



BC
GREENHOUSE
GROWERS'
ASSOCIATION

Greenhouse Vegetables and Water Conservation



Presentation Overview

- Industry overview
- Growing the crop
- Water conservation
- Horticultural water use

BC Greenhouse Sizes

- 22 operations: 12 to 109 acres
- 18 operations: 2 to 12 acres
- 25 operations: less than 2 acres



High Capital Costs

- Glass structures
- Computer control environment
- Heated by natural gas or wood boilers
- Heat storage tanks, energy curtains & grow pipes
- Some grow lights are used for winter production
- Packing lines



Labour Intensive

- Placement of plastic ground cover, grow bags & transplants
- Leaf pruning
- Twisting
- Harvesting
- Packing
- Fall clean-up



Crops grown

Tomatoes

- TOV, Beefsteak and cocktail



Pepper

- Sweet Bell and Mini



Cucumbers

- Long English, Mini and Cocktail



Lettuce

Eggplant

Strawberries

Canadian Greenhouse Area

	Tomato acres	Pepper acres	Cucumber acres	Eggplant acres	Lettuce acres	Total acres
Ontario	936	891	726	19	12	2584
BC	259	383	104	2	5	753
Quebec	156	12	30	2.5	35	235.5
Alberta	37	16	77	1.5	1	132.5

North American Greenhouse Area

	Tomato acres	Pepper acres	Cucumber acres	Total Area acres
Canada	1388	1302	936	3376
United States	1141	35	104	1280
Mexico	2162	875	875	3912

Markets

- ❖ Tomatoes, cucumbers, peppers and lettuce are regulated products in Canada
- ❖ Retailers demand 3rd party food safety audits
- ❖ Retailers demand year round supply
- ❖ Most produce is sold in Canada and the US
- ❖ Minor markets in Japan and Taiwan
- ❖ Farm gate value – \$290 million (BC) and \$1.3 billion in Canada

Propagation House



Rockwool cubes
Graphed tomatoes
Flood irrigation
Mechanization



Production House

- Hydroponic uses drip irrigation
- Coco fibre or peat, rock wool or sawdust growing media
- Crop fed carbon dioxide
- Bumble bee pollinated
- One tomato or pepper crop grown for 10 to 11 months
- One cucumber crop grown for 3 to 4 months



