Drainage and Water Management on VT Farms

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Vermont Tree Fruit Growers' Association
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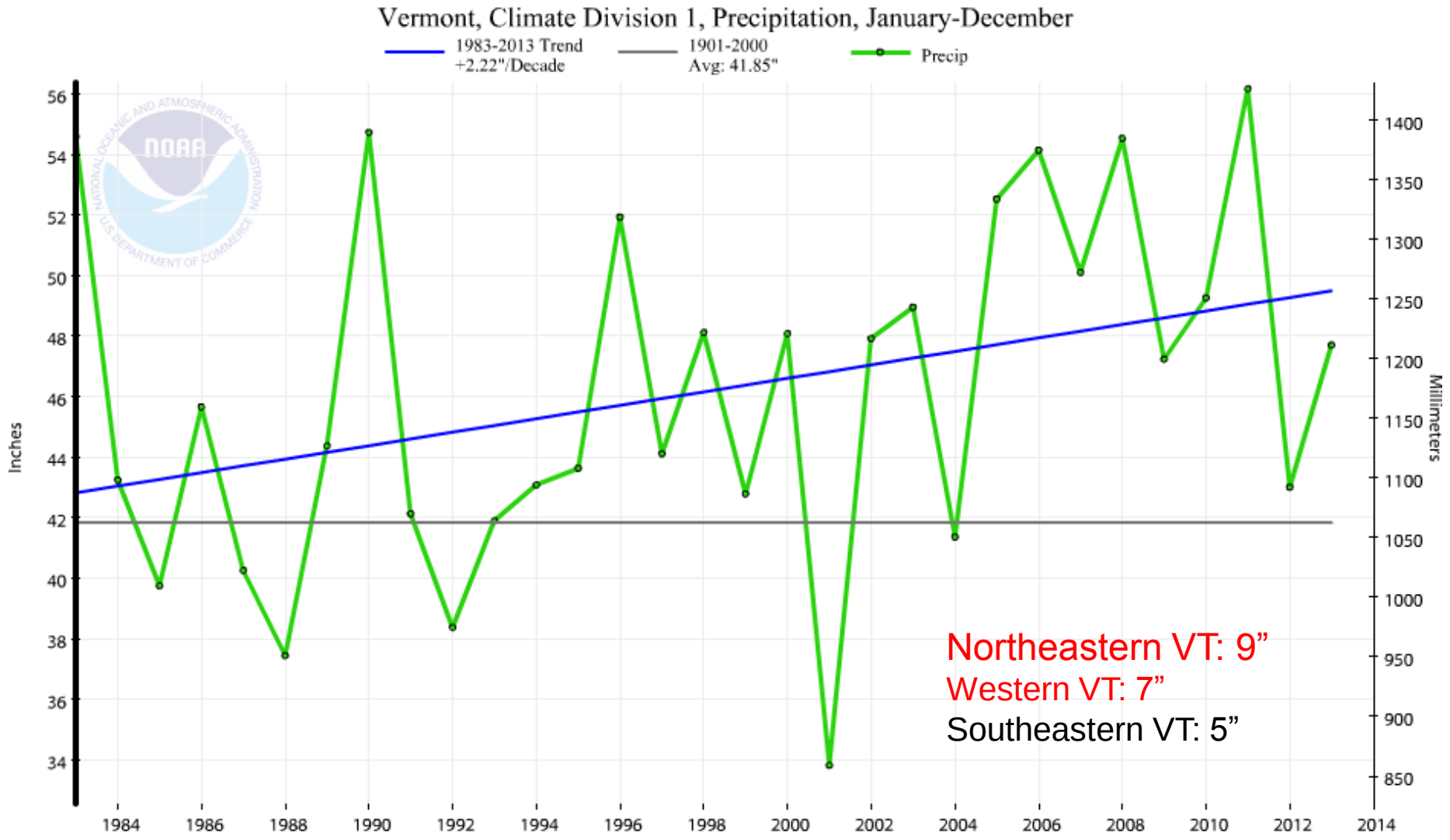
The University of Vermont EXTENSION

