

Appraisal Report

Appraisal of Haiti Post-Harvest Loss Reduction Program

TaiwanICDF

March 2012

Prepared by

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Abbreviations and Acronyms

- ANEM** Association Nationale des Exportateurs de Manges *or*
National Association of Mango Exporters (Haiti)
- FAO** Food and Agriculture Organization of the United Nations
(Italy)
<http://www.fao.org/>
- FDA** United States Food and Drug Administration
- MARNDR** Ministère de l’Agriculture des Ressources Naturelles et du
Développement Rural *or*
Ministry of Agriculture, Natural Resources and Rural
Development (Haiti)
<http://www.agriculture.gouv.ht/>
- MC** Mercy Corps
<http://www.mercycorps.org/>
- MOSOPA** Mobilizasyon pou Sove Pwodiksyon Agrikòl, a Haitian
farmers’ organization
- ORE** Organization for the Rehabilitation of the Environment (Haiti)
<http://www.oreworld.org/>
- TaiwanICDF** International Cooperation and Development Fund
<http://www.icdf.org.tw>
- SAPKSO** Sosyete Agrikòl pou Pwodiksyon ak Komèsyalizasyon, a
Haitian farmers’ organization
- SPAVO** Sosyete Pwodiktè agrikòl ak Vandè Oranger, a Haitian
farmers’ organization
- RAPKOM** Rassemblement des Planteurs pour la commercialisation et la
Production de mangues Francisques, a Haitian farmers’
organization
- USAID** U.S. Agency for International Development

1. Executive Summary

To appraise the Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti (project), MC and the TaiwanICDF jointly formed a mission to Central Plateau, Haiti, where we identified objectives that could be take into consideration to relieve the constraints faced by local small-scale mango farmers. Table 1 summarizes the constraints and objectives of small-scale mango farmers in Central Plateau, Haiti.

Table 1. Summary of Constraints and Strategic Objectives		
Actors/ Activities	Constraints	Strategic Objectives to Address Constraints
Farmers' Organizations	<ul style="list-style-type: none"> • Lack of long-term training • Resources duplication 	<ul style="list-style-type: none"> • Develop long-term training curriculum • Support coordination among different organizations
Production	<ul style="list-style-type: none"> • Poor production knowledge and resources • Sparse distribution of mango trees 	<ul style="list-style-type: none"> • Provide training for production techniques • Distribute production materials • Provide subsidies and promote associated policy • Distribute seedlings
Harvesting and post-harvest processing	<ul style="list-style-type: none"> • Poor picking skills and resources • Poor transportation and equipment • Poor post-harvest handling skills 	<ul style="list-style-type: none"> • Provide training on pruning and ripeness of fruit • Support distribution using plastic crates • Provide training on grading and storage
Marketing	<ul style="list-style-type: none"> • Poor bargaining ability • Poor understanding of costs and benefits • Poor knowledge of organic and fairtrade certification • No effective traceability system 	<ul style="list-style-type: none"> • Develop stronger farmers' organizations • Identify and diversify marketing channels • Introduce concept of costs and benefits • Provide assistance toward obtaining organic and fairtrade certification • Develop traceability system

2. Introduction

Historically, cooperation between MC and the TaiwanICDF has been limited to emergency relief and post-disaster reconstruction projects. To strengthen their partnership, MC and the TaiwanICDF more recently agreed to extend the scope of cooperation to include development projects. MC has experience in rebuilding local economies through the establishment of value chains and the TaiwanICDF is skilled at stimulating local development through the transformation of agricultural production techniques. Both parties agreed that combining these advantages would strengthen and accelerate local economic development in their countries of operation.

When MC first proposed the concept of building post-harvest centers (PHCs) to improve the livelihood of small-scale farmers in Haiti to the TaiwanICDF in early 2011, we sensed that this could be an opportunity to build closer cooperation between the two organizations.

MC then proposed a project, Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti, to be jointly implemented with the TaiwanICDF. The project would carry out critical activities designed to address the needs of poor, small-scale farmers in rural Haiti, improving economic security for them and their families by strengthening their ability to engage more effectively in agricultural markets.

The mango is Haiti's primary export. Increasing mango exports might not only benefit the country, but also increase the income of small-scale farmers. MC has observed that in Haiti, small-scale mango farmers traditionally supply produce both for local consumption and for export. However, such farmers are plagued by numerous market barriers, including: limited access to improved techniques, poor infrastructure,

inadequate post-harvest management, lack of access to agricultural credit, lack of market information, inadequate knowledge of new food safety standards, and low yields that are inconsistent in quality. In the post-harvest stages of production, on-farm inefficiencies and inefficiencies arising during processing and transportation result in losses estimated to be between 40 and 50 percent of the maximum potential value of their produce.

The majority of farming families in the area to be targeted are trapped in a cycle of poverty due to poor yields and an inability to take advantage of market opportunities. This cycle results in missed opportunities and below-market payment for produce. Despite the widespread existence of farmers' organizations, farmers are still not benefiting from collective action, because such organizations lack the financial, organizational and business skills needed to operate effectively, as well as having a limited ability to address the economies of scale required by their target markets.

In light of these issues, the project will promote activities that focus on: strengthening business and farm management capacity; improving production techniques; agricultural investments; providing access to credit; providing access to markets; reducing losses of crops, with a particular emphasis on post-harvest losses; establishing functional farmers' organizations; and accessing and using mobile technologies.

The project will also initiate a produce traceability system in the target area and train farmers on basic international food safety standards to ensure that they do not become excluded from high-value export markets at a time when importing countries are imposing increasingly stringent regulations and requirements upon their imports.

For example, the FDA will soon require that all agricultural products imported into the United States be traceable to their source of origin. Presently, Haiti does not have a national traceability system. With the support of the Minister of Agriculture, the project will work with Haitian exporters, other NGOs and small-scale producers to develop a traceability system that meets U.S. standards.

The impact of these collective efforts will be to increase the living standards of poor farmers, thus reducing the susceptibility of farming families to economic shocks that would otherwise affect their food security and overall well-being.

Accordingly, in March 2012 MC and the TaiwanICDF organized an appraisal mission to visit Haiti and jointly initiate the project.

3. Project Summary

The project proposal was created in December 2012; the project summary is described as below¹:

Table 2. Project Summary	
Project name	Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti
Goal	Improve living standards and reduce economic insecurity among small-scale producers by increasing participation in the agricultural value chain in the Centre and Ouest Departments of Haiti.
Objectives	<ol style="list-style-type: none">1. Build capacity at five farmers' organizations (of a total membership exceeding 7,500 persons) so that such organizations function more effectively and better serve their membership;2. Reduce post-harvest losses by 15 percent by improving crop storage and handling measures and establishing well-managed post-harvest centers;3. Build capacity among 600 farmers to better manage their agricultural operations and achieve a greater return on their harvests;4. Enable farmers to meet the increasing demands of high-value export markets by developing a produce traceability system and training such farmers on traceability and international food safety standards.
Location	Centre and Ouest Departments, Haiti
Beneficiaries	600 direct; 3,000 indirect
Duration	July 2012 – December 2013
Funding requested	US\$1,000,000

¹ Please refer to Annex 3 for the complete project proposal.

4. Field Observations²

The observations of the appraisal mission are discussed below.

1. Farmers' Organizations³

1.1. Lack of Long-term Training

The mission visited and met with representatives of four farmers' organizations from Central Plateau. Most of these organizations had been trained previously by other international organizations such as USAID, ORE, Concern Worldwide or ANEM⁴. These organizations were generally well-organized and familiar with working with international organizations. However, training had not been provided to a consistent standard, nor been sustained to a sufficient degree. More long-term forms of training will be needed to build capacity among small-scale mango farmers.

1.2. Duplication of Resources

Mango is the principal fruit grown in Haiti. According to FAO (2010), Haiti was among the top ten mango producing countries in the world until the late 1980s, and was also one of the top ten mango exporting countries until the early 1990s (CRS 2010), at which time, possibly due to competition from Mexico, Brazil and other countries, Haitian exports as a share of worldwide totals began to decrease year on year. Another reason for this decline may

² Please also refer to Annex 5 and 6 for reports prepared by Dr. Chun-Ta Wu and Mr. Danny Yang.

³ MC identified four farmers' organizations and a potential two further farmers' organizations to participate in this project. Please see Annex 4 for detailed information about each organization.

⁴ ANEM, the Association Nationale des Exportateurs de Mangues, comprises 10 major exporters.

be that mangoes due for export were failing to reach FDA food security standards, with fewer and fewer qualified mangoes being produced by local farmers due to poor production and management skills.

Local mango exporters have realized that production has now reached a critical point and sought the assistance and resources that local, small-scale mango farmers need. However, a significant influx of resources from a wide range of international organizations has in fact caused much confusion and represents a duplication of resources. Coordination among different organizations will be required to reduce such waste of resources.

2. Production

2.1. Poor Production Knowledge and Resources

The mission found that most small-scale mango farmers lack the knowledge and resources required to handle production. Such farmers simply pick their fruit when it is in season. Furthermore, the majority of farmers fail to devote any time toward caring for their trees.

Mangoes are not grown under any standard production practices, with no seed selection, pruning, fertilization or disease control carried out. All of these issues result in the production of low-quality mangoes, which subsequently brings in low incomes for farmers. Basic production techniques are required to improve both quality and yields.

Most small-scale farmers lack sufficient production materials such as tools, fertilizers, bags, pesticides or herbicides. Providing such materials could ease the burden on farmers and improve quality and yields.

If farmers are encouraged to invest time and effort in caring for trees, then inevitably their ability to focus on other activities would be reduced. A subsidization policy could be considered for any period during which farmers are undergoing training.

2.2. Sparse Distribution of Mango Trees

Statements made by small-scale farmers who met with the mission indicated that the majority of farmers possess fewer than 10 mango trees, with some possessing as few as one or two trees. Additionally, their mango trees were grown randomly in the field. Such sparse distribution increases management and transportation costs, despite the income derived from mango production being vital to small-scale farmers. Selected seedlings could be distributed to farmers to increase the density of distribution, which would increase production yields and reduce future production costs⁵.

3. Harvesting and Post-harvest Processing

3.1. Poor Picking Skills

Due to a lack of attention to pruning and associated concepts, most mango trees are taller than two stories, which causes

⁵ Due to inconsistencies in Haiti's land registry system, exporters prefer to achieve desired export volumes by strengthening relations with farmers' organizations rather than attempting to establish their own mango nurseries.

difficulties when picking the fruit. Farmers climb their trees and pick all of the available fruit regardless of how ripe it is, allowing it to fall onto the ground. This results in significant post-harvest losses. Proper training to stress the importance of pruning and to teach farmers to assess the ripeness of fruits would be required to reduce such losses. This would also have the simple and additional benefit of reducing the risk of farmers falling from trees and hurting themselves.

3.2. Poor Transportation and Equipment

Most small-scale farmers lack modern means of transportation or proper containers in which to transport their mangoes. The common resources available to the majority of farmers are sacks and donkeys. When carried this way, mangoes are easily damaged by being trampled or jolted. Distributing the fruit using hard-sided plastic containers could reduce a proportion of post-harvest losses.

3.3. Poor Post-harvest Handling Skills

Local farmers have little experience in grading mangoes and lack sufficient facilities or skills to conduct basic cleaning, drying, grading and storage operations. Farmers place various grades of fruit into the same sack and sell them at a fixed price at the earliest opportunity. Training to improve basic post-harvest handling skills, including training on basic grading and storage techniques, could further reduce a proportion of post-harvest losses.

4. Marketing

4.1. Poor Bargaining Ability

The mission identified four major approaches to marketing within the project's target area:

Exporters

Demand for mangoes for export exceeds the available supply. Most mango exporters cooperate with local mango-producing farmers' organizations to obtain a supply of fresh produce. Mangoes qualified for export fetch the highest price and exporters will transport qualified mangoes from the field to their own place of business free of charge.

The suitability of such mangoes is determined by the maturity, size and appearance of the fruit. Weight is not one of the factors considered, possibly due to the lack of measuring equipment. Trained mango farmers are able to select suitable mangoes and sell them to exporters.