Hanging Gutters

Sanitation and Biosecurity

Start clean, stay clean

Disinfection of cropping area

Foot baths and hand wash stations

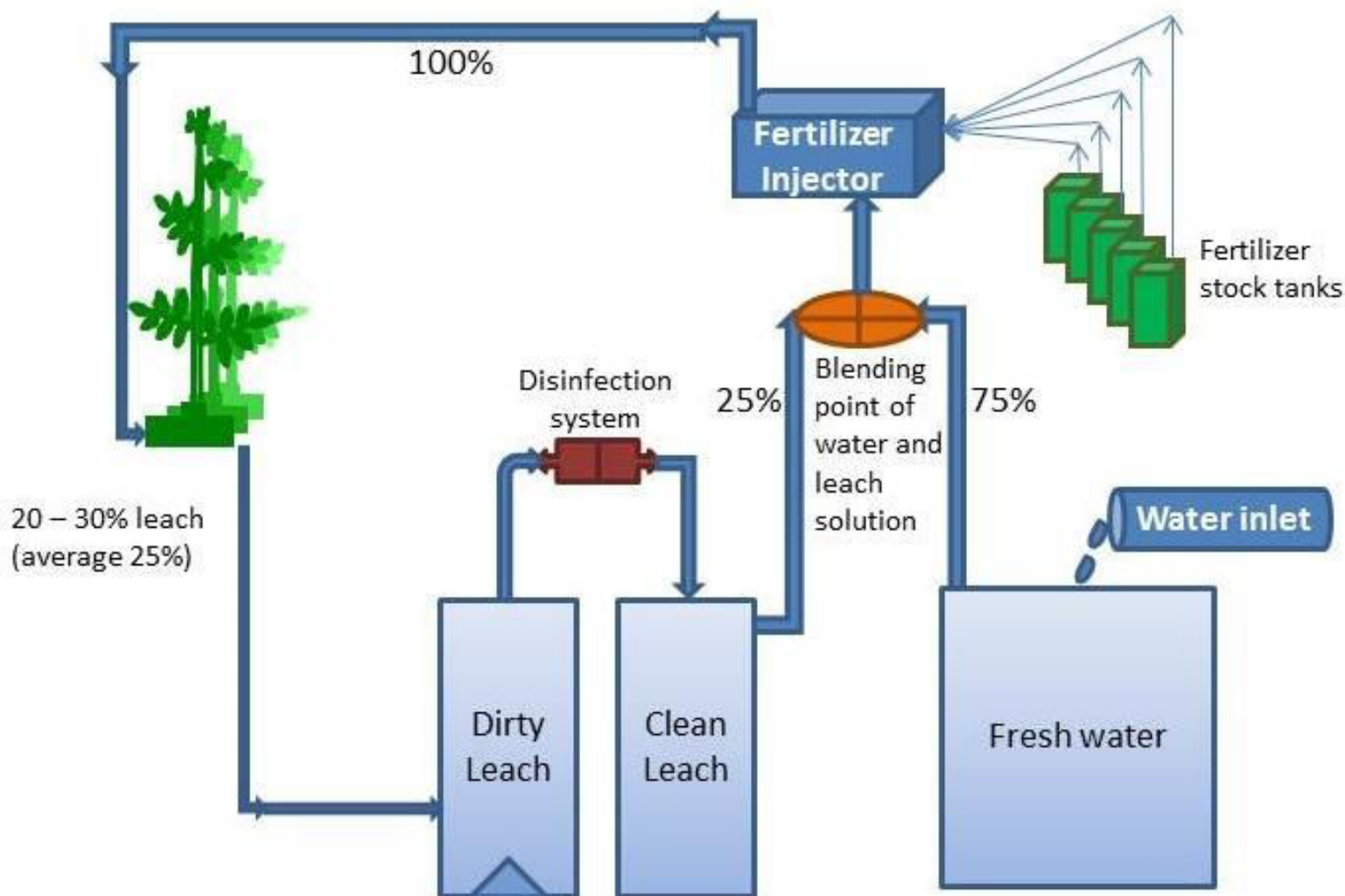


Integrated Pest and Disease Management

- Tolerant varieties
- Monitoring & scouting
- Biological Control Agents
- Pesticides only as needed



