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## *PCCP Sustainability Pathways Series*

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### Risk Reduction and Expanded Markets for Mango in Northern Mindanao facilitated by the Winrock Philippines Cold Chain Project (PCCP)

#### The Situation

Mango production, harvesting and marketing is a high-risk venture in Northern Mindanao and specifically in Caraga. The major risks are associated with:

- vulnerability to high rainfall during and after flowering
- vulnerability to low rainfall and reduced soil moisture at flowering and fruit set
- poorly controlled insect pests at flowering and fruiting
- post-harvest diseases such as anthracnose and stem-end rot
- poor packaging, transport and storage of harvested mango
- low productivity per hectare

Mango farmers have great difficulty accessing finance because the costs and returns are not accurate or measured, and to the high-risk nature as indicated. Mango economics is heavily influenced by yield and accurate yield data is poor. Yields vary considerably with tree size. Many trees in Caraga are large, so yield/tree is high in the range of 75-120 kg/ tree/ year. However, since plant density is very low, yields per hectare are also low, with potential to double yields by controlling tree size, and planting more trees in each hectare.

Anthracnose disease after harvest is a major hidden loss of value in the mango value chain.

Many in the value chain accept anthracnose by reducing price. Farmers and local Caraga traders do not see anthracnose on green fruit at harvest or on the tree. It only shows at ripening. Infection occurs during fruit development on the farm, especially with rain. The disease is latent, developing only when the fruit ripens. This is a major cause of loss in price for fresh fruit markets. Fruit with anthracnose is sold, but at reduced prices. Anthracnose develops very rapidly from the first signs on ripening. Prices reduce daily as anthracnose develops on the fruit. Anthracnose develops rapidly, increasing from a small mark to covering a large area of the fruit in 2-3 days.



Traders have to sell fruit very quickly after ripening before anthracnose develops. Fruit with anthracnose are sold at a lower price. Many mango fruits have anthracnose (and stem-end rot) from the day of ripening, the first day of sale to consumers. Anthracnose severity develops rapidly with further price reductions as severity increases (as low as 10P/kg retail). Traders take risks in selling mangoes and have finance costs to pay farmers for mangoes. Buyers in Manila and other regional markets also incur costs in grading, packing, ripening, storage, freight, packaging, and losses. These traders incur large losses due to high rates of anthracnose in ripe fruit.

## The Opportunity

In the normal season (April May harvest), farm prices “all in” are 23-27P/kg (USD 0.5/kg), so profit is low. In the off season (July – September harvest), farm prices “all in” are 50-60P/kg. The profit in the off-season crop can be high due to the higher price, but yield may be lower, as pest control costs and the risk of crop failure are both higher, increasing cost/kg higher in some cases. Focusing on success of the off-season crop can be profitable for Caraga mango farmers. Only Mindanao can produce mango in this period in any quantity, and high demand of mangoes is felt in time for the summer season in the Philippines. Mindanao can take advantage of this gap in supply and demand, with large areas available for mango expansion and intercropping with coconuts.

The risk of mango production and marketing can be greatly reduced by reducing post-harvest diseases, in particular, anthracnose. Controlling anthracnose during post-harvest with hot water treatment (HWT) is a major marketing opportunity to add value for Carmen packing shed. Very few supply chain actors use management methods to control post-harvest anthracnose.

Installing a hot water dip or treatment plant will give ripe fruit a much longer life, reducing loss of sale price due to anthracnose. HWTs are well-known to control post-harvest disease in the Philippines but seldom used in the domestic market. Exporters from Davao and processors all use hot dips to reduce anthracnose losses in fruit for export. Suppliers (e.g. Dizon) to high level supermarkets (Robinson, S&M) use HWT, as these markets do not accept anthracnose losses.

Installing a HWT at Carmen facility will control post-harvest diseases. Caraga mangoes will have a much longer life of over 7 days ripe to sell after ripening, without the price loss currently occurring with anthracnose causing price reductions from the first day of ripening. This will give Caraga mangoes a major marketing advantage, a point of price differentiation over most other suppliers who do not use any post-harvest disease control. More mango marketed, higher quality, less loss more income.

Using HWT opens the opportunity to develop a Caraga brand that is different to other mangoes in the supply chain – Caraga disease free mangoes. Hot water dipping reduces anthracnose losses in Philippines compared to control and Benlate dips, commonly used in domestic markets e.g. Butuan, Manila

### The Solution.



*HWT Installation in Carmen Mango Processing Facility*

Winrock PCCP funded the installation of an HWT facility at the Carmen Mango Processing and Packing Center capable of processing 2 tons per hour in two water lines. The cost for this was USD 42,000. Mango are dipped for 5 minutes at 52-55 degrees C, then dried, sorted and weighed for packing. SPFFC will introduce the post-harvest systems, practices and standards commencing with mango harvesting from June 2019 onwards. The HWT plant will be turned over to the LGU Carmen after commissioning in March 2019.

The LGU of Carmen and Winrock PCCP explored business models for operation of the Carmen Mango Processing and Packing Center. Discussions between the LGU and the Winrock PCCP have resolved the best model in the short term (next 3-5 years) is to lease the facility to a suitable current mango trader, while a viable cooperative is developed. As a result, the Southern Philippines Fresh Fruit Company SPFFC, was selected to operate the Carmen Facility with local Carmen mango growers and the LGU Carmen. A MOU to govern this arrangement was developed and facilitated by Winrock PCCP, the LGU Carmen and the SPFFC. Specific inputs and responsibilities of each party are clearly indicated in this agreement.

The key to success and throughput of the Carmen facility is to offer farmers a better price than other traders. In a competitive and free trading environment, farmers sell to the highest price offered. The best way to offer a better price is to add value to the supply chain by marketing quality mangoes and by reducing losses to postharvest anthracnose using a HWT.

The SPFFC has developed outlets that recognize the benefits of HWT and pay a higher price for mangoes. This is a key factor in suggesting SPFFC as the operator of Carmen facility. SPFFC already use defect analysis to measure the performance of famers supplying their facility; very few traders do this. They are interested in using benchmarking of quality data at the pack house as a farmer training tool to identify farmers that need management assistance and in what techniques and identify good farmers and good management techniques, they use to achieve good results. SPFFC will purchase local mangoes, from Northern Mindanao and Caraga to market in: Manila, Export. Regional markets and in processing.

A key area Carmen LGU and Winrock can assist SPFFC is through the linkage to Carmen growers and traders who can supply fruit to the facility. This will be the main concern of SPFFC- establish linkages to get enough throughput. Winrock PCCP has supported the formation of the Carmen Mango Producers Cooperative, as a contact group for the SPFFC. Currently there are 35 mango producers in this group.



*How Carmen Mango Processing and Packing Center HWT operation will look like in the future*