Local Hotels

Mangoes that do not qualify for export but are nevertheless in good condition can be offered to local hotels at a slightly lower price than would be received if they were exported. Only farmers' organizations situated relatively close to Port-au-Prince have access to this sales channel, so the opportunity to make such sales is not available to all organizations.

Madam Sarah

Mangoes that do not qualify for export also reach the local market through Madam Sarah, a local broker, at a lower price. In such cases farmers are expected to pick and transport fruit to Madam Sarah themselves.

Voltigeurs

Small-scale mango farmers who do not have time to pick fruit or are simply in urgent need of cash have the option of selling to *voltigeurs*, who visit farmers and offer a fixed price (usually lower than local market rates) for all the mangoes on a given tree, regardless of their real production value. *Voltigeurs* offer to pick the fruit from the trees themselves and demand a lower price on the rationale that farmers do not have to spend any time or effort picking, marketing or transporting their own produce.

Table 3. Price by Marketing Channel	
Actor	Price per Count (US\$)⁶
Exporter	1.00 - 1.60
Local hotels	0.90 - 1.00
Madam Sarah	0.60 - 0.87
<i>Voltigeurs</i>	0.50 - 0.70

⁶ A “count” is a local measurement for mangoes, with one count representing 12 mangoes.

Somewhat surprisingly, although market demand for mangoes exceeds supply, few mango suppliers display significant competence in bargaining. One reason for this may be that the quality of mangoes on offer is, or is perceived to be, quite low. A well-organized farmers' organization could increase the bargaining skills and leverage of its members. Diversifying marketing channels to include supermarkets or restaurants may also assist small-scale farmers to achieve similar results.

4.2. Poor Understanding of Costs and Benefits

Some small-scale farmers need cash urgently and sell their produce without first making any careful calculation of costs and benefits. Training that provided farmers with financial skills could improve farmers' bargaining abilities and convince them of the added value and benefits to be had from improving operations.

4.3. Poor Knowledge of Organic and Fairtrade Certification

Mangoes with organic or fairtrade certification could be sold at a higher price. Since most small-scale farmers lack access to, or funds to buy, chemical fertilizers and pesticides, most of their produce already happens to be organic.

The mission learned that exporters apply for organic certification from importers such as the FDA and the EU, bearing such fees themselves in order to gain greater profit. Therefore such profits fail to find their way back to producers.

Only farmers' organizations are able to apply for fairtrade certification. The fee for certification is high. Supporting farmers to obtain certification could raise the price of their mangoes; however, a further survey and cost-benefit analysis would be required to determine whether the production of fairtrade mangoes would in fact be more profitable than regular production.

4.4. No Effective Traceability System

The United States banned imports of Haitian mangoes into the country in 2007 due to the detection of shipments infested with fruit fly larvae — a phytosanitary restriction imposed upon all countries exporting fruit to the United States. The strategic importance of this commodity is such that this decision threatened Haiti's mango industry and the economy of production areas. The reopening of the U.S. market to Haitian mangoes was made contingent on the implementation of a detection and control program in production areas, which is currently being implemented by the MARNDR, ANEM and the USDA (CRS 2010).

The mission observed that very few pest management operations appeared to be being carried out in the field. Two mango exporters with whom we met, Ralph Perry and J.M.B. SA, both said that they are not familiar with government-led pest management.

A well-developed traceability system is under operation in Taiwan. Based on the GAP (Good Agricultural Practice,

GAP) system, any product passing through the system can be traced at every step, from production and transportation through to marketing. The system provides consumers with information about exactly how, where and when produce was grown. Moreover, produce is guaranteed to be organic as well as disease free.

However, no general good agricultural practices are in place in Haiti and the traceability system used by Haitian mango exporters is limited to the ability to trace where mangoes were produced. A more complete traceability system could assist Haitian mango exports.

According to Ralph Perry, using an electronic traceability system would be excessive for small-scale farmers and exporters, since the traceability system in Haiti only needs to identify where mangoes are from. While trading, exporters ask middlemen or farmers' organizations to mark the place of origin, with their facilities using paper registration systems. They claim that in this way, all employees can simply read the paper and identify the place of origin without spending extra costs on expensive electronic equipment.

On the other hand, according to J.M.B SA, using electronic traceability systems is an inevitable trend for mango exports, and demonstrated a QR code system sponsored by a local telephone company, Viola. The idea is to distribute cell phones to small-scale farmers; each farmer could register through the phone and receive a QR code representing their

location. During trading, they show the code to the exporter to identify the place of origin. Additionally, they can receive extra agricultural information through the phone from the exporter.

MC is working on building a beneficiaries database through the open data kit system⁷, which can identify the location of each of the beneficiaries. If all relevant farmers' names and their locations are stored in one database, it would be much easier for exporters to build a traceability system for mangoes.

5. Analysis

5.1 Technical Issues

Project Scope

The project was designed to utilize US\$1 million for 600 direct and 3,000 indirect beneficiaries over the course of 18 months — a project scope that is reasonable and sufficient if the focus is only on post-harvest handling. However, during the mission, we realized that post-harvest handling is not the most critical factor in improving the livelihoods of small-

⁷ Open Data Kit (ODK) is a free and open-source set of tools which help organizations author, field, and manage mobile data collection solutions. ODK provides an out-of-the-box solution for users to: build a data collection form or survey; collect the data on a mobile device and send it to a server; and aggregate the collected data on a server and extract it in useful formats. In addition to socio-economic and health surveys with GPS locations and images, ODK is being used to create decision support for clinicians and for building multimedia-rich nature mapping tools.

scale farmers. Therefore, either the project activities or the project scope should be modified accordingly⁸.

Processes, Materials, Equipment and Reliability of Technical Systems to be Used

MC has experience in building communities, and is capable of building capacity at local farmers' organizations, as observed during the mission. Its regional office resources and human resources are sufficient to implement this project. The project would be more comprehensive if additional agricultural technical support were provided.

Project Location

Traditional mango producing areas are in Léogâne (Ouest), Plaine de Cul de Sac, Archaie (Ouest) and Cabaret (Ouest), Artibonite, Central Plateau, Gros Morne (Artibonite Department), and Northeast and Belladère (Centre). Jacmel (Sud-Est) and Les Cayes (Sud) are considered new production areas to be developed (JMB, 2005).

The project will be located in Saut-d'Eau, Casales, Oranger, Nirva and Mirebalai, mainly in the south of Centre Department. Mirebalai, approximately 60 km northeast of Port-au-Prince on National Road 3, is the biggest city in the project area, with around 165,000 inhabitants. The local population can afford to consume mango. The capital city is within a three-hour drive, which is a suitable distance for the transportation of mangoes.

⁸ Preliminary revised project documents were received on March 30. Please see Annex 7 for details.

Sustainability of Plans, Layout and Design

The general running costs of farmers' organizations would be supported by profits from mango sales, while capacity building would ensure the sustainability of their operations. Although physical infrastructure would require maintenance, a well-organized, profitable farmers' organization could be expected to manage these and other affairs sustainably.

Availability of Various Factors of Production, both Physical and Human

Staff recruitment for the project is almost finished. Materials procurement will need to be done early because delays in business and trading are common in Haiti.

Availability of Necessary Infrastructure

The road to Port-au-Prince is functional. However, irrigation systems and a stable supply of electricity are unavailable in the project area, which may therefore limit the development of the project.

5.2 Environmental Issues

Hydrological and soil resources in Haiti are in poor condition, for which reason it could be appropriate to consider ecofriendly methods of building the post-harvest centers. Although the project will follow all relevant local and international laws, it may prove difficult to obey certain laws due to the scarcity of restricted resources.

5.3 Economic Issues

The opportunity costs must be factored into the project. Most small-scale farmers have very limited time and resources to use; increasing inputs to mango production would decrease inputs to other necessary activities.

According to mango exporters, demand for and potential consumption of mangoes is higher than the available supply, while the prices offered by exporters and *voltigeurs* can differ by as much as a factor of three. These conditions represent the existing economic model in the local market and market equilibrium should be taken into consideration during the operations of the project.

5.4 Social Issues

Membership of farmers' organizations is not limited to small-scale farmers: Middlemen and *voltigeurs* are also inseparable links to mango production. Some small-scale farmers also play the role of middlemen or *voltigeurs* and are part of these organizations. During the mission's meetings with local farmers' organizations, some *voltigeurs* were very concerned that the project could jeopardize their livelihoods. This is a universal situation in every market; some extra effort could be spent to ensure that harmony is maintained within farmers' organizations.

6. Possible Cooperation Model between MC and the TaiwanICDF

Although MC has welcomed the prospect of technical cooperation between MC and the TaiwanICDF, its representatives have clearly stated that current projections for project funding would not be sufficient to complete the project. Funding requested of and supplied by the TaiwanICDF would therefore be vital to this project. Additionally, MC's financial structure is designed around the provision of grants; to date MC is unable to process non-grant financial support.

MC has experience in coordinating programs that involve umbrella grant programs, having taken responsibility for supervising and managing different projects among different organizations.

After discussions with members of MC's Haiti office, three possible cooperation models were identified:

Table 4. Possible Cooperation Models		
Scenario 1	Grant Model	The TaiwanICDF offers a grant to MC. One project manager is dispatched to the field to implement the project with the MC field team.
Scenario 2	Hybrid Model	Project components are separated into two parts: MC implements part of the project, which the TaiwanICDF supports financially. The TaiwanICDF then implements the remaining project components, for which MC offers management assistance to the TaiwanICDF.
Scenario 3	Technical Cooperation Model	The TaiwanICDF implements the project and MC offer advisors to assist from project design through to evaluation, with the TaiwanICDF covering the expense of such advisors.

Scenarios 1 and 3 are preferable to scenario 2. MC suggested that project beneficiaries may be confused if different organizations are implementing one project, and also noted that such an arrangement might generate unnecessary administrative work.

7. Recommendations

- In the time since the project proposal was created 18 months ago, the situation in the field has changed. Project activities should be modified accordingly⁹.
- The major reasons for disqualified mangoes are: mechanical damage, sap burn, diseases and pests. Mechanical damage and sap burn could be avoided during post-harvest processing. Whether disease and pest control measures should be included in the project could be discussed.
- In the short-term, the project could increase the quantity of qualified mangoes by focusing on post-harvest processing and marketing. However, the quality of mangoes can only be maintained, not improved, after harvesting. In the long-term, training in production techniques could therefore be added into the project.
- A grant project would not be a practical possibility for the TaiwanICDF; we suggest that MC consult with MOFA on the possibility of employing grants.

⁹ Preliminary revised project documents were received on March 30. Please see Annex 7 for details.