Water Conservation - Overview



Case Study – Sunnybay



Fresh Water



Rainwater collection

Fresh Water



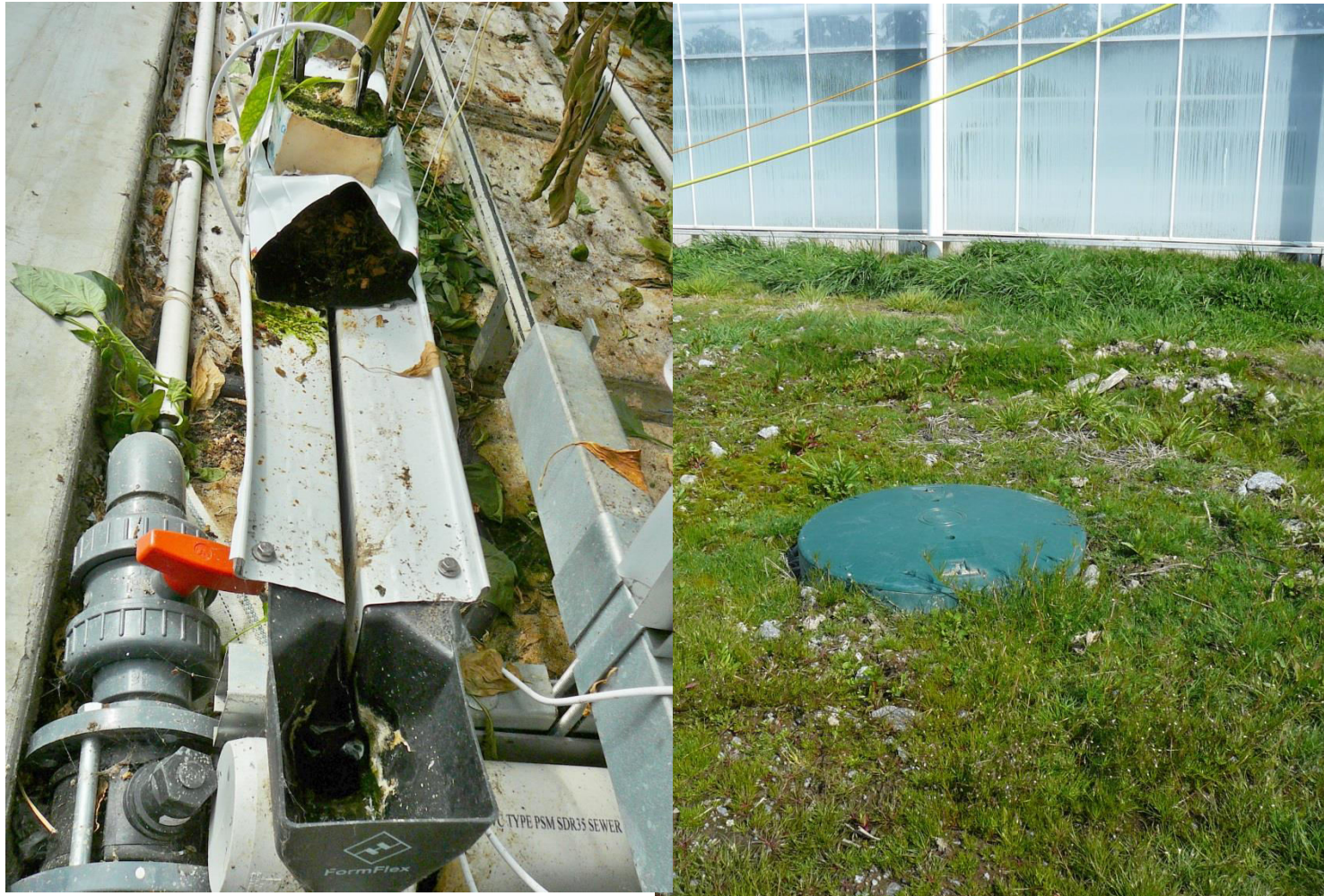
Rainwater retention pond

Fresh Water



City water storage tank

Drain water collection



Drain water treatment

- Heat
Pasturization
- UV radiation
- Ozonation
- Sand/Gravel
- Lava rock
- Membrane