Image: Tom Cherveny, West-Central Tribune

Center for Sustainable Agriculture

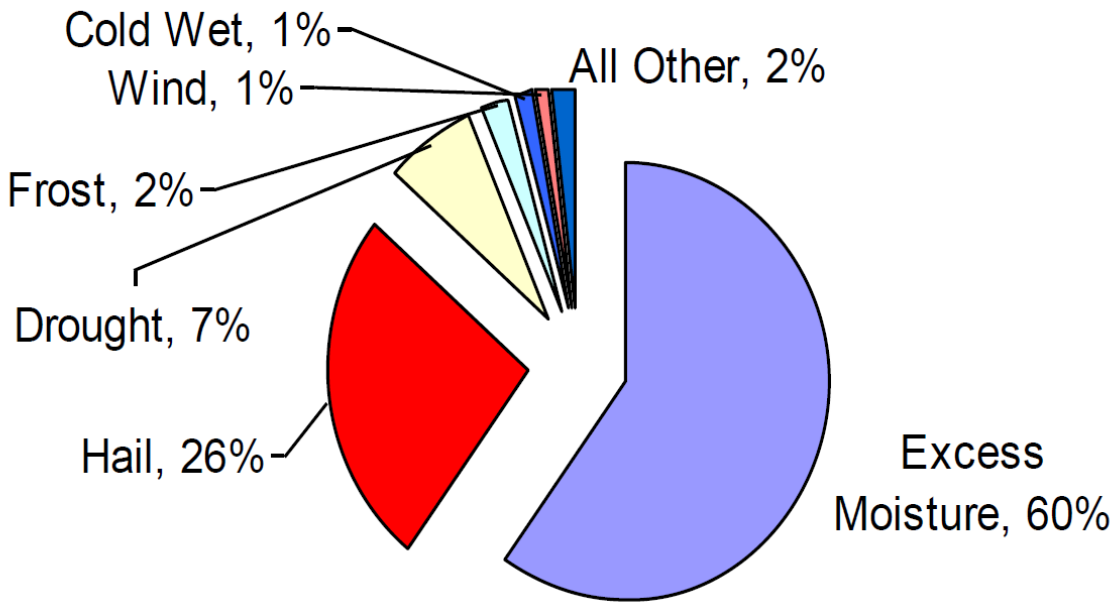
Precipitation in Northeastern Vermont (1983-2013)



Direct and Obvious Impacts…

Why Vermont Crops Fail (2001-10)

Since 1988, Crop Ins. provided
$213 Bil. of Protection and Paid $15 Million
in Loss Payments to VT Farmers