Annex 1: Mission Member List

For Mercy Corps:

- Mr. Paul Dudley Hart, Senior Vice President
- Mr. John E. Hanson, Haiti Country Director
- Mrs. Amy English, Global Technical Advisor, Agriculture
- Mrs. Sarah Wardwell, Haiti Saint-Marc Head of Office
- Mrs. Marie Carmel, Haiti Capacity Building Specialist

For the TaiwanICDF:

- Mr. Carlos Hsiang, Mission Leader, Taiwan Technical Mission in Haiti
- Dr. Wu Chun-ta, Assistant Professor, National Taiwan University
- Mr. Danny Yang, Horticultural Specialist, Taiwan Technical Mission in Haiti
- Ms. Regine Liu, Project Manager, TaiwanICDF

Annex 2: Appraisal Mission—Schedule

Date/Time	Schedule
Mon, 12 March	
8:00 – 12:30	Mercy Corps Office: Project update and discussion on collaboration
12:00	Lunch
12:30 Travel	
13:00	Meeting with Perry Family (Fair Trade, Organic Mango exporters) traceability
14:30	Meeting with ANEM (Association National des Exportateurs Mangues) - Bernard Kraan – production, problems, traceability
16:00 Travel	
17:00	Meeting Embassy of Taiwan
19:00 Dinner	Dinner with Embassy staff at Chez Wu
Tues, 13 March	
Travelers/Vehicles	1) John Hanson, Marie Carmel, Gene, Amy, Driver 2) Regine, Dr. Wu Chan-ta, Danny, Carlos, Driver 3) Alix Cantave Program Officer for Latin America and the Caribbean, Kellogg Foundation, Astrid Viveros, Paul Dudley Hart,
8:00 Travel	Depart PaP to travel to Mirebalais
10:00 Nirva	Nirva is the potential site of new PHC, meeting with Farmer’s Association representatives – RAPKOM , also it is a certified organic association
11:30 Travel	Travel to Saut d’eau
12:00 Saut d’eau	Lunch
12:30 Saut d’eau	Meeting with BAC (Bureau Agricole Communal) Agronome Bouccibault
13:30 Saut d’eau	Meeting with Concern Worldwide Project staff (satellite collection points, farmer training) - Thiamawa
15:30 Saut d’eau, Grand Savane	Meeting with Farmer’s Association – SAPKO PHC Manager – Blaize
17:00 Travel	Travel to Mirebalais – Hotel
Wed, 14 March	
9:30 Flight AA816	Departure: Paul Dudley Hart
09:00 Mirebalais	Bureau – Mercy Corps Mirebalais, meet teams, Lunch Meeting with WINNER project (production, provision of grates)
12:30 Travel to Oranger	
14:00 Oranger	Visit site of new PHC, meeting with Farmer’s Association representatives – SPAVO
15:00 Travel to Casales	
16:00 Casales	Visit of new PHC, meeting with Farmer’s Association representatives – MOSOPA ; PHC manager – Paul
17:30 Travel	Return to Port-au-Prince
Thurs, 15 March	

09:00	Mercy Corps Office Meeting with Agridev (marketing, value chains) Meeting with Technoserve (production, grafting, disease control, organic production methods)
12:30	Lunch
14:00	Possible meeting with SA Solutions Traceability – Kurt Jean Charles
Fri, 16 March	
10:30	Internal meeting Embassy of Taiwan
14:00	Mercy Corps Office Additional meeting time, Discussion of project, implementation plan, funding, and feasible cooperation model
Saturday, 17 March	
9:30 Flight AA 816	Departure: Amy English
15:10 – Flight AA 0896	Departure: Dr. Wu Chun-ta
	Regine and Gene travel to Savane Diane

Annex 3 Project Proposal

PROPOSAL TO ICDF: Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti



Photo: Fabiola Coupet/Mercy Corps, Haiti 2011

Mercy Corps Contacts:	<p><i>Headquarters Contact</i> Paul Dudley Hart SVP, Global Partnerships and Alliances 503.896.5842 pdudleyhart@mercycorps.org</p> <p>Amy Hause Senior Program Officer, Haiti Mercy Corps Portland 503.896.5866 ahause@mercycorp.org</p>	<p><i>Field Contact</i> Brian Oakes Senior Agriculture Advisor Mercy Corps Haiti Cell : (509) 3702 7466 boakes@mercycorps.org</p>
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Project Name:	Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti
Submission Date:	December, 2011
Goal:	The goal of <i>Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti</i> is to improve the living standards and decrease the economic insecurity of small-scale Haitian produce growers by increasing participation in the agriculture value chain in the Center and West Departments of Haiti.
Objectives:	<ol style="list-style-type: none"> 1. Increase capacity of five farmer associations (with over 7500 members) to function more effectively as organizations and better serve their members. 2. 15% reduction in post-harvest losses through better storage and crop handling, and the establishment and effective management of post-harvest centers. 3. Increase the capacity of 600 farmers to better manage their agricultural activities and achieve greater return on harvest. 4. Enable farmers to meet the increasing demands of higher value export markets through the development of a product traceability system and training on traceability and international standards of food safety.
Geography:	The Center and West Departments of Haiti
Beneficiaries:	600 direct and 3000 indirect
Duration:	July 2012 – December 2013
Funding Requested:	\$1,000,000

PROJECT OVERVIEW

Through *Improving Lives of Farm Families through Post Harvest Loss Reduction in Haiti*, Mercy Corps will carry out critical activities to address the needs of poor, small scale farmers in rural Haiti that will improve economic security by strengthening farmers' ability to engage more effectively in agriculture markets and provide greater economic security for their families.

Funding requested from Taiwan ICDF will support work in five communities in the Center and West Departments of Haiti. These areas have been selected because of their production potential for in-demand crops, their market access (regional road network), and farmer motivation, giving the project a high potential for success.

In Haiti, small farmers are the traditional suppliers of produce, both for local consumption and for export, but are plagued with numerous market barriers including: limited access to improved techniques, poor infrastructure, inadequate post-harvest management, lack of access to agricultural credit, lack of market information, inadequate knowledge of new food safety standards, and low yields that are inconsistent in quality.

In the post-harvest stages, inefficiencies both on farm and during the processing and transportation stages result in losses that are estimated to be between 40-50%.

The majority of farm families in the targeted project area are trapped in a cycle of poverty due to poor yields and an inability to take advantage of market opportunities. This cycle results in missed opportunities and below-market payment for produce. Despite the widespread existence of farmer associations, farmers are still not benefitting from collective action, because associations lack the financial, organizational, and business skills needed to run effectively, and they have limited ability to organize for economies of scale in the market.

Mercy Corps conducted a series of assessments in the agricultural sector determining that the area for the biggest impact and intervention was in the post-harvest phase (targeting the crops from the point of harvest on to the final market). These assessments show that in the final stages of harvest, by using best practices for crop handling, cleaning, sorting and packaging, small farmers can significantly reduce crop losses and ensure that a higher quality product is getting to market, which will increase the amount of income in their pockets. Furthermore, reducing these losses by half has been shown to be feasible and would mean that farmers would have 40 to 50% more marketable produce.

To address these urgent needs and opportunities, Mercy Corps proposes a program in partnership with ICDF to overcome these challenges and invest in technologies and training that will help Haiti's small farmers reach high value markets, which will in turn improve income and overall standards of living for rural families.

The project will promote activities that focus on: strengthening business and farm management capacity; improving production techniques; agricultural investments; access to credit; access to markets; reducing crop losses with a particular emphasis on post-harvest losses; establishing functional farmer's organizations; and access to and use of mobile technologies.

Mercy Corps will also initiate a produce traceability system in the target area and train farmers on basic international food safety standards to assure that farmers will not be excluded from high-value export markets as importing countries impose increasingly stringent regulations and export requirements.

The United States Food and Drug Administration (FDA) will soon require that all agricultural products imported into the United States be traceable to source of origin. Presently, Haiti does not have a national traceability system. Mercy Corps will work with Haitian produce exporters, other NGOs, and small producers to develop a traceability system in the target communities that will be supported by the Minister of Agriculture and that meet US standards.

The impact of these collective efforts will be to increase the living standard of poor farmers, thus reducing the susceptibility of farm families to economic shocks that affect their food security and overall wellbeing.

PROJECT GOAL AND OBJECTIVES

The goal of this project is to improve the living standards and decrease the economic insecurity of small-scale Haitian farmers by increasing their participation in the agriculture value chain in the Center and West Departments of Haiti. Specific objectives are:

Objective 1: Increase capacity of five farmer associations (with over 7500 members) to function more effectively as organizations and better serve their members.

Farmer associations have the potential to provide much needed services to their members, such as wholesale purchase of inputs, extension of credit, and provision of training. They can also provide organized representation to middle men and exporters, to serve as a conduit for communicating quality expectations and market demand, and to negotiate better prices for farmers. These associations exist in the project target areas, but are often weak or non-functional. Mercy Corps proposes to work with ICDF to build the capacity of these associations to support their members.

The five associations we will work with are diverse in their experience, management capacity, membership, and representation. In total, the associations represent more than 7500 farmers, with 1500 to 3000 registered members each. Of those, on average, 300 members per association are active (attend one meeting a year) and about 100-150 participate regularly in association meetings and activities. We will initially target the most active members in each association and work with the association committees to find ways to increase the participation of the membership.

The associations are at different levels of maturity, where some have greater experience working within an association framework with good democratic practices, and others that are younger and have little to no experience of working within formal association structures and are not run in a particularly participatory manner. Assessments of the associations will be carried out regularly to assess their composition and ongoing training needs. Our trainings will be adapted to the needs of the associations, their leadership, and their members.

One major role of the association will be to provide access to credit service for their members, which will enable farmers to harvest at optimal times according to market demand, instead of harvesting early when they are cash hungry, or selling at a low price to middlemen for bulk harvesting. This project will make connections between the associations and micro finance institutions so that they are able to access such services, though the project will not be directly providing these services.

Objective 2: 15% reduction in post-harvest losses through better storage and crop handling, and the establishment and effective management of post-harvest centers.

The project will build the capacity of associations to manage post-harvest community centers that will facilitate the work of farmer associations to improve market access and offer services that increase economies of scale for their members. These centers serve a

number of important functions. Fundamentally, these facilities will serve as a central physical location for farmers to bring their produce and for exporters and buyers to come and purchase produce. It therefore facilitates better communication and connection for both sides. Buyers can access a greater amount of produce at once, an incentive without which they may not be interested in buying from many remotely located farmers at all. Farmers can bring their produce and confirm market prices before selling. Another purpose of the center is for quality control and post-harvest handling. Fruits and vegetables can be washed, graded, and packed appropriately to protect the products. This capacity has been articulated as a priority by buyers and exporters, and will facilitate increasing the amount of produce sold.

There are two key conditions that will have to be met by each association before construction of the Center. The first is that the association will have to identify and contribute an appropriate piece of land, with easy access, water available, and a clear land title, the second is that the association will have to show that they have the organizational maturity to manage the post-harvest center. This will be demonstrated through the production of a sound business plan, which we will help to facilitate as one of the outcomes of our trainings. The members of the association will be expected to contribute labor during the construction phase, but the costs of materials and the fees of the construction company will be covered by the project budget. The associations will identify a local construction company through a competitive process.

Post-harvest centers will become assets belonging to the farmer associations. It will be up to each association to decide how to manage their post-harvest center. Depending on the level of maturity of the organization, they can choose to run the center themselves, contract a management group or an individual to run the center for them, or a combination of both, where some of the posts are filled by organization members and others by professional managers. During the course of the project, we will discuss each of these options with the organizations and make recommendations.

The predominant business model for post-harvest centers presently used in Haiti is that of the association purchasing products from producers, adding value (washing, sorting, shelling, grinding, etc), then selling on to the market. Farmers want to be paid as soon as the product is taken from them. Even in the case of fair trade mangos, where farmers get a return long after the harvest as an incentive to meet stricter standards, they are still paid market price upon delivery of their product. The business plan that each PHC prepares will have to demonstrate how they plan to make and distribute profit. At the management level, each center will need a PHC manager, a processing supervisor, and an accountant. Temporary staff would also be required during the harvesting seasons for washing, handling, sorting, packaging, shipping, and maintenance.

Post-harvest centers will act as focal points for the reduction of post-harvest losses. They will provide facilities for proper washing, grading and packing of produce. Communities will provide land for these centers, and the associations will manage them. Each center will include a lockable office with a computer for managing the business of the center, a washing station, a lockable area with packing tables and where crates can be stored, a water source, and a small solar electric system to run the computer and charge cell phones. The space can also be used to support training functions. During the training of the association, the particular specifications for each center will be determined based on anticipated types and amounts of produce that will run through the center, though the total amount to be spent on each center inclusive of the building,

tools, equipment, water and solar systems will be capped. The associations will be required to provide a percentage of the construction costs in the form of in-kind labor and/or materials. Though the aim is for all production in each area to pass through the centers, focal crops will include mangos (for local and export sales), citrus, bananas, peanuts, sweet potatoes, and pigeon peas (for local sale).

Objective 3: Increase the capacity of 600 farmers to better manage their agricultural activities and achieve greater return on harvest.

Mercy Corps will train farmers in a number of critical areas to improve their capacity to manage their farms more effectively and efficiently and to improve their ability to engage in agriculture value chains. Specifically, we will train them to manage their farms like a business, including introducing simple analytic tools to manage cash flow of agricultural activities and basic record keeping of expenses to calculate cost of production that will result in overall improved economic performance for the small farm. At the community level, farmers will strengthen their networks to develop economies of scale and strengthen market position, and improve access to inputs and services, collective learning, and risk sharing.