Sand and gravel filtration

Blending Fresh and Drain Water



Nutrient Injection



Precision Watering



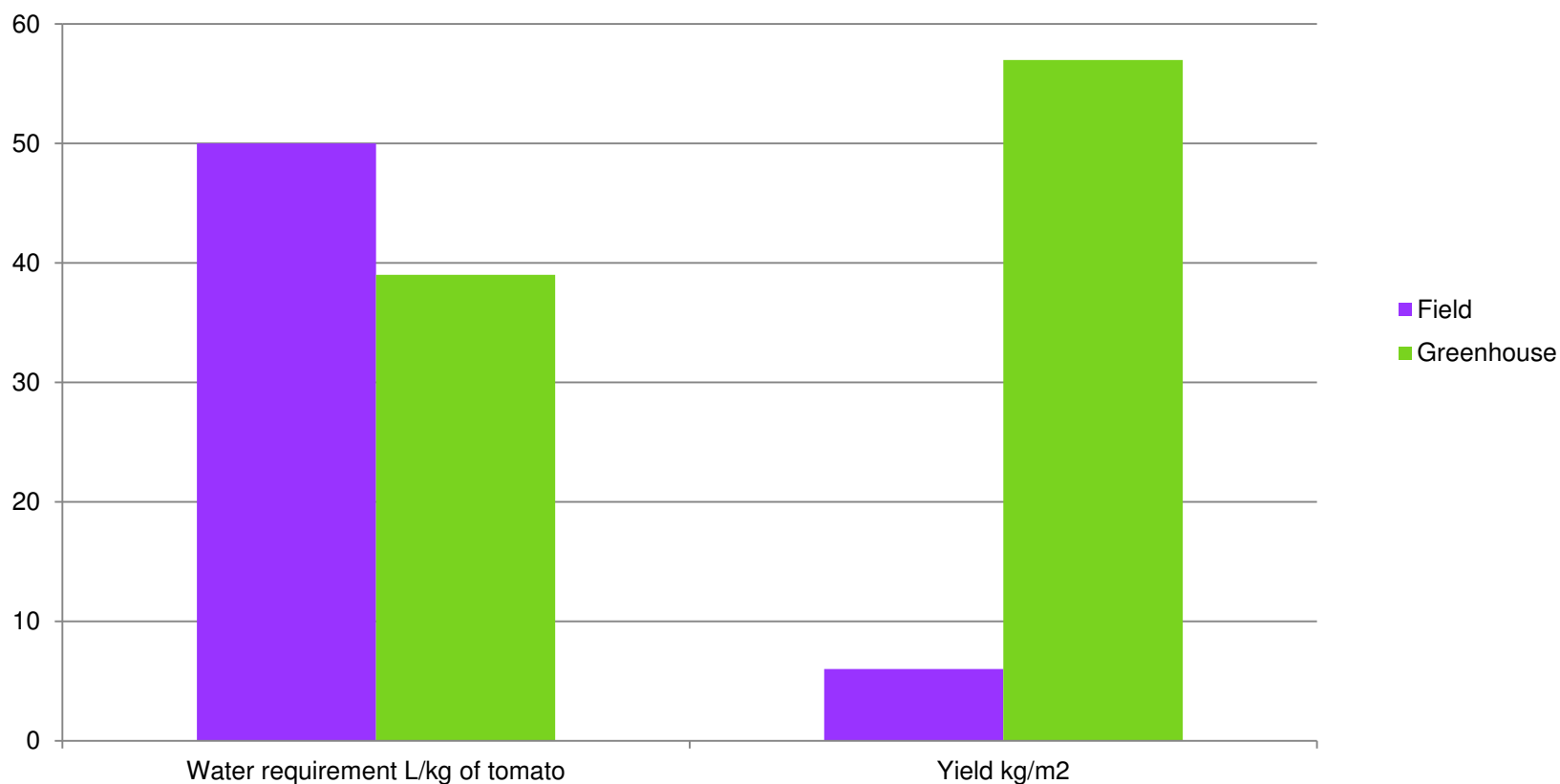
Drip irrigation

Water Utilization

- Extremely efficient water use
- 30 acres of plants use 84 million L annually
- 60 % rainwater
- 40 % city water
- \$35,000 water bill

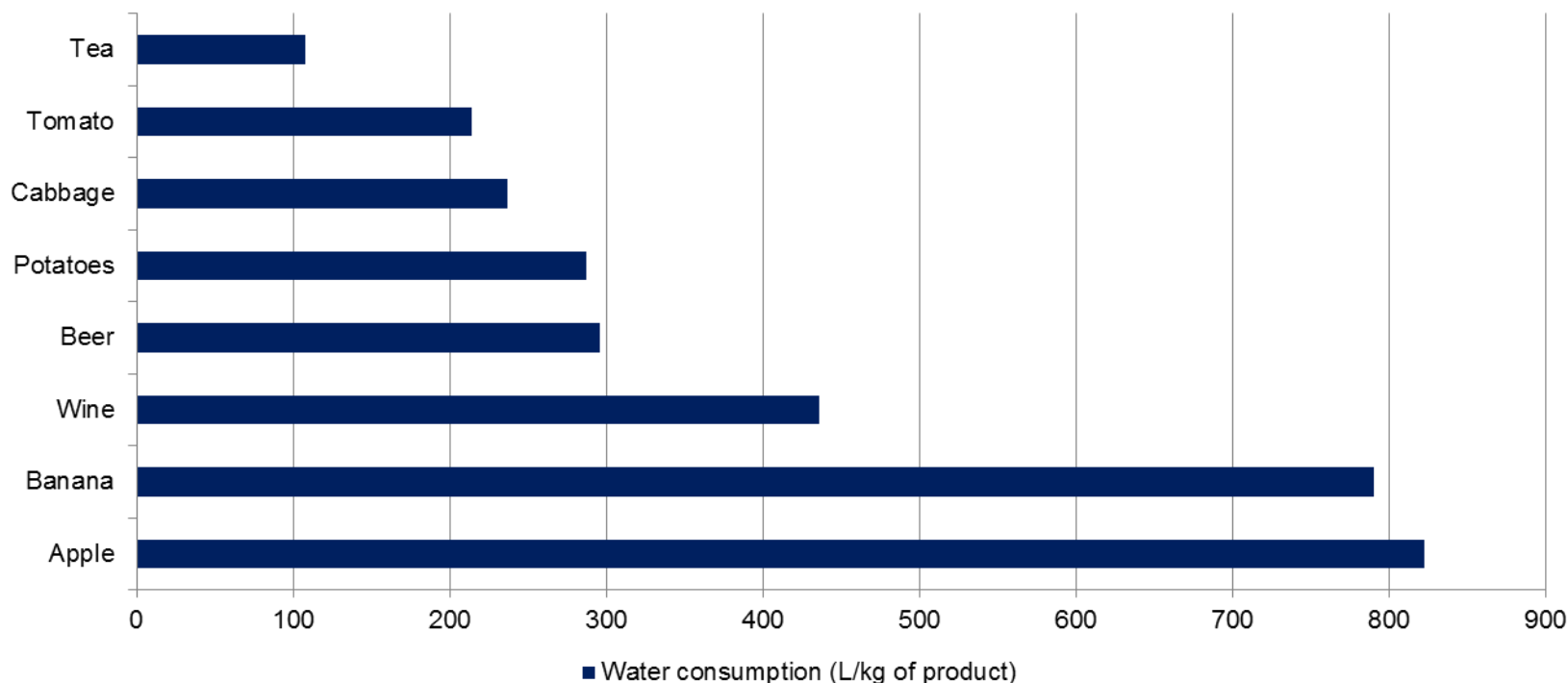
Comparison of tomato production systems

Source: Page et al., 2012. J. Cle. Pro. Vol. 32 pp. 219-226



Overview: Horticultural Water Use

Typical values for the volume of water required to produce common foodstuffs*



*Source: Water Footprint Network, University of Twente, Netherlands

Comments or questions?

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