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**ASSESSMENT OF POST-HARVEST LOSS REDUCTION DUE TO
PROJECT INTERVENTIONS**



MARCH 2014

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CONTEXT

In addition to low productivity in the production of key crops, Haitian farmers lose valuable products after harvest due to poor storage, packaging, and transportation conditions. The Feed the Future West/WINNER project provided technical and material support to farmers in its areas of intervention to reduce post-harvest losses in the target crops supported by the project: beans, corn, rice, plantain, and mangos.

This report provides an assessment of the reduction in post-harvest losses due to FtF West/WINNER interventions.

NATURE OF POST-HARVEST LOSSES

There are many factors that can affect post-harvest losses for Haitian smallholders. The first set of factors is related to poor storage conditions of the products after harvest. Many times, the harvested crops are left in the field and can remain there for long period until the buyer picks them up or the farmer finds a way to transport them to market. While in the field, grains such as corn and beans are subjected to moisture, soil contamination, and attacks by rodents and pests. Thus, an important part of the harvest can be contaminated and degraded.

For mangos and plantain, poor transportation and packaging conditions lead to bruising and crushing of the products, reducing their market value. For mangos destined for export, any blemish on the fruit leads to rejection by the exporters' facilities and is a net loss for the farmers. Prior to the interventions of FtF West/WINNER, the average rejection rate for mango *francisque* at exporters' facilities was 25%.

The lack of storage facilities also means that farmers have to sell their products quickly, often at low prices, and are not able to benefit from price fluctuations throughout the year.

POST-HARVEST EQUIPMENT PROVIDED

Starting in 2011, FtF West/WINNER provided post-harvest equipment to farmers in all target crops. The project distributed two types of post-harvest equipment.

1. For mangos and plantain, FtF West/WINNER provided farmers with mobile collection centers and crates. In addition, the project introduced innovative donkey pack frames to transport mangos from the production areas to aggregation points.
2. For beans, corn, and rice, the project provided farmers with silos, tarps, humidity gauges, and packaging materials.

Mangos and plantain

To reduce post-harvest losses for mangos and plantain, FtF West/WINNER provided the following equipment to mango producers:

Mobile collection centers. These centers consist of tents and sorting tables. They protect recently harvested mangos from excessive sun and the sorting tables allow for export-ready mangos (of the right size and without blemish) to be separated from others.

Crates. Plastic crates prevent the crushing and bruising of mangos during transport. They also provide aeration and are an efficient way to transport fresh produce.



Water drums allow for fruit washing before they are placed into crates.

Pack frames. This innovative technique, developed at the University of Florida, allows the transportation of mangos on the backs of donkeys from mango producing areas inaccessible to vehicles. Crates are placed in the pack frame.

Table 1 provides a summary of the post-harvest equipment provided by FtF West/WINNER to mango and plantain farmers.

Table 1
Post-harvest equipment provides to mango and plantain farmers

Year	Mobile collection centers	Crates	Water drums	Donkey pack frames
FY 2012	38	9,800	76	-
FY 2013	2,753	1,575	-	78
Total	2,791	11,375	76	78

Beans, corn and rice

For beans, corn and rice that can be stored for long periods after harvest, the FtF West/WINNER project supported farmer associations with the following post-harvest equipment:

Tarps are used to place the products after harvest so that they are not laid directly on the ground where they can be contaminated by worms and affected by moisture.

Silos are very useful to store non-perishable agricultural products. The silos provided by the project are mobile and can easily be installed close to production areas, they are elevated to



protect products from pests and rodents, they are hermetic to prevent moisture from affecting the products, and they are easy to assemble. With the use of silos, farmers are able to store grains that can be sold throughout the year at more interesting prices than immediately after harvest.

Humidity gauges allow farmers to control the humidity conditions inside the silos to monitor that the storage conditions are appropriate.

Farmers were trained on how to use the gauges and on the acceptable humidity levels for each target crop (i.e., beans, corn and rice).

Jute bags are used to transport beans and corn in a more efficient way. They protect the products from deterioration when it changes hands.

Table 2 presents a summary of the post-harvest equipment provided to farmers producing beans, corn and rice in FtF West/WINNER's areas of intervention. This equipment was provided to 59 associations regrouping 30,521 members.

Table 2
Post-harvest equipment provided to beans, corn, and rice farmers

Year	Tarps	Silos	Humidity gauges	Jute bags	Crates
FY 2012	3,060	70	70	-	-
FY 2013	6,553	53	53	6,275	660
Total	9,593	123	123	6,275	660

ESTIMATED POST-HARVEST LOSS REDUCTION

Post harvest losses in the mango value chain

In the mango value chain, we have precise estimates of the reduction in post-harvest losses. At the start of FtF West/WINNER, the association of mango exporters ANEM estimated at 25% the rejection rate of mangos at exporters' facilities. That is, one in four mangos provided by producer associations was not paid for because the fruit was not exportable.

Table 3 presents a summary of the reduction in rejection rates at exporters' facilities of the mangos provided by farmer associations receiving support from FtF West/WINNER. Overall the mango rejection rate was reduced from 25% to 16.3%. This is due to the post-harvest equipment and training provided by the project.

Table 3
Reduction in the mango rejection rates due to FtF West/WINNER interventions

Quantity of mangos purchased by associations (2011- 2013)	Quantity of mangos sold to exporters (2011 – 2013)	Rejection rate	Baseline rejection rate (2010)
3,549,394	2,969,134	16.3%	25%

Survey of the impact of post-harvest equipment on losses

In order to assess the impact of the use of post-harvest equipment on the reduction of losses, the FtF West/WINNER monitoring and evaluation team conducted a survey of 109 farmers in its areas of interventions. The results of the survey are summarized below.

Tarps:

According to interviewees in the Cul de Sac and Matheux corridors, tarps contributed to the reduction of post-harvest losses in corn, beans, and rice by an average of 85% (from 14.8% losses to 2.8% losses). Because tarps are not expensive and reduce the percentage of impurities present in crops, farmers are willing to buy tarps and continue to use them after the end of the FtF West/WINNER project.

Silos and Moisture Gauges:

Overall, 76% of interviewees claimed that the use of silos reduced their post-harvest losses at an average of 87% (from 22.4% losses to 2.2% losses). Silos allow the storage of commodities in a safe place that pests cannot access. Because silos are expensive, most farmers do not having enough money to buy them unless they can have access to credit. Farmers also reported that they can sell 2.5 kgs (marmite) of rice or beans about 37 Haitian gourdes higher after the harvest period by using silos.

Farmers also recognized the usefulness of moisture gauges. They stated that before receiving moisture meters, they used subjective methods that lead them to store crops with high humidity rates that resulted in the development of fungi, mold and worms. With the moisture gauges and proper training, they can monitor their crop humidity rate and conserve them better.

Jute Bags:

All farmer associations recognized the merit of jute bags in transporting crops to markets and were ready to use and buy them after the end of the FtF West/WINNER project.

CONCLUSIONS AND RECOMMENDATIONS

It is clear that the introduction of appropriate post-harvest equipment for target crops has had a positive impact on reducing losses and increasing revenues for farmers. It will be important to scale up the introduction of simple post-harvest tools and to continue to train farmers on these techniques.

Farmers interviewed said they are ready to continue to use post-harvest techniques such as tarps, humidity gauges, crates, and mobile collection centers. However, more important storage structures such as silos or storage and conditioning units, that are critical to the development of agricultural value chains in Haiti, need to be expanded through appropriate financing mechanisms.

The experience of FtF West/WINNER with post-harvest equipment demonstrates that significant reductions in post-harvest losses can occur with modest investments.