We will conduct a training of trainers on the more straight forward post-harvest practices, which the trainers can then take to other farmers in their villages. These trainings will focus on low-tech methods of decreasing losses, such as assessing when and how to harvest, using the right tools, and proper handling of the product after harvest, on-farm temporary storage, sorting, crate-packing, washing, and transport methods. Trainings will also cover pests and diseases, since this production issue continues to be a major constraint for farmers.

Mercy Corps will also carry out training on how to make financial transactions via cell phones through the use of mobile wallets. These mobile wallets provide an alternative method of payment to cash, which is more secure for both the buyer and the producer. Robbery and theft are a problem for farmers and buyers alike, and mobile money can diminish the vulnerability of both groups by reducing the need to carry cash. It also provides farmers an initial introduction to mobile financial services. The post-harvest centers can act as cash-out points for the wallets, as can local vendors who have adopted this technology.

Objective 4: Enable farmers to meet the increasing demands of higher value export markets through the development of a product traceability system and training on traceability and international standards of food safety.

Capacity building for farmer associations and farmer training on business and financial management and post-harvest practices is only part of the solution to improved livelihoods for participating farmers. Mercy Corps, in partnership with ICDF, will train producers at the post-harvest level on quality standards and the purpose and use of a traceability system.

Mercy Corps will introduce a traceability system in the project areas. We will work with associations to set up databases at the association level, and farmers will be registered in their association database and assigned a traceability code and given an identification card with the code information. We will train the association committees on how to register purchases and sales.

Mercy Corps will create a comprehensive training package that integrates FDA, and European market standards to target export oriented producers, in particular Mango producers who are already exporting or want to export. These tools, in combination with traceability activities will be effective in helping rural small holders improve post-production techniques and ensure that produce can meet the demands of higher value markets inside and outside the country. Trainings for producer groups will cover the following topics:

- Traceability
- Record keeping and internal self-inspection
- Varieties and rootstocks
- Fertilizer use
- Harvest and transfer to packing facilities
- Produce handling in packing facilities
- Waste and pollution management, recycling and re-use
- Worker health, safety and welfare
- Transportation to markets

Measuring Project Impact

The following indicators will be measured to track project impact (specific indicators for each objective can be found on the logframe):

- 1) # of farmers achieving greater return on harvest (% increase in quantity sold : % increase in volume harvested)
- 2) % decrease in lot rejection (Target: 15%) by Post-Harvest Centers and Exporters
- 3) % decrease in average (per smallholder farm) post-harvest losses per crop
Average proportion of smallholder members' commodities sold through Post-Harvest Centers.
- 4) % increase in sales
- 5) % usage of new mobile and tracing technologies

PROJECT ACTIVITIES

Activities under Objective 1 (*Increase capacity of five farmer associations (with over 7500 members) to function more effectively as organizations and better serve their members*):

- 1.1 Conduct an institutional capacity assessment for each association
- 1.2 Training to increase understanding of the mission of the association
- 1.3 Training of association committee (10 members from each of five associations) in governance, financial management, administrative management and collective marketing
- 1.4 Development of association management tools
- 1.5 Training of association committees in supply of financial services such as: savings and loans to members for investment based production.
- 1.6 Association committees assisted either to access commercial credit from the nearest provider or to develop their own savings and credit methods so that they can provide those financial services to themselves.

Activities under Objective 2 (*15% reduction in post-harvest losses through better storage and crop handling, and the establishment of post-harvest centers*):

- 2.1 Sensitization of association members on the role and importance of the post-harvest center
- 2.2 Construction of three new post-harvest centers (two exist already)
- 2.3 Facilitate selection and train the post-harvest center management teams on potential management approaches
- 2.4 Training of management team in procurement of supplies and equipment for the post-harvest centers including cost recovery, amortization, planning and maintenance, and equipment replacement.
- 2.5 Post-harvest center management team training for five post-harvest centers in post-harvest loss reduction, increasing quality and improved handling of agricultural products.
- 2.6 Facilitate management team to prepare and implement marketing plan for post-harvest center products, and training of management team on accessing markets.

Activities under Objective 3 (*Increase the capacity of 600 farmers to better manage their agricultural activities and achieve greater return on harvest*):

- 3.1 Training 600 farmers in post-harvest loss reduction, increasing quality and improved handling of agricultural products.
- 3.2 Training 600 farmers in marketing and business skills.
- 3.3 Training of 600 farmers in basic investments, obtaining and managing loans, recurring investment and credit needs.
- 3.4 Training 600 farmers in the use of basic financial management tools.
- 3.5 Training 600 farmers in mobile banking technology

Activities under Objective 4 (*Enable farmers to meet the increasing demands of higher value export markets through the development of a product traceability system and training on traceability and international standards of food safety*):

- 4.1 Coordinate with other strategic traceability partners on a quarterly basis.
- 4.2 Training of select association members in data collection and data entry for pilot traceability system.
- 4.3 Design and build data base.
- 4.4 Registration of selected association members in the pilot data base.
- 4.5 Sensitization of association members on the importance of a traceability system.
- 4.6 Establishment of a traceability system through the PHCs for agricultural production.
- 4.7 Training of 600 farmers on quality and phytosanitary standards for market.

PROJECT SUSTAINABILITY

The project will result in farmers having a stronger position in agricultural markets, which will increase their incomes, and therefore their ability to provide for their families, in the long-term. Farmer associations, which exist now but are very weak, will have greater capacity to function as entities that both serve their constituencies and bring in revenue to support their key functions. Post-harvest community centers will be managed

by the associations, and will be sustained through profits from the purchase of products directly from farmers for treatment and sorting before selling to the market. The centers and the individual farmers will be able to buy and sell at higher prices because of increases in quality. And farmers will be better equipped to make sound business decisions about the use of their resources because of greater capacity and a position of increased strength in the market.

MERCY CORPS IN PARTNERSHIP WITH ICDF

Mercy Corps proposes to build on our complementary strengths with ICDF, where ICDF takes an active role in the project. Specifically, we would like to engage ICDF sponsored technical experts for short term consulting assignments associated with identified areas of project need. The following potential area of technical expertise are of interest, though this list can be expanded or changed based on the interests and resources of ICDF: Process Management /Flow Management: This work would focus on identifying improvements and increasing efficiencies to processes such as stock and warehouse management, hygiene, inputs and outputs, storage, and post-harvest quality control systems. ICDF could also play a role in transferring new research out to farmers, particularly in the area of fruit and orchard management. If there are new, drought resistant varieties or other crops with successful field trials from Taiwanese research centers in the Caribbean that would be strategic for Haiti, we would encourage implementation of field tested technologies within the scope of the program. We are open to other areas of technical support that would also be of interest to ICDF to engage in, and we hope to continue a dialogue about what additional areas this might include, such as harvest management and scheduling, packaging, marketing, and support to farmers through mobile telephone applications (market information, pricing, technical support, etc.)

OTHER PARTNERSHIPS & COLLABORATION

Mercy Corps will coordinate and partner as appropriate with a number of other actors working in the agriculture sector in the targeted geographic areas.

Other NGOs working on similar issues include Concern Worldwide, Technoserve, and the USAID WINNER project run by Chemonics. All three of these organizations are training farmers in mango production techniques and are working either directly or indirectly on post-harvest handling. Regular coordination meetings have already been established.

Concern Worldwide is carrying out organizational development and creating mobile post-harvest satellite units. They are working in the same general target area, and we have already begun to closely coordinate with them to ensure that we are reinforcing each other's work and not overlapping. The satellite units will work with the more centralized post-harvest centers so that the produce goes first to the localized satellite units and not to the center. They have not begun training yet, and we will ensure that our respective trainings either target different farmers and associations, or cover different training topics.

The WINNER project is concentrating on nurseries and production techniques such as grafting, tree trimming and pest and disease control. Technoserve is working with Coca-

Cola to process mango pulp for juice, improve production techniques, build post-harvest centers, and build the capacity of mango farmer associations. Both organizations are working in different target communities than we are working in, but we intend to meet regularly to share best practices and find opportunities for collaboration throughout the project.

Other critical actors include:

MARNDR

The Ministry of Agriculture and Natural Resources and Rural Development's (MARNDR) Five-Year Plan for Agriculture calls for strengthening its capacity to provide better services to farmers and private entrepreneurs working in the agriculture sector. In a market-led economy, the role of the MARNDR is to provide an institutional framework and environment in which the private sector will prosper. The MARNDR therefore has an essential function in economic analysis, policy formulation, and provision of basic farm management advice to farmers so that they can make sound business decisions regarding economic choices for levels of inputs, cropping patterns, marketing and storage options, livestock feeding rations, etc. MARNDR is also encouraging the construction of post-harvest community centers to increase quality and reduce losses. The Ministry recognizes the importance of creating a national traceability system by 2013 as a series of stricter norms and standards is imposed on countries exporting to the United States, and will actively participate in setting the guidelines for the traceability monitoring systems to assure that they meet national as well as international standards and norms. The Local Departmental Bureau of Agriculture will accompany Mercy Corps in the training of producer associations and their members with the expectation that the Bureau will support the ongoing training and technical needs of the post-harvest community centers and their members upon completion of the project.

The National Association of Mango Exporters (ANEM)

The National Association of Mango Exporters will provide support in the form of guidance and information on the mango industry. They also play a coordinating role among the government, exporters, agricultural credit agencies, and NGO's. They will assist in the establishment of a national traceability system, and will facilitate the transfer and dissemination of information to the ten companies that export mangos. They will also be involved in trainings of farmers on quality standards, packing, and handling, for mangos and other export crops.

Farmers & Farmer Associations

The farmers themselves will be the central partner in this project. Though a new and unfamiliar role to many small farmers in rural Haiti, they have a critical role in the market-led economy as individual economic agents who must make business decisions based on economic factors. The project approach will be participatory and will emphasize farmer ownership over all aspects of the program.

Buyers & Exporters

Another important partner will be buyers, whose representatives will be involved at key stages such as training in quality control and market-oriented production, in which they have a vested interest. Buyers include the Madame Sara traditional produce traders who purchase from farms and sell in the cities, as well as exporters and processing companies. The produce buyers will explain their quality standards and the relationship between

quality and prices paid, and give trainings on packing and post-harvest handling to optimize quality and minimize post-harvest losses, thereby leading to increased profits for producers and traders alike.

MONITORING AND EVALUATION

Drawing upon its extensive Design, Monitoring, and Evaluation (DM&E) experience across many countries, Mercy Corps will implement a thorough monitoring and evaluation plan over the course of the project. Through these activities, Mercy Corps and program stakeholders will be able to determine whether the program is on track to meet targets, ensure that beneficiary input is used to guide ongoing implementation, and determine how the program has been able to generate alternative livelihood opportunities in rural Haitian communities.

Program monitoring and evaluation (M&E) will be a continuous and collaborative process conducted by Mercy Corps staff, program partners, participating local organizations, community members, contractors, and other stakeholders. The purpose of the M&E activities will be to determine baselines, track progress against indicator targets, and inform managerial and strategic decision-making in order to make ongoing adjustments to implementation strategies and ensure maximum impact.

The Haiti-based Mercy Corps DM&E Specialist will work with the project team to develop a detailed M&E plan and tools for collecting and analyzing data based on the outcome and output indicators. The M&E officer will oversee the monitoring process throughout the project, both with the DM&E specialist and program staff. Staff will use monitoring tools to routinely collect data to assess the project's processes and activities during implementation. In addition, tools will be developed for participatory monitoring with communities so that beneficiaries can evaluate the efficacy and process of interventions. Mercy Corps will ensure the participation of women and youth in monitoring and evaluation.

Mercy Corps will also carry out an initial baseline assessment in the first quarter of activities in order to establish a benchmark to measure program impact. An end-line evaluation will take place in the final month of the program (with analysis and report) and will look at the impact of the project's activities on the farmer and sectoral levels. This will include evaluation of the impact of post-harvest community centers on the reduction of product loss, the impact of organizational capacity building on the agricultural cooperatives' overall management, as well as the impact of business management training on individual producers' ability to run their farms more effectively. The end-line evaluation will measure overall impact of the program in the target areas and also look at sustainability and replication to other areas. Final results on program indicators and feedback from all stakeholders will be provided in the final report.