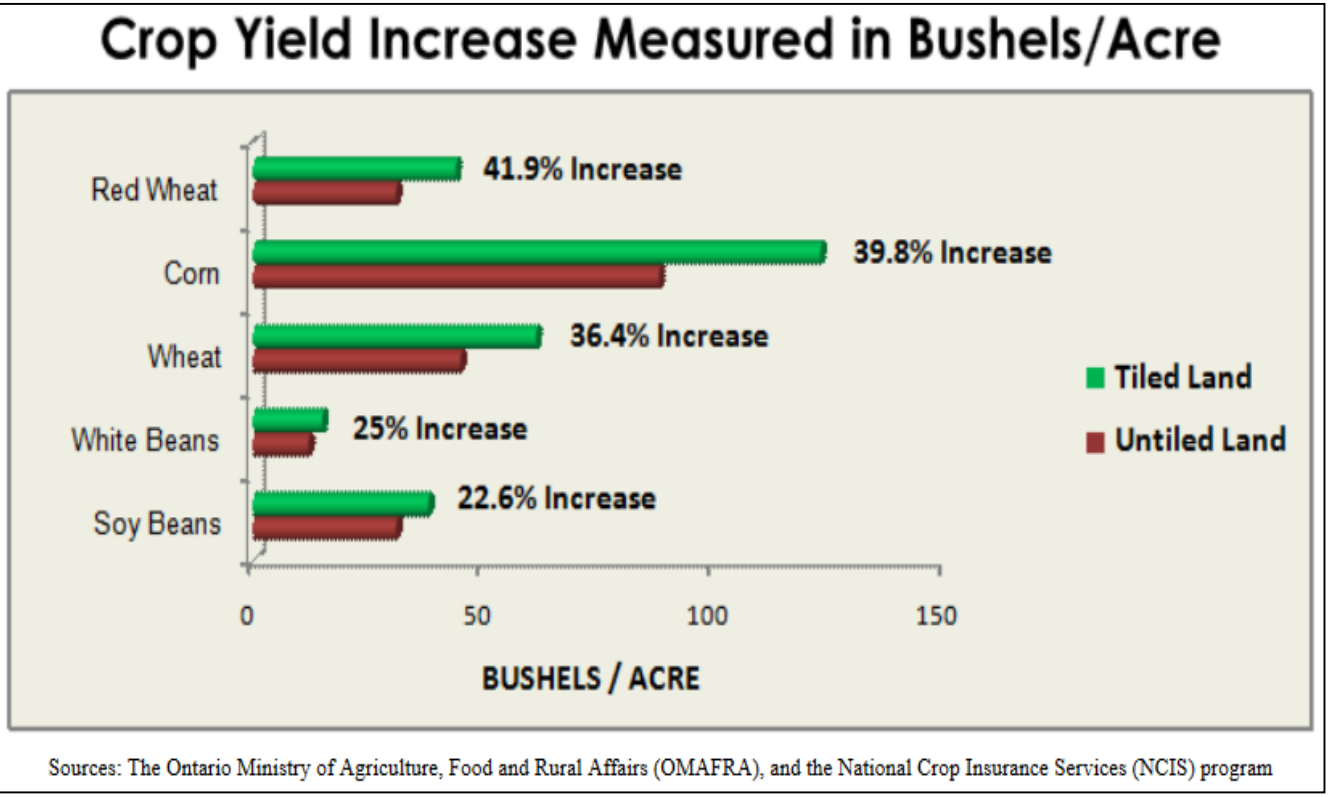


RMA, 2012

Benefits of Drainage: The Big 2

1. **Improve crop production and less year-to-year variability**

2. **Allows earlier and later field operations**

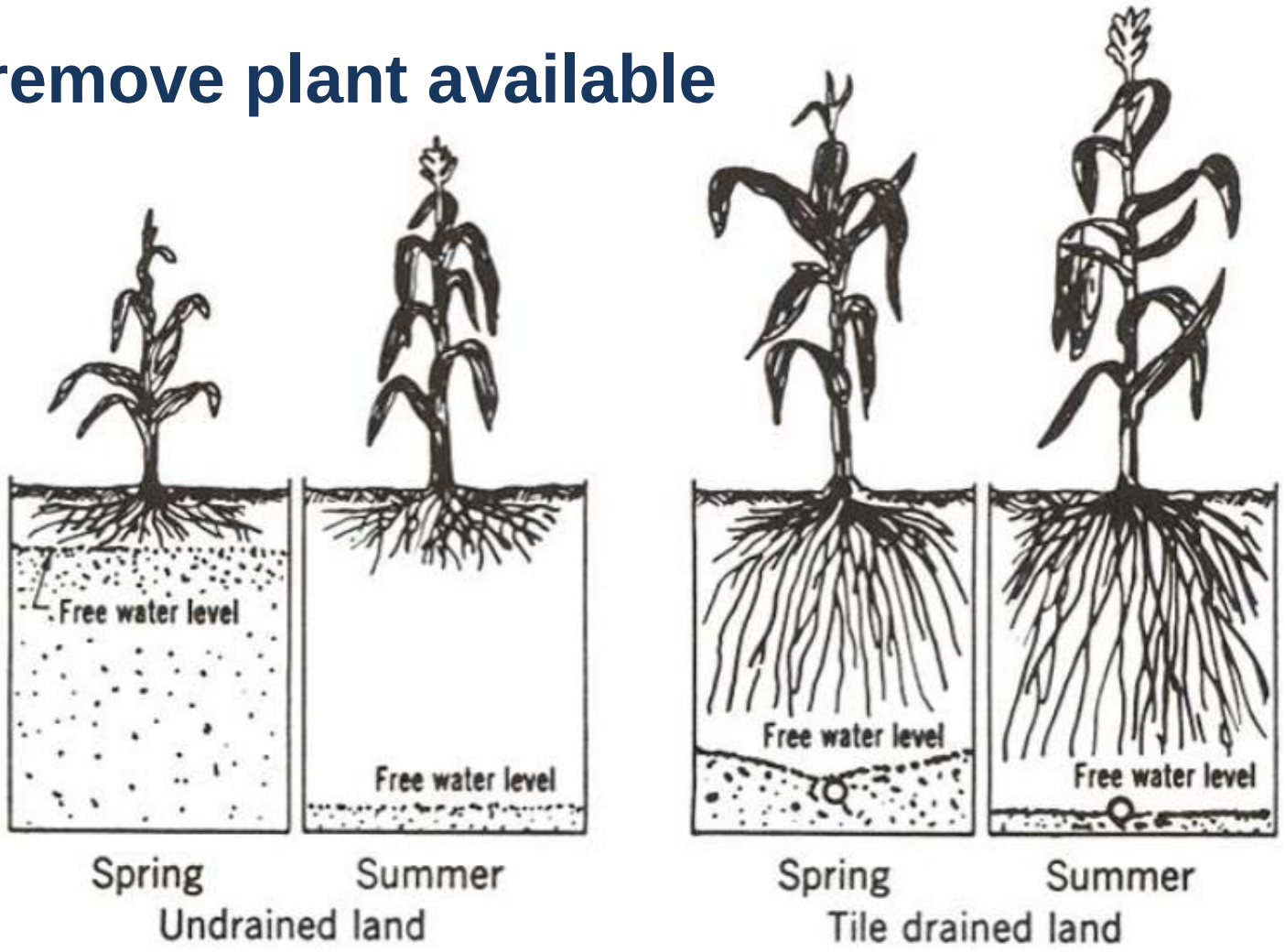


Sources: The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), and the National Crop Insurance Services (NCIS) program

Average of 30% yield increase in corn and soybeans due to drainage over 25 years in Ohio *(Reeder et al., 2011)*

