetown. The imposition of the quarantine prevented the author's return to Koidu Town, so the author returned to Philadelphia in the second week of August, five weeks prior to his rescheduled return.

The remaining authors researched Ebola and the spread of the outbreak prior to and during the visiting author's travels to Koidu Town in order to remain current on events that eventually forced the visiting author's evacuation from Koidu Town. In addition, the remaining authors researched potential natural antimicrobial/antiviral compounds in an attempt to reformulate the palm kernel soap recipe to improve the soap's abilities to prevent the spread of disease. The result was a decision to maintain the use of pineapple juice ("pineapple liquid") as the primary antiseptic ingredient.

Impact of the Ebola outbreak on the locals in Koidu Town has been, as might be suspected, much more significant than that on the authors. As Ebola-induced inflation set in, the local manager pressed for an increase in the selling price of the soap from Le1,000 to Le2,000 to offset the increased cost of raw materials. Several key stakeholders in the project, however, decided to keep the price of the soap at Le1,000 for the duration of the epidemic. [14] This decision was taken in an effort to generate goodwill among the customers and residents of Kono towards P2P once the outbreak is over.

The implementation of new technology and process improvements caused the palm kernel soap-making operation to grow significantly during the June to August 2014 period. P2P sellers visited many of the fourteen chiefdoms in Kono District. The imposition of Ebola quarantines and the general level of fear among residents of contracting Ebola, however, greatly reduced the ability and willingness of sellers to travel from village to village and chiefdom to chiefdom. Soap sales dropped from ~35 units/day/seller to ~10 units/day/seller. Simultaneously the cost of raw materials rose dramatically due to Ebola-induced inflation. As a result, P2P ceased production.[17] As of this writing, production has not been resumed. [19] Since production has stopped, the local manager has indicated the following three requirements that need to be met for him to restart and manage P2P going forward:

1. Guarantee of salary for the year for local manager [18]
2. Sufficient capital [19]
3. The ability to pay employees [19]

To raise additional capital the authors have investigated the availability of and requirements for grants, while simultaneously investigating crowdfunding opportunities. To date no additional capital has been secured.

Local employees and their families have been significantly impacted by the cessation of P2P production activities, as for most employees their P2P wages supported an extended family. Since production has ceased the local project manager has found employment with a local foundation providing healthcare. [18] It is currently unknown how the remainder of employees are faring. It is the authors' hope that the necessary capital can be acquired and production restarted shortly to help the employees and their families recover economically from the Ebola outbreak. As mentioned earlier, however, resumption of production is not a certainty.

CONCLUSION

What began in 2010 as a microscale sustainable economic development in Koidu Town, Kono District, Sierra Leone, became much more in 2014 as the Ebola epidemic ravaged Kono, Sierra Leone and West Africa. One author noted that it was odd working on a project that was affected daily by an event making headlines around the world. The period covered (Fall 2013 to Spring

2015) has been a very difficult time for P2P, Sierra Leone, and West Africa. At the time of writing, it appears that the end of the Ebola outbreak in West Africa may be more than a mirage. Whether Sierra Leone and West Africa recover is a question the world has to answer. Whether P2P recovers is a very personal question for the authors. Our hope is that P2P will recover, and even thrive, as a sustainable enterprise. Much work and many resources are needed even for our small project.

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