STRATEGIC ALIGNMENT WITH MERCY CORPS' INTERNATIONAL GOALS & VALUES

Since 1979, Mercy Corps has provided \$1.7 billion in assistance to people in 107 nations. Our global programs are supported by headquarters in North America and Europe and field offices in some of the world's most troubled and challenging regions. Mercy Corps

is a team of 4,000 professionals helping turn crisis into opportunity for 19 million people around the world each year. By trade, we are engineers, financial analysts, drivers, community organizers, project managers, public health experts, administrators, social entrepreneurs and logisticians. Mercy Corps believes that solving social problems in the developing world requires blending sustainable, entrepreneurial strategies with a deep knowledge of local culture and context. Mercy Corps puts first the expressed needs of the people we serve, partnering to create durable solutions that make sense in the community context.

Mercy Corps' mission is to alleviate suffering, poverty, and oppression by helping people build secure, productive and just communities. We believe countries affected by conflict, natural disasters or economic and political crisis offer tremendous opportunities for positive change. Our strategy is to reduce income poverty in transitional environments through market driven, community-led interventions. We work in places where we see the potential to turn a situation around, helping communities join forces with each other and harness the power of markets to change their lives for the better. We prioritize the expressed needs of those we serve, and do not impose foreign answers to local problems. As careful stewards of the resources entrusted to us, we work to build local capacity, move programs toward self-sustainability and to benefit the greatest number of people.

Mercy Corps takes a progressive approach, supporting communities, entrepreneurs, governments, and the private sector from recovery to long-term economic growth and encourages applying a market-development perspective to other sectors including agriculture, environment, water, health, and sanitation. In the agriculture sector, Mercy Corps is currently investing more than \$100 million worldwide, and works with smallholder farmers, agricultural businesses, and governments to reduce hunger, increase incomes, and mitigate the environmental impact to watersheds, crops, and livestock.

This proposal reflects a key Mercy Corps strategy of alleviating poverty by ensuring that markets work for the poor. Improved road infrastructure, production potential, and market demand have created an opening for us to provide critical support to farmers in rural Haiti to be able to take advantage of economic opportunities and lift themselves out of poverty.

PROJECT TEAM

Expat Staff:

The team will be led by an expat Agriculture Program Director, who will assume overall program management responsibility. He will work closely with the project partners to assure that the project objectives are accomplished within the allocated budget and timeframe.

National Staff:

Program Coordinator – Infrastructure & Process Flow: This project manager is an agriculture infrastructure and process flow specialist, responsible for the design of the post-harvest facilities and post-harvest handling processes.

Program Coordinator – Capacity Building: This project manager is a rural development specialist, with extensive experience training rural agriculture associations and farmers,

and will be responsible for developing all training modules, overseeing the delivery of the training, and supporting the post-harvest community center management team.

Program Officer: The program officer is responsible for technical training of the post-harvest community center workforce and association members, and has a technical agriculture background.

Three Farmer Trainers: will deliver the curriculum and support the program team.

PROJECT BUDGET

Item	ICDF Total	Mercy Corps Private Funds	Total
Personnel	529,381	276,345	805,726
Project Costs	340,184	164,979	505,163
Indirect Costs	130,435	0	130,435
Total Budget	1,000,000	441,324	1,441,324

Annex 4: Basic Information on Existing Farmers' Organizations

Basic information on existing farmers' organizations, including but not limited to the following items:

- | | | |
|------------|-------------------------------------------------------------------------------|-------|
| 1.1 | The number and location of potential farmers. | Tab 1 |
| 1.2 | The production area of each farmer. | Tab 2 |
| 1.3 | The structure of farmers' organizations. | Tab 1 |
| 1.4 | The average situation of the usage of agricultural machinery. | Tab 2 |
| 1.5 | The average situation of the usage of pesticide. | Tab 3 |
| 1.6 | The types, amount and harvest season of major agricultural production. | Tab 3 |

PHC Location	Farmers' Organization	Membership (total/active)	Structure of Farmers' Organization	Management Committee	Capacity Building Modules:	Capacity Building—Comments	PHC Type (Established/ Newly Constructed)	Comments on Construction and/or Improvements Required at PHC
Commune of Saut-d'Eau (Grande Savane)	Sosyete Agrikòl pou Pwodiksyon ak Komèsyalizasyon (SAPKO)	300/125	Structure of SAPKO includes the General Assembly of members, the Lead Committee and seven cells; also has a Commercialization Committee, Marketing Committee and a Technical Committee responsible for environment and agriculture.	General Assembly of members has an annual meeting where the members decide upon activities to be conducted by the Lead Committee. Lead Committee, comprising nine members elected by the entire membership, implements all of the activities of the association.	1, 2 and 3 to complete.	During the early stages of Mercy Corps' intervention, this association had only 35 founder members, of which only two members were active. Committee meetings were not held and the General Assembly was not convened. Now, the General Assembly will convene in March 2012 and seven cells comprising producers are becoming members of the organization. The next step will be to draft a Marketing Plan for the Post-harvest Center.	Established.	This PHC needs water resources to function properly, and another pool in which to process potatoes. A borehole would be the best way to provide water. Windows should be covered with tarp to reduce dust and prevent rainwater damage. Each cell is to be located in one production area.

Commune of Saut-d'Eau (Nirva)	Rassemblement des Planteurs pour la commercialisation et la Production de mangues Francisques (RAPKOM)	354/100	Structure of RAPKOM includes the General Assembly of members, the Lead Committee and some cells organized for harvesting in-season mangoes. Commercialization and some Technical Committees responsible for environment and agriculture.	RAPKOM committee is functional but members have a 'providers' status rather than membership status. Organization focuses on commercialization and production of mangoes but interests extend to others crops produced in their areas of production.	1, 2.	Management capacity is very low but has around five years' experience in commercializing activities. Able to identify weaknesses but requires assistance to build capacity.	Not yet established (expected).	Has a lot of materials provided by Winner and DAI/HAP but doesn't yet have a locally available human resources to implement certain operations, which has already caused losses during mango harvesting.
Commune of Cabaret (Casales, Cameau)	Mobilizasyon pou Sove Pwodiksyon Agrikòl (MOSOPA)	16/14	MOSOPA has only one functioning committee, although according to its status it should have a technical committee per sector, a General Assembly of members and cells. Only the first assembly has been organized to date.	MOSOPA was established by a group of producer associations in Casales (Cabaret), each represented by one committee member. After establishing MOSOPA, these associations did not form cells, leaving only one functional committee. With Mercy Corps' support, they have begun to establish nine cells.	1, 2, 3 (marketing plan is under preparation with Mercy Corps' support).	Would need support to continue to integrate members, establish cells and make PHC functional.	Established.	Already has sufficient land to build a PHC and plentiful skill in post-harvest processing of mangoes.

Commune of Croix-des-Bouquets (Oranger, near Commune Saut-d'Eau)	Sosyete Pwodiktè agrikòl ak Vandè Oranger (SPAVO)	100/75	Located in a production area, SPAVO was not functioning when Mercy Corps arrived. According to its status, must have a General Assembly of members and a committee, one technical committee by sector and one cell by locality. With the Mercy Corps support they are currently reviewing their status, improving their capacity to resume work, and a part of the committee has now met.	Plans to elect a new committee to support recovery of activities. Mercy Corps has provided assistance to revise the organization's status in accordance with recommendations that would gain recognition from the Ministry of Social Affairs (MAST). Members are very interested in recovering the functions of the organization.	1.	Needs support to build institutional framework and enhance functional capacity of the organization.	Not established.	
Commune of Archaie (possibly La Chapelle)				Producers' association as yet unidentified.				
Savane Diane (viability of this PHC as yet undecided)				No producers' association as yet.				

Assessment Report of the Haiti Postharvest Loss Reduction Project

Chun-Ta Wu

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Executive Summary

Most mango productions in Haiti are involved very limited field managements and the quality loss of mango fruit during postharvest handling is estimated as high as 50%. The fact that Haitian mango growers cannot easily perform field managements, including properly harvesting, due to extremely tall tree height (7 m or more) and huge canopy is attributed to the major cause of postharvest loss for this product. In order to shorten the mango trees, radical pruning for adult trees and implementation of intense cultivation system and technology for newly planting trees in the near future are recommended. The handling processes conducted in the existing Postharvest Center is gathering, washing, and sorting. Currently, mangoes are purchased based on fruit quantity (count), rather than on fruit quality (weight and/or size) by wholesalers and exporters. Further grading the harvested mangoes into different classes and traded with various prices according to their weight or size are suggested, which not only benefits the farmers, also assures quarantine effect and reduces heat injury for the hot water treatment done by exporters. In addition, adding temporary storage facility to the postharvest centers, as well as establishment of direct supply chain between farmer associations and Haitian supermarkets may improve the operation of the Postharvest Center and the revenue of the mango producers in Haiti.

Introduction

Mango is not only an important export horticultural commodity in Haiti also an indispensable cash crop to the Haitian small farmers. In terms of distribution during 2009-2011, Haiti is the top six country exporting mango to the USA, the largest single-country mango importer (Table 1). However, according to the estimations provided by growers and exporters, the rejection percentage for mango export in Haiti is as high as 40-50%, which significantly reduces potential income to small farmers producing this crop. Quality loss during postharvest chain, particularly from harvesting to wholesale or exporter, has been ascribed to the major cause of the high rejection percentage for Haitian fresh mango. The reduction of postharvest mango loss is an effective, easy, and instant way to increase the product availability and the income of Haitian small farmers, because the cost of preventing food losses in general is less than producing a similar additional amount of food of the same quality.

The major objective of this mission is to visit the mango small framers and exporters in Haiti and to appraise the Haiti Postharvest Loss Reduction Project proposed by Mercy Corps to ICDF. The report is based on a visit to Haiti from the 11th to 17th March 2012.

Assessment and Observations

1. 芒果栽培概況

- 小農芒果栽培數 10 株/果農，且並非專業芒果栽培。
- ‘Francique’為海地出口芒果品種。
- 芒果植株高大(7 公尺以上)，沒有果園管理，結果量低。
- 考察時間剛進入芒果產季，尚未在採後處理中心作業。
- 看天田，無灌溉。

1. Mango Industry in Haiti

There are no large plantations of mango in the central plateau area of Haiti we visited (Fig. 1). The average number of mango trees owned by each Haitian grower is 10 trees, based on the information provided by Perry Family Company (see below). Moreover, most, if not all, of the mango producers we met were not mango-specific producers, i.e., they also plant other crops such as corn, avocado, sweetpotato, pigeon pea or/and sorghum.

'Francique' (or 'Francis') (Fig. 2) is the best-known as well as the only mango cultivar exported to the USA in Haiti. The fruit is oblong, sigmoid with rounded base in shape and weighing 350-500 g. After ripening, the peel is greenish to bright yellow and the flesh is orange color, soft and juicy with medium fiber, and sweet taste with a pleasant aroma.

Because Haitian mango growers traditionally never prune mango trees, adult trees can attain a height of 7 meters or more (Fig. 1). The trees are too tall to manage easily; as a consequence, Haitian farmers typically apply no management practices to their trees. Although the canopies of mangy Haitian mango trees are huge, trees have only a few fruit on some shoots whereas most of the branches have no fruit (Fig. 1). They harvest whatever the trees happen to produce and the commodity can easily meet the criteria of organic farming. The mango production regions we visited in Mirbalais were not humid, it is probably the reason why anthracnose, a fungal disease caused by *Colletotrichum gloeosporioides* Penz., is not a severe problem there and the flavor of mango fruit is rich spicy and sweet.

