

**INDUSTRY LEVEL
CONSIDERATIONS
FOR:**

Holland Marsh Growers'
Association

February 1, 2022

HMGA-02-P01

Industry Level Considerations

Introduction

Enviro-Stewards was hired by the Holland Marsh Growers' Association (HMGA) to undertake water use assessments at a vegetable irrigator and a vegetable wash facility to identify site specific opportunities to reduce water use without impacting the end-product or crop growth. In addition, sector specific templates were developed for future assessments by the farm operations themselves.

During this project, several opportunities beyond the scope of this work were identified. These opportunities are presented as follows.

Opportunities

Develop Spreadsheets to Support the Self-Assessment Tools

Self-assessment tools were developed for Activity 1 Water Efficiency Audit project. It was determined during this project that opportunity calculators are required for the growers to enter the data rather than relying on each grower to do the calculations themselves. These calculators could be housed on the HMGA website for members to access.

Two calculators would be required tailored to¹ the specific needs of the self-assessments being conducted.

- 1. Irrigation System Efficiency Calculator:** allows the grower to enter data gathered during the distribution uniformity (low quarter), nozzle pressure & nozzle flow tests to calculate distribution uniformity (DU) & potential issues affecting the DU.
- 2. Vegetable Washing Facility Water Use Opportunity Calculator:** allows the grower to enter water use data for a series of end uses to calculate current water consumption. Savings can be calculated based on selecting an opportunity or set of opportunities specific to each end use. An 'Other' option would be available to calculate savings for niche opportunities

¹ The nozzle pressure & flow tests are specific to sprinkler irrigation systems & are not required for centre pivot, travelling or stationary gun systems.

Test Spray Nozzles on Vegetable Washer

An opportunity identified in previous studies involves fitting a vegetable washer potable water wash bar with spray nozzles. Current washers have holes cut in the wash bar that discharges potable water over the vegetables before they are discharged from the washer.

Enviro-Stewards believes that it may be possible to reduce the amount of potable² water used for the final rinse of the vegetables by installing efficient spray nozzles in the wash bar.

Issues:

1. There is a lot of root and vegetable top debris still present near the discharge of the washer. This debris could quickly interfere with the spray pattern from the nozzles or completely block it in a worst case scenario.
2. The potential for mould growth, biofilm, or other contaminants on the spray nozzles. Washdown of the interior of the washer drum is done at the end of the day with a sanitation hose. We do not know how these nozzles will stand up to the washdown or whether the current technique will be able to effectively clean the nozzles.

Issue 1: Proposed Test:

- The Muck Crops Research Station has a vegetable washer. It is proposed that spray nozzles be installed on the washer's potable water wash bar & a test conducted to assess the applicability of those nozzles for use on commercial washers. The spray nozzles would be selected based on support from a spray nozzle vendor that will take into consideration water quality, system pressure, mounting height, hole diameter, etc.

Issue 2: Review Food Safety Control Points

- A review of food safety critical control points should be conducted to ensure the nozzles do not present an issue.

² Potable water used in vegetable wash facilities comes from well or municipal sources.

Establish an Industry Standard for a Clean Vegetable

OMAFRA & Enviro-Stewards have identified that there is no standard for a clean vegetable. Clean is determined by the operator as the vegetables discharge from the washer. Each operator at each vegetable washing facility will have a different definition of clean, & that measure of clean may vary day to day.

Issue:

The amount of water required to wash the product will depend on:

1. The type of vegetable (carrot, parsnip, beet) affects the amount of dirt that will 'stick' to it.
2. The type of soil & the soil moisture content will affect the amount of dirt on a vegetable. Work done by OMAFRA found that on average more muck soil stuck to vegetables than mineral soil.
3. Seasonal conditions at harvest affect soil moisture content. A wet harvest will result in more soil sticking to the vegetables.
4. Is there an optimum level of clean that its customers will accept?

Other considerations:

1. Can throughput be increased?
2. Will shelf-life be affected?

Recommendations:

- HMGA work with its members, OMAFRA, & major customers to establish a standard for clean. This initiative could include:
 - A survey of retail practices;
 - Conduct a wash test on carrots from five packers to evaluate turbidity levels using a commercially available sensor.
- Undertake research to determine impact on product shelf-life.

Investigate Optical Eye Systems to Evaluate Product Cleanliness

The previous recommendation was to establish a standard for clean and to post visual targets of clean for the washer operator to reference. This approach is a necessary first step to standardize clean in order to manage water use; however, it is still a subjective evaluation based on the operator's opinion.

The potato industry uses optical eyes to discard non-spec potatoes. Many other industries use optical eyes for a variety of purposes. It is a mature technology worth

investigating as a tool to meet the target 'clean' vegetable by removing the subjective operator assessment and reducing fresh water use.

Recommendations:

- A technology review be undertaken of optical eye systems to determine if there is a system that has the technical capability & whether it will work on vegetables such as carrots, parsnips and beets;
- A controlled test of systems identified with potential through the technology review to determine the effectiveness & efficiency, identify issues and commercial viability of those systems;
- A case-study on-farm test of systems that appear to be suited to the target product(s) & site conditions.

Discussions with Wyma Vegetable Washer Distributor

A number of opportunities to reduce washer fresh water use have been identified by different organizations. These opportunities are applicable to every washer.

Recommendation:

- Work with the local distributor of Wyma vegetable washers to:
 - Incorporate the turbidity sensor tested on vegetable washers by OMAFRA's John Van de Vegte & Tim Brook;
 - Sell washers with flow meters on the fresh water supply to the washer;
 - Sell washers with automatic shutoff of the fresh water supply with an adjustable time delay when the washer drum shuts off;
 - Invite Wyma to participate in the spray nozzle test on the Muck Research Station's washer;
 - If the nozzle test is successful, encourage Wyma to offer spray nozzles on the fresh water distribution pipe.