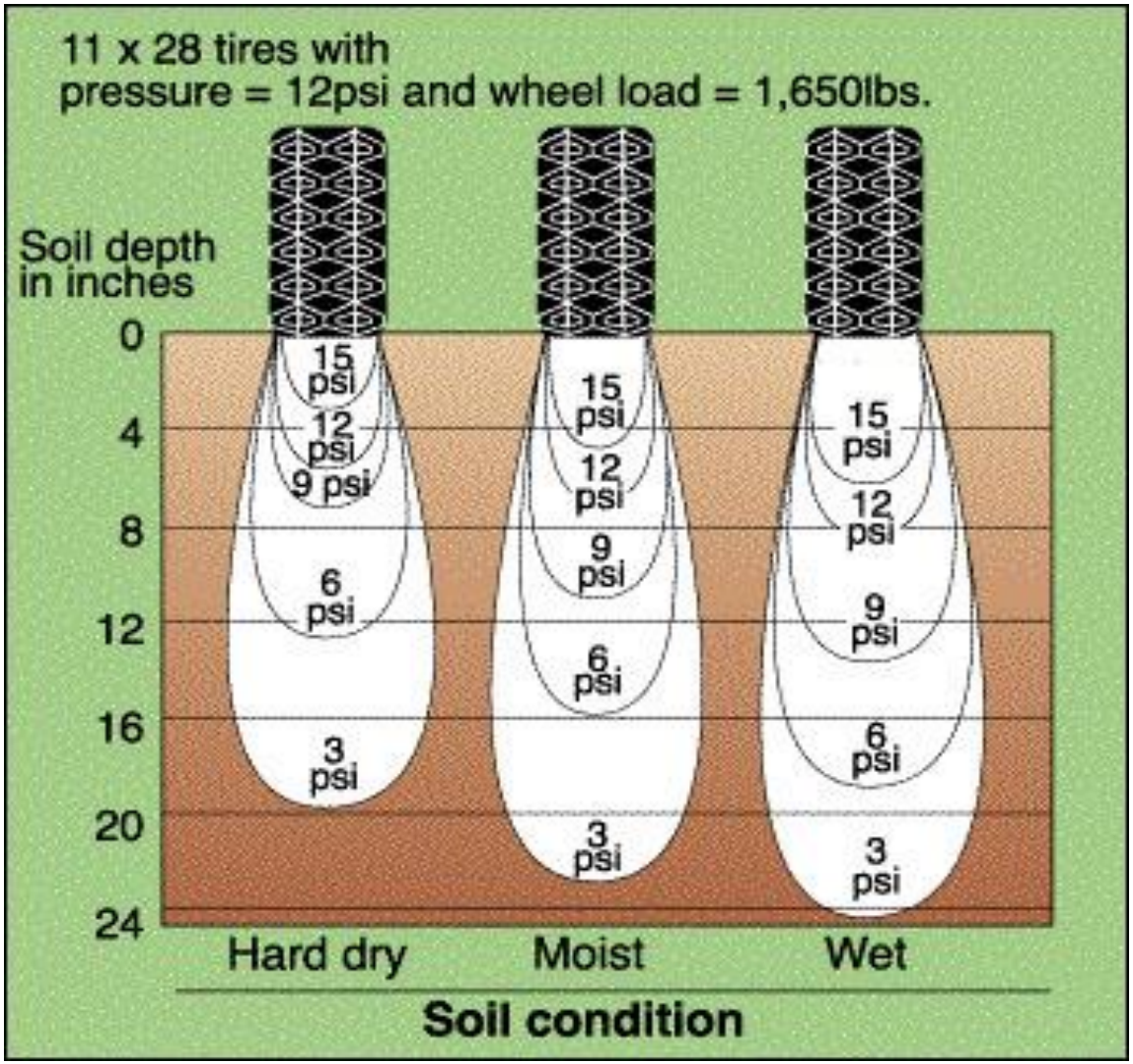
Wet years, and dry years

Does not remove plant available water

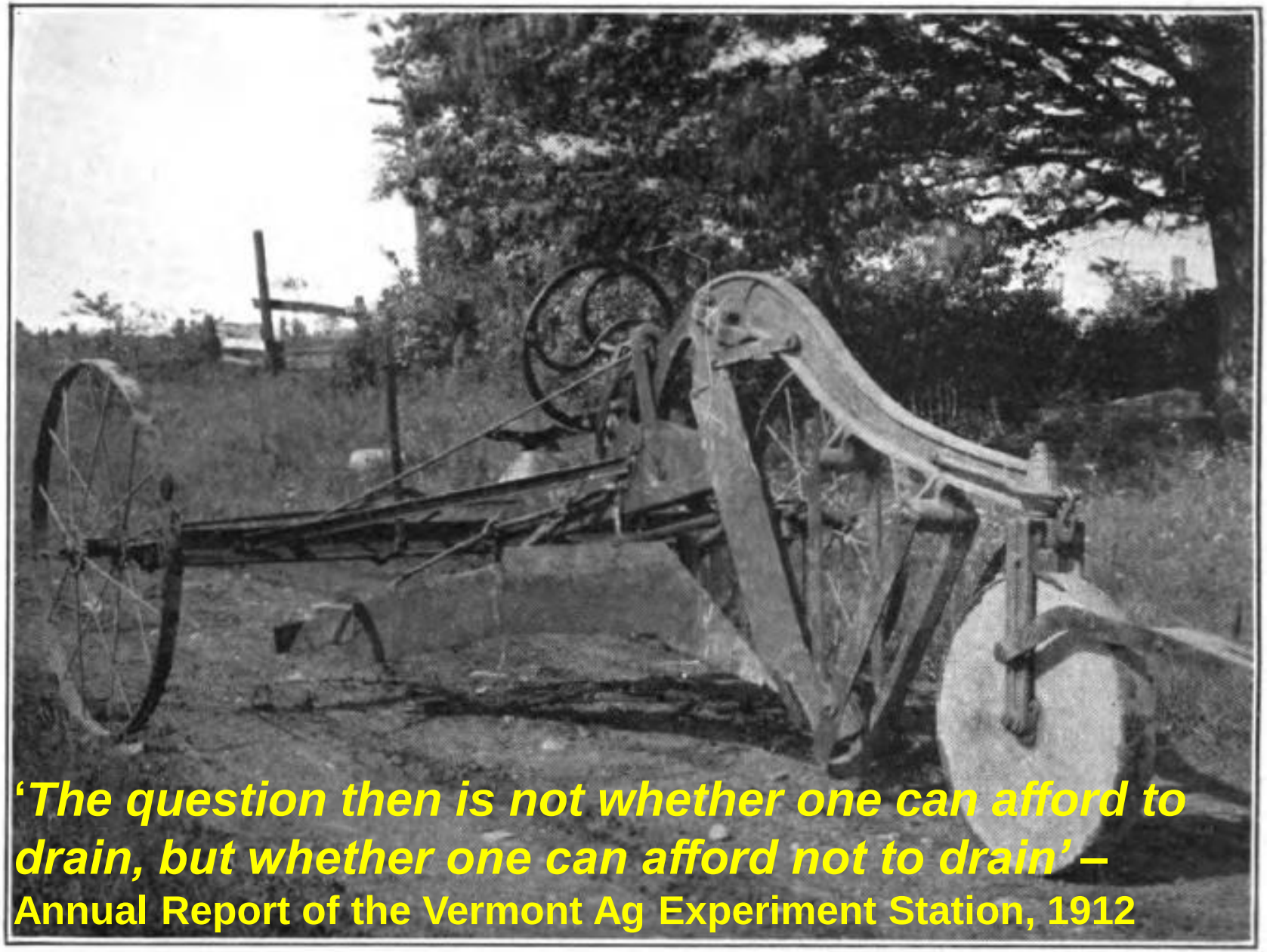


Reduce Compaction

Especially tough-to-remedy deep compaction



extension.missouri.edu/explore/images/g01630art01.jpg



'The question then is not whether one can afford to drain, but whether one can afford not to drain' –
Annual Report of the Vermont Ag Experiment Station, 1912