2. 採後處理中心概況

- 已有基本的集貨、清洗、蓄水池、選別設備。
- 並無紗網隔絕昆蟲；缺乏輸送帶聯接。
- 只將果實分為外銷與內銷兩群。
- 水源不足。

2. The status of existing Postharvest Center

Two established Postharvest Centers, built via USAID grants, we visited were located in Grande Savane, Saut d'Eau (Fig. 3) and Cameau, Cabaret, respectively. Each of these two Centers has basic facilities including a roof, a cleanable concrete floor, two concrete wash tanks (Fig. 3C), a water reservoir and pump (Fig. 3B), two wooden grading tables (Fig. 3D), and ventilated plastic crates. But both Centers were not isolated from outer space with screen to prevent fruit fly invasion (Fig. 3A and B); no conveyer belt to connect different stations in the Center, and availability of washing water has been a problem to the Centers. Since major harvest of Haitian mangoes takes from March through August, with a smaller crop available from October to February, we did not get a chance to monitor the postharvest operations of both Centers. However, according to the interview with

SAPKO (Sosyete Agrikol pou Pwodiksyon ak Kome syalizasyon) Farmer Association at Grande Savane Postharvest Center, all the fruit on a mango tree were usually one-time harvested by hand, and were transported to the Postharvest Center. After entering the facility, harvested mangoes were water-washed in the tank without adding any bleach, detergent, or fungicide and air drying the extra water on the surface in the ambient environment. The product was then transferred to grading table and was manually segregated into two groups, i.e., export and domestic grade, by eye based on the external appearance and fruit size.

3. 太子港芒果出口商

- Perry Family 進出口公司出口有機認證、公平交易芒果。
- 包裝廠有溫湯處理檢疫設施。
- 芒果收購以數量為基準，並不依照不同產品品質給予不同價格。

3. Mango Exporters in Port au Prince

In this trip, we had a brief meeting with Ursula Perry and Ralph Perry Jr., the managers of Perry Family Import-Export S. A. which is one of the major certified organic and fair-trade mango exporters to North America at Port au Prince in Haiti. Besides providing training on picking and handling techniques to the members, the company has established its own mango traceability system by maintaining the paper records of each farmer's entire production history. Perry Family's packinghouse has equipped with hot water treatment facility approved by the USDA (Fig. 4A). After the disinfestation or quarantine process and room cooling at 12°C for overnight, mangoes were packed into cartons according to different fruit size (Fig. 4B).

4. 芒果果農組織

- SAPKO 農民水準高、年輕，可作為推廣教育的示範點

4. Mango Grower Association

Among the farmer associations we met, I was impressed by the members of SAPKO for the concepts regarding to harvest maturity and postharvest handling of mango they have.

Recommendation

1. 落實以重量或大小分級果實

- 在採後處理中心不要只是進行果實選別(外銷與內銷)，建議將合格品依重量、大小、外觀訂出不同等級(標準可採用出口商的標準)，以不同價格售予出口商，達到真正的公平貿易。藉此也可激勵農民栽培管理，使一級果數量增加，提高自身收益。
- 計畫結束，讓出口商收購品質要求，成為農民持續管理芒果果園的動力，如此創造貿易商與農民雙贏的局面。

1. Grading, but not only sorting, fruit by weight/size in the Postharvest Centers

Currently, the handling procedure conducted in the existing Postharvest Center are collecting commodity, cleaning, and sorting (only divided into export grade and non-export grade). The price paid by Haitian mango exporters is only based on fruit number (count) but not on fruit size or weight (quality). It is fair that a horticultural commodity with superior quality, for example bigger in size and heavier in weight, deserves a higher price. After sorting, I suggest that the mangoes can be further graded into several classes according to their weight. Fruit from different classes will be traded for different prices. This policy not only benefits the farmers, also may assure deinfestation effect and reduce heat injury for hot water treatment done by exporter due to uniformity of fruit size. In addition, the fact that higher proportion of exportable first class mango fruit represents more revenue will be received can encourage the mango producers to perform orchard managements such as training and pruning, fertilizing, pest and disease control, and harvest and handle product carefully. The only equipment they need to add is several weighters or balances.

Using slide conveyor to connect each processing station in the Postharvest Center can minimize the case of carrying product by workers and reduce the chance of physical injury during handling.

2. 建立集約管理芒果栽培系統與技術

- 選擇有意願管理、配合度高的農民，小面積新植芒果嫁接苗，推廣集約芒果果園栽培系統與技術，成為示範點。
- 逐年矮化高大芒果樹。新植芒果應由果園栽培管理技術教育做起，需 4 年以上才能看見成果。如果不矮化，管理與採收皆不便，造成目前海地芒果

損耗最主要的機械傷害問題亦不易降低。

- 集約精緻栽培才有高品質，但如果農民無法持續密集管理，修剪矮化植株因根系較淺、樹體貯藏養份少，對環境逆境的忍受能力必然不及高大樹體，可能反而降低產量。
- 有管理記錄才有追溯系統建立之必要性。

2. Implementation of intense cultivation system and technology for mango production

It is important to emphasize that fruit and vegetable quality begins in the field. Mango quality can only be maintained, not improved, after harvest. In order to increase the incomes of Haitian mango small farmers, transforming Haitian mango production from a wild harvesting way to an intense cultivation system to improve both yield and fruit quality is inevitable and urgently required.

The height of existing adult mango trees need to be gradually reduced year by year through proper training (or radical pruning) technique to facilitate operations of orchard managements including pruning, spraying, and harvesting. It has been estimated that most of fruit deterioration, more than fifty percentage of mangoes produced in Haiti, were occurred prior to collecting or postharvest center, especially those caused by mechanical damage. Difficulties for growers to reach each fruit for field operations during fruit development and to pick the product genitally when mature are ascribed the major problems. Therefore, shortening adult mango trees to around 2 meters is necessary.

For newly planting mango trees in the near future, on the other hand, I suggest that to establish some small-scale, modern, commercialized mango orchards on the lands of Haitian growers selected from the current farmer associations with high cooperation willingness and under the advising and technical assistance of ICDF horticultural specialists for demonstration. The other farmers near by the demonstrating orchards will be impressed by the yield and quality differences of mango produced between intense cultivation and the production way they are utilizing, and will be willing to adapt the recommended planting system. Unfortunately, the impacts of this suggestion will not be able to see within the coming one or two years. It may take at least four years for the effect to be demonstrated. But I strongly believe that it is the only solution to improve the mango industry and, thus, the income of the growers in Haiti.

One thing needed to be aware is that the tolerance for various stresses, such as drought, high temperature, or diseases, of a small fruit tree is usually worse than that of a large tree does, because of less amount of reserve in the trunk and shallower the root system in the ground. Therefore, the former needs intense practical management in order to gain good revenue. It means not much to build up a traceability system in an agricultural area without field management and practical record.

3. 增設暫時貯藏設備

- 目前沒有控溫暫存空間(10-15°C 冷藏庫)，農民可能必須在當天出售，否則腐損增加，因此只能賤價求售，價格可能全由外銷商或中間商主控。
- 暫存設施可緩和芒果處理作業集中於下午，上午可能無沒有果實可處理的現象。

3. Adding Temporary storage facility in the Postharvest Centers

There is no temporary storage room available in these two Postharvest Centers. Such a facility can buffer mango supply-demand chain and avoid the case of lowering price to sell out all the harvested fruit in a day. Furthermore, fruit delivered to the Center late can be stored in this space and be handled next morning, which will make the Center operation more efficiently in day time. Of course, it will be better if the temperature of temporary storage room can be controlled within 12°C to 15°C.

4. 直銷超市

- 超市價格較傳統市集佳，跳脫中間商階段，由農民組織直接銷售到超市或高級餐館，果農可獲得較高的利潤。

4. Establish direct supply chain between growers and Haitian supermarkets

Direct supply chain from farmer associations to retailers can detour wholesaler (Madam Sarah) and create better revenue for the farmers. Selling of mangoes directly to Haitian supermarkets and/or celebrated restaurants is a sale channel worthy to try.

5. 各階段採後損耗百分比需要實際考察評估，才能找到主要原因與亟待解決的問題

- 改善芒果採後處理作業，減少採後損耗，需要實際調查分析芒果由採收到出售給貿易商期間，各項損耗原因與比例，才能針對原因思考因應對策。

5. Investigating the percentage and cause(s) of product deterioration at different postharvest steps

To diminish postharvest loss, the percentage and cause(s) of product deterioration occurred at each step from farm through retail site have to first be assessed and investigated. After figuring out the major problem(s), then the possible postharvest techniques to dealing with can be recommended.



圖 1. 海地 Grande Savanea 芒果成株。植株高大但結果量稀疏。

Figure 1. Adult mango trees at Grande Savanea, Haiti.



圖 2. 海地太子港超市販售的'Francique'芒果。果皮機械傷害嚴重。

Figure 2. Packed 'Francique' mangoes display in a supermarket at Port au Prince, Haiti.

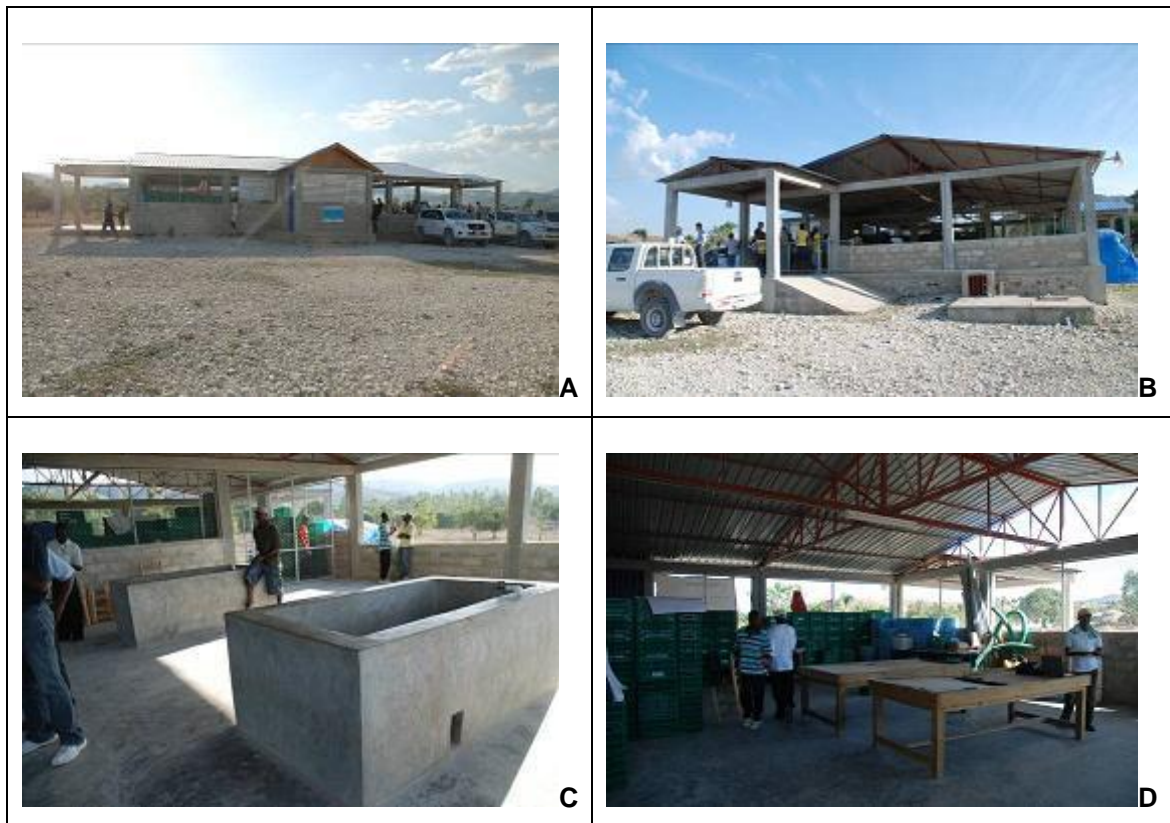


圖 3. 海地 Grande Savane 採後處理中心。(A)中心包括清洗區(右側)、選別區(左側)、辦公室(中央)；(B)清洗區產品入口與蓄水槽；(C)清洗區水泥清洗槽；(D)選別區木製選果檯。

Figure 3. The Postharvest Center at Grande Savane, Haiti. (A) The bulding appearance of the center, which includes a washing and cleaning area (the right side), a sorting and grading area (the left side), and a office (the center room). (B) The product entrance of the center and the water reservoir. (C) The two concrete wash tanks in the washing and cleaning area of the center. (D) The wooden grading tables used in the center.



