

# Wastewater Management on Horticultural Farms

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## Introduction

There are several different types of waste water that can exist on horticulture farms in Ontario. Examples of waste water include:

- Greenhouse nutrient water
- Vegetable washing water
- Pack house washing water
- On farm winery, cider or juice production
- Boiler blow down water
- Truck wash water
- Ice pack water
- Hydro cooling water
- Manure storage or compost pad run-off water
- On farm processing water

All of these waters vary in their volume, composition, seasonality of release and the extent to which their management is required. This poster takes you through the steps you need to go through on your operation.

## Step 1 – Reduce, Reduce, Reduce

The first step to managing the waste water produced on your farm is to decide how to minimize it, both in volume and in concentration of constituents.

Agricultural systems in Ontario are generally blessed with abundant and sometimes excessive amounts of water. It is hard to imagine restricting its use on farms but one only has to sit down with an engineer and do the math, to conclude that managing less water costs less.

One of the main problems with releasing waste water into the environment is directly related to the amount of soil and organic matter in the water.



**Photo 1.** A screw press is used to separate soil and plant debris from the waste water stream.

**Keep your soil in the field and out of your waste water**

## Step 2 – Characterization

### Know what you have. How much?

- What is the total volume produced? Daily? Weekly? Yearly?
- What is the variability in the flow rate?
- What is the storage capacity? Now? Later?

### Know what you have. What is in it?

Table 1 contains a list of the main water quality parameters of interest on most horticulture farms in Ontario.

Analysis Required	Needed to Evaluate
Total Suspended Solids (TSS)	Water quality impact
Total Dissolved Solids (TDS)	
Turbidity	
Ammonium/Ammonia	Water quality impact
Biological Oxygen Demand (BOD)	
Dissolved Oxygen (DO)	
Nitrate/Nitrite	
Total Kjeldhal Nitrogen (TKN)	
Total Phosphorus (TP)	Ag re-use potential
Dissolved P	
Potassium	potential ag impact
Micro Nutrients	
pH	
E.Coli	Water quality impact
Electro-conductivity	
Heavy Metals	potential ag impact
Boron	
Sodium	potential ag impact
Total organic matter or organic carbon	Potential for compost or anaerobic digestion
Particle size analysis	Design of treatment system

**Table 1.** Description of the water quality parameters required to best determine how to manage on-farm generated waste water.

## Step 3 - Re-Use, Re-Use, Re-Use

### Identify items of use in the water?

- Can I use the nutrients? Macro or Micro?
- Can I use the organic matter? In compost? In a digester?
- Can I use the water? What different water qualities do I need on the farm? Potable? Rinse? Irrigation?
- Can I use them as is or do they need to be modified?

## Step 4 - Determine your treatment goals and evaluate different treatment technologies

There are generally 3 questions asked at this stage.

- What are the cost effective treatment options to reach a specific water quality for an identified re-use option?
- What are the cost effective treatment options that can attain water quality capable of discharge to the environment?
- What are the cost effective treatment options that will allow me to close my system and have no discharge?

## Summary

These last three questions are currently being addressed in a horticulture wash water treatment project being conducted by the Holland Marsh Growers' Association with funding provided by Ontario vegetable growers and Environment Canada. Technologies being evaluated include:

- Various solid separation systems (de-watering bags, drum filters, parabolic gravity screen filters, cyclones and centrifuges)
- Coagulation based systems in conjunction with filter bags
- A dissolved air floatation system
- Different methods of aeration (surface and bottom up)
- Vegetated filter strips
- Various settling pond designs and management practices



**Photo 2.** De-watering bag pilot test



**Photo 3.** Surface aeration trial

**Specific information on the HMGA wash water project can be found at [www.hmgawater.ca](http://www.hmgawater.ca)**