PLATE III. Cyclone Ditcher, drawn by six horses. (Courtesy Hon. E. S. Brigham, St. Albans.)

Where is that water coming from?
(and why won't it leave me alone?!)

- Up-slope? Rising river/lake? On-site?
- True or perched water table? Compacted layer?
- Will a surface drainage approach work?
  - Fine textured soil, low permeability
  - Water originating on-site

Land Leveling

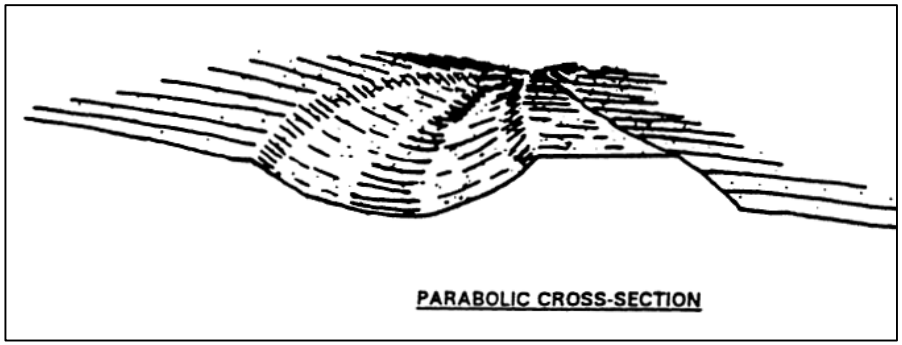
(gpsontario.ca)

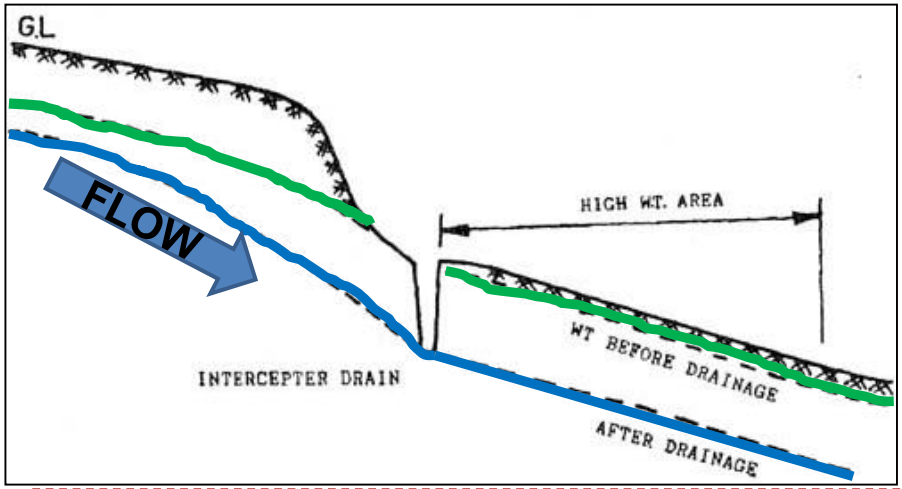
Ditching

(Source: bae.ncsu.edu)