圖 4. 海地太子港芒果出口商 Perry Family Import-Export S.A. 包裝廠檢疫芒果溫湯處理設施(A)與包裝盒(B)。
Figure 4. The hot water treatment quarantine facility (A) and the corrugated boxes utilized for mango export (B) in the packinghouse of Perry Family Import-Export S.A. at Port au Prince, Haiti.

表 1. 美國芒果市場 2009 至 2011 年前六大進口國與進口量。海地為美國芒果第六大輸出國
 Table 1. The top six mango export countries and the import amount for the USA during 2009 - 2011.

THREE YEAR TRENDS FOR U.S. MANGO IMPORTS BY COUNTRY AND BY MONTH, 2009 - 2011

Top 6 Source Countries Representing 99% Of Imports Into The U.S.

Country	Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Country Total	%
Mexico	2009	37	1,645	5,468	6,591	7,377	8,655	6,869	3,365	584	8	5	9	40,613	64.10%
	2010	14	232	3,633	6,518	9,818	9,044	9,344	6,745	2,037	115	7	13	47,519	67.23%
	2011	43	1,336	4,734	7,827	9,669	11,031	9,005	6,573	1,549	58	12	5	51,842	63.97%
	AVG	31	1,071	4,612	6,979	8,955	9,577	8,406	5,561	1,390	60	8	9	46,658	65.08%
Peru	2009	1,528	810	569	34	0	0	0	0	0	0	18	858	3,817	6.02%
	2010	2,157	2,998	1,592	13	0	0	0	0	0	2	1	329	7,093	10.03%
	2011	2,463	4,652	2,698	110	0	0	0	5	0	0	0	34	9,961	12.29%
	AVG	2,049	2,820	1,620	52	0	0	0	2	0	1	6	407	6,957	9.70%
Ecuador	2009	1,237	125	0	0	0	0	0	0	0	801	2,737	2,884	7,784	12.29%
	2010	698	0	0	0	0	0	0	0	0	587	2,676	1,691	5,652	8.00%
	2011	1,194	170	5	0	0	0	0	0	3	538	2,330	2,454	6,694	8.26%
	AVG	1,043	98	2	0	0	0	0	0	1	642	2,581	2,343	6,710	9.36%
Brazil	2009	0	0	0	0	0	0	0	630	1,517	2,008	946	0	5,101	8.05%
	2010	0	19	196	0	0	0	0	401	1,658	2,656	450	0	5,380	7.61%
	2011	0	59	100	0	0	0	0	383	2,705	1,713	464	40	5,464	6.74%
	AVG	0	26	99	0	0	0	0	471	1,960	2,126	620	13	5,315	7.41%
Guatemala	2009	0	0	374	1,570	1,209	90	0	0	0	0	0	0	3,243	5.12%
	2010	0	0	110	1,069	1,419	198	0	0	0	0	0	0	2,795	3.95%
	2011	0	131	870	1,645	1,265	26	0	4	0	0	0	0	3,941	4.86%
	AVG	0	44	451	1,428	1,298	105	0	1	0	0	0	0	3,326	4.64%
Haiti	2009	0	0	0	291	805	227	431	226	6	0	0	0	1,986	3.13%
	2010	0	0	0	9	286	709	338	80	1	0	0	0	1,423	2.01%
	2011	0	0	0	539	769	346	91	282	6	0	0	0	2,033	2.51%
	AVG	0	0	0	280	620	427	286	196	4	0	0	0	1,814	2.53%
2009 Totals		2,804	2,582	6,682	8,770	9,590	8,999	7,324	4,225	2,107	2,817	3,706	3,751	63,357	100.00%
2010 Totals		2,869	3,254	5,861	7,942	11,587	10,010	9,692	7,227	3,700	3,361	3,138	2,037	70,679	100.00%
2011 Totals		3,700	6,364	8,859	10,615	11,800	11,433	9,104	7,247	4,269	2,309	2,807	2,533	81,041	100.00%
AVG TOTAL		3,124	4,066	7,134	9,109	10,992	10,148	8,707	6,233	3,359	2,829	3,217	2,774	71,692	100.00%
3-Yr Avg %		4.36%	5.67%	9.95%	12.71%	15.33%	14.15%	12.14%	8.69%	4.69%	3.95%	4.49%	3.87%		

Stated in 10,000 lb units
 Source: USDA Foreign Agricultural Service



From: <http://mango.org/sites/default/files/download/3yrtrend.pdf>

海地芒果生產現況

簡介

芒果為海地最主要的果樹作物。根據 FAO 在 2010 年報告指區，海地的芒果生產及出口量曾達世界前十名國家之一。海地芒果品種繁多，常見商業品種包含 Baptiste, Corne, Doudouce, Jean-Marie 以及 Francisque 等，其中以 Francisque (又稱 Francis 或 Madame Francisque) 因其熱處理耐受性高，且香氣芬芳、口感細緻而廣受消費者喜愛，成為唯一出口至美國的品種。Francisque 種約占海地芒果生產總量的 15%，但僅約 25-33% 的產品可成功外銷。

Mango is the principal fruit grown in Haiti. According to FAO, Haiti was among the ten mango producing countries in the world (FAO, 2010). There are more than 100 varieties on the country (J.M.B., 2005). Common commercial varieties includes: Baptiste, Corne, Doudouce, Jean-Marie and Francsque. Francisque is the only variety exported to the United States for its tolerance of hot treatment. Francisque comprises 15 percent of total mango production in Haiti and only 25-33% percent of production is exported (CRS, 2011).

2007 年由於果蠅感染問題海地芒果一度被禁止出口至美國，直到在生產區建立偵測及管控計畫（此計畫由農部、ANEM 以及 USDA/APHIS 共同執行）後才再度有條件的開放（出口產品須經溫湯處理）。

Haitian mango was restricted exporting to the United States owing to infestation with fruit fly. The restriction was relieved until the implantation of a detection and control program running by MARNDR, ANEM and USDA/APHIS.

栽培現況

海地芒果主要生產地區包括北部省 (Nord)、阿迪波尼地區 (Artibonite)、中央平原區 (Central Plateau) 及南部省 (Sud) 等，本次考察地區為中央平原區，估計每年生產約 1,000,000 打芒果，海地多為小農且採野生栽培，平均每戶農民栽培量僅 10 顆樹以下，鮮少投入任何資材使用如肥料、農藥等，亦缺乏樹體管理等觀念，造成產量低落及採收困難。由於海地農民普遍缺乏整枝修剪知識，其錯誤觀念認為樹體越大則產量會越高，因此多放任樹體自由生長，造成樹體過高 (可達 4-5 公尺) 而不利採收作業，枝幹過密而病害易發生，以及枝葉擦傷果體減少商業價值等負面影響。平均產量因樹體差異甚鉅可自 5-10 打/株/年至 70-75 打/株/年。

The major mango producing area are Nord, Artibonite, Central Plateau and Sud. Our mission visited Central Plateau where produce around 1,000,000 dozens/years of mango. Most of the farmers in Haiti possess only less than 10 trees. They rarely use any agricultural inputs and careless of management. Farmers have a wrong concept that mango trees must reach a large size that they can begin producing mango. As a result, most of the trees reach more than 4 meters that farmers have more difficulties to harvest mangos. The average production varies from 5-10 dozen/year to 70-75 dozen/year.

現行採收方式及成熟度判別

3 月至 11 月為海地芒果主要產季，小農多以目測方式進行成熟度判別，由於芒果樹體過高，無法直接地面摘採，少部分農民會以工具進行採集，但多數乃由採收工攀爬至樹梢摘採後投下，由地面工人銜接。由於此採收方式耗時且費力，農民常將全株果實不論成熟度是否足夠一次採收，且易造成果體傷害，造成產品損耗率高達約 50%

Generally mango harvest season start from March and end up in September. Harvesting is sometimes carried out by picking tools but most of the time by climbing the tree and drop to the catcher on the ground. Since farmers must take great efforts that they prefer harvest all the fruits in one time regardless the maturity of individual fruits. In this way fruits take more damages and almost 50 percent of loss is due to this practice.

病蟲害問題

海地芒果主要病蟲害為果實蠅及炭疽病，炭疽病會危害果實、花穗、嫩葉及嫩枝等，造成芒果產量嚴重下降以及果實外觀產生黑色斑點而喪失出口價值，本次參訪地區炭疽病發生未如預期的嚴重，可能因雨季尚未開始有關。果實蠅會於鮮果內產卵。孵化後之幼蟲以果肉為食，引起果實軟化、變黃、腐爛及落果，降低產量並使果實失去商品價值。因海地已確認為果實蠅疫區，故出口至美國之芒果皆需進行溫湯處理。

The fruit fly and antrachnose are the major phytosanitary problem, when antrachnose may jeopardize fruits, flowers, young leaves and branches that cause the production drop tremendously and the fruit fly lay eggs in fresh fruit that incubated larvae will cause etiolating, decaying and dropping of fruit. During the observation occurrence of antrachnose was not as serious as expected that possibly due to the rainy season had not approach yet. Since Haiti has been verified as fruit fly affected area, all mangos exported to United Stated must be hot water treated.

農民組織現況

SAPKSO (Sosyete Agrikòl pou Pwodiksyon ak Komèsyalizasyon)

本組織目前分為 7 班 (cell)，登記成員共 300 名，實際參與成員為 125 名；此農民組織結構較完善，委員會由成員共同選出 9 名擔任主席、秘書、書記等職務。採後處理中心已開始運作，前一期銷

售量為 25,000 打，除販售予出口商外，於太子港有設立銷售點販售次級品。

The association is divided into 7 cells, with 300 registered members and 125 of the members are active. the association has an more intact structure (comparing to others associations) and there are 9 committee members elected by all participants. The post-harvest center has began to operated. The previous season 25,000 dozen of mangos are sold to exporters. A local sales station is set in PAP to sell the unqualified mango.

RAPKOM (Rassemblement des Planteurs pour la commercialisation et la Production de mangues Francisques)

本組織目前分為 7 班，登記成員共 354 名，實際參與成員為 100 名，於 2005 年 12 月由 USAID/DAI 協助成立，與出口商 Perry Family 合作下，其中有 27 戶已獲得有機認證。Worldwide Concern 曾提供栽培協助（成果不明）。尚未有採後處理中心等硬體設施。

The association is divided into 7 cells, with 354 registered members and 100 of the members are active. The association is established by the assistance of USAID/DAI program. Cooperating with Perry Family that 27 members has obtained organic certification. World Concern has provided growing technical support however it seems the results remain vague.

MOSOPA (Mobilizasyon pou Sove Pwodiksyon Agrikòl)

本組織尚未完善，登記成員僅 16 名，實際參與成員為 14 名，已成立委員會，目前由美慈進行協助設立管理中，預計將成立 9 個班。

The association is under organizing by the assistance of Mery Corps. Currently there are 16 registered members and 14 of the members are active. They expect 9 cells will be build.

SPAVO (Sosyete Pwodiktè agrikòl ak Vandè Oranger)

本組織目前共 7 班，100 名班員，，委員會有 8 名會員，採收期每個月定期召開 4 次會議，已有一座採後處理中心，尚未正式啟用，本季預計銷售 25,000 打芒果。銷售出口商如 J.M.B.及 Caribbean Fresh 等，不符合出口規格之次級品除售至當地市場外，亦售至鄰近飯店。不同出口商收購價格相近（約 50 古德/打），旅館收購價為（約 40 古德/打），因本區產期較早，且近太子港，故價格較其他地區高。

The association is divided into 7 cells, with 100 registered members and 75 active members. There are 8 committee members which hold meetings regularly (4 times a month during harvest season). The post-harvest center was already completed and begin to operate in the coming season (approximately 25,000 dozen will be sold to exporters such as J.M.B. or Caribbean Fresh). The unqualified products will be sold to local market and nearby hotels. The buying price between exporters are similar (around 50 Gdes/dozen) and price of hotel is around 40 Gdes/dozen. Owing to the producing season is earlier than others and transporting convenience to PAP, producer at this region can have a better price than others.

出口商現況

海地出口商聯盟 (Association Nationale des Exportateurs de Manges, ANEM) 由十個主要出口商組成，本次考察僅參訪 Perry Family 公司。Perry 為目前海地最大間出口公平認證及有機認證的出口商，依據公平認證規定，Perry 會支付額外補貼 (premium) 給合作的認證農民組織，同時 Perry 已建立紙本的產品追溯系統，由於 Perry 的產品要求門檻較高，因此退貨率亦高，但買價也較其他出口商好 (58 古德/打)。

ANEM (Association Nationale des Exportateurs de Mangues, ANEM) is assembled by 10 major exporters. In this mission we only visited Perry Family which is the largest exporter that export fair trade and organic certificated product. According to the fair trade regulation, Perry buys the products with a price higher than average but also pays "Premium" to the association. Perry has establish its own paper-work traceability system. Perry has a higher demand on products quality. The rejection rate is higher while they provide a better price (58 Gdes/dozen).

芒果銷售現況

中央平原地區之芒果銷售主要透過 1)出口商：以 ANEM 成員為主，亦有部分未參與聯盟之出口商。通常能以較高價格向農民購買產品，價格範圍為 1 USD ~ 1.6 USD/打。2)零售商 (Madam Sarah)：Madam Sarah 是當地最常見的零售商，無法出口的芒果會透過 Madam Sarah 售往當地市場，價格落在 80 古德 ~ 100 古德/籃 (4-5 打)。3)中間商 (votigeurs)：部分出口商不直接向農民購買產品，votigeurs 向農民收購後銷往這些出口商。votigeurs 會預付農民訂金，因此農民會同意以較低價格將產品賣給他們，通常以每株果樹為單位計算價格，範圍在 1,500-2,000 古德/株之間。

There are three approaches to marketing in Central Plateau: 1) **Exporters** usually can provide a better buying price to farmers. The prices falls from 1 USD to 1.6 USD/dozen. 2) **Madam Sarah** is a local broker. Those mangoes don't meet the quality to exporters will go to local market by Madam Sarah. The prices falls between 80 Gdes and 100 Gdes/ basket (4-5 dozens). 3) **Votigeurs** is a middleman. They provide cash in advance to the farmer to reserve the products before they are ready to pick. Therefore those farmers who are in urgent need of cash may agree to sell to Votigeurs with a lower price. The price falls 1,500-2,000 Gdes/tree (depend on the tree size).

農部政策執行現況

目前農部應與 USAID 合作進行果蠅偵測計畫，但據悉其執行效率極低，所聘僱之偵測員多未完成實際觀察。考察過程曾與一名農部僱員會談，結果顯示農部所投入之人力及物力皆低，如 Mirebalais 區之計畫辦公室破舊不堪，且僅有一名計畫執行人力。另觀察到芒果採收季節係由農部發佈，後出口商才開始進行收購，但如現 (3) 月實際上芒果已進入採收期，農部仍未發佈消息。ANEM 成員亦對農部之角色採不信任之態度。

A detection and control program of fruit fly should be carrying out by the MARNDR (Ministry of Agriculture, Natural Resources and Rural Development) and other partners. However, we have been told the executive efficiency is extremely low. In the conversation with a agronomist assigned to Mirebalais area we realized Minister barely has any fund or man human input. Another observation is the official harvest season is decided by the Minister. After the declaration that exporters will begin the purchase. However, In fact fruits are ready to harvest before Minister take any actions. Members of ANEM also adopt a distrustful attitude to the Minister.

執行現況

本計畫共有四個主要目標：1) 強化 5 個農民組織能力。目前已完成大部分基本資料調查及統整，同時已著手進行組織管理訓練；2) 建立採後處理中心及改善貯藏、農產品處理以減少 15% 採後損失。已完成 3 座處理中心之測量、工程量清單及可行性等評估；3) 強化 600 名農民經營管理及產品操作能力：已提供 116 名農民採後處理相關訓練，同時正在進行設計經營管理訓練辦法；4) 建立農產履歷制度以提升出口價值。現正與 J.M.B.、Voila 及 SA solution 合作開發系統，目前成果如後段所述。

The progress to date of the 4 objectives in the program are: 1) Increase capacity of five farmer associations: Mercy has complete most of the data mining and 4 associations are under training. 2) 15% reduction in post-harvest losses through better storage and crop handling, and the establishment of post-harvest center: Mercy has worked with association committees (but not with the member). All necessary construction information are ready. 3) Increase the capacity of 600 farmers to better manage agricultural activities: 116 farmers are trained with agricultural handling technique. 1 training module is in development for marketing. 4) Develop a product traceability system to meet the demands of export markets: Mercy is working with J.M.B, Volia and SA Solution to develop a traceability system combined with QR code and GPS.

農產品追溯系統可行性

農產品追溯系統之建立主要為因應未來美國 USDA 將要求所有產品應提供生產履歷，目前 USDA 雖無明確規定，但主要需求應包含生產地、生產者、出口商等資訊，然應更進一步了解是否需要提供其他細節，如台灣係配合良好栽培規範 (Good Agriculture Practice) 等。美慈現正著手建立一資訊平台，配合 Android 系統軟體及 GPS 衛星定位，可將產品背景資料上傳至 ODK (Open Data Kit) 網路平台供人查詢。

The need of establishing the product traceability system is especially for the requirement of USDA policy. Though USDA has not set up a solid regulation, the basic information should include place of origin, producer, exporter and other details. However there should have much difference with the system we have in Taiwan that further research is necessary. Mercy is now developing a system which combine with Android software and GPS to upload the background information to the internet platform that can be inquired.

國際組織援助現況

本次考察原定與 Concern Worldwide 以及 USAID/WINNER 兩個國際組織（計畫）會談。Concern Worldwide 目前計畫執行方向與美慈計畫同質性高，其中雖有針對改善生產面之活動，但係由當地合作單位進行，目前成果未知；另亦有改善採後處理活動，與美慈計畫目標重疊。USAID/WINNER 會談因故取消。

We had scheduled to meet with Concern Worldwide and USAID/WINNER however the meeting with USAID/WINNER was not happened. We are surprisingly realized Concern Worldwide is already working on mango value chain. They are also building post-harvest center which share the same strategy with Mercy Corp. Additionally they work with local partner on the producing level, however the achievement is unknown.

問題發現及建議

計畫活動目標：本次考察可觀察到美慈具備優異的農民組織能力，然在採後處理中心設立部分，由於海地已有其他國際組織協助芒果產業（如 Concern Worldwide 及 USAID 等），應加強與其他國際組織之協調溝通，以避免重複投注資源；另由於目前農民仍缺乏整枝修剪及果園管理等技術觀念，若僅提昇採收、採後等後端作業，其獲得影響將有限，增加針對生產層面之相關活動，將有利未來整體產業發展。若建立採後處理中心產品分級制度，以區別不同等級產品價格，可增進農民組織與出口商議價籌碼，且具鼓勵農民改進栽培方式已提昇產品品質之效果。

Modify the project activity: During this mission we find Mercy Corp shows an excellent ability on organizing associations. However we realize there are other NGOs (such as Concern Worldwide and USAID)

has been working on mango value chain. We recommend Mercy may open a dialogue to communicate with other NGOs to avoid repeated input. Since most farmers are lacking of agricultural technique such as pruning trimming and others methods, the influence of the program will be limited If only focus on post-harvest level. To increase activities on producing level may benefit the development of whole mango value chain. By establishing grading system at post-harvest center to distinguish price in different level may increase the advantages when associations bargain with exports also encourage farmers put more efforts to improve products.

生產層面可嘗試達成以下目標：1) 樹體矮化及管理。為了有效迅速改善現有樹體以便利採收及減少病蟲害，藉由成立及訓練專業的栽培技術班，提供田間修剪及矮化服務；但為避免樹體修剪後恢復期間造成生產空窗期，應以逐步漸進式進行；2) 設立種苗園暨示範果園。由於農民舊有觀念根深蒂固，不易接受改變，可找尋配合意願高之農民或由農民組織合作建立示範果園，示範果園可直接顯現投入技術及資材後之生產成果，農民可了解其實際生產效益而提升投入勞力之意願；同時果園生產優良種苗以提供農民栽種，將可提高果樹栽培密度；3) 提升農民栽培技術及訂定規範。舉辦講習會以及田間觀摩等活動，同時協助建立良好栽培規範供農民遵循。

We recommend the following activities can be attempted: 1) Tree shape shortening and management. Improvement of tree shape can facilitate post harvest procedure and reduce phytosanitary problem. By establishing a professional technical team to provide pruning and trimming service in the field can efficiently improve the existing tree shape in short time. However to avoid creating a producing gap time, the treatment must proceed gradually. 2) Establish nurseries and demonstration farms. Since the farmers refuse to adopt new concepts or skills easily, demonstration

farms are necessary to be established to show farmers the difference while adequate technique and materials are applied. Demonstration farms can be also used as nurseries to provide healthy seedlings to increase growing density. 3) Promote farmers' growing skills and establish a GAP (good agricultural practice, GAP) system. 配合 previous 2 activities. Hold workshops and regularly and set up a standard growing protocol for farmers to follow.

計畫期程及階段：本計畫期程為 18 個月，然以農業型計畫而言，若欲達到實質效益，建議延長計畫期程或分兩階段進行，第一階段配合美慈現有的農民組織架構，進行基本生產面技術提升，第二階段配合已建立之採後處理中心，強化採後處理及產品追溯系統。

Extend the project schedule: The program is designed in 18 months, however to expect a greater achievement that an elongate period or after-step phase is recommended. In first phase the producing level can be promoted basing on Mercy's existing farmer associations. In second phase enhance post harvesting procedures and traceability system basing on established post-harvest center.

Annex 7: Preliminary revised project document

Improving Lives of Farm Families through improved agricultural productivity and post-harvest management in rural Haiti

I. Overall Project Objectives

Since the last version of the proposal, we have reduced the number of areas we are proposing to work in from five to three, but are expanding the objectives to include improvement of production.

1. Increase capacity of three farmer associations to function more effectively as organizations and better serve their members.
2. 15% reduction in post-harvest losses through better storage and crop handling, and the establishment and effective management of post-harvest centers.
3. Increase the capacity of 450 farmers to better manage their agricultural activities and achieve greater return on harvest.
4. 450 farmers increase farm productivity through better orchard management using new production techniques, irrigation, pruning, grafting, and overall improved agricultural practices. (ICDF)

II. Management Structure

Mercy Corps is looking forward to building on our complementary strengths with ICDF, where ICDF takes an active role in the project. ICDF' scope of work will be a clearly defined subset of the project, and is further articulated in section III below.

The ICDF representative will oversee the implementation of the fourth objective which is the improvement of agricultural production for the three geographic areas. The ICDF representative will be responsible to the Mercy Corps field Project Director for the appropriate coordination and execution of ICDF's tasks. ICDF will engage international and local program staff as necessary to carry out activities under this objective. ICDF staff will be located in the Mercy Corp's office, and we anticipate will play a participatory role in Mercy Corps lead activities.

III. ICDF role

Mercy Corps proposes that ICDF should take a lead technical role and program management for improving overall agriculture production for farmers, which equates to project objective #4 above. Activities in this technical component are the following:

- Introduction of plot intensification through the establishment of orchards

- Tree nurseries
- Pruning and grafting techniques
- Use of green manure/mulching
- Transfer of research to farmers
- Fertilizer application
- Disease control
- Demonstration plots with field trials
- Irrigation

We welcome ICDF to expand or change this list based on ICDF interests and resources.

The traceability system as it was demonstrated during your visit has been successfully tested in the field, and we will continue over the next month with additional activities and expansion of the program. We think this is very likely to be a viable, locally available solution. We would welcome ICDF's participation in rolling out the traceability system, and your recommendations and advice as the system is implemented.

IV. Budget

While it will take a little more time to revise the program plan and budget we estimate that the funding required by Mercy Corps to execute the work is approximately \$600,000, for what is anticipated to be an 18 month project beginning on July 1st, 2012. This amount is in addition to those other funds already secured from other sources and the scope of ICDF's component of work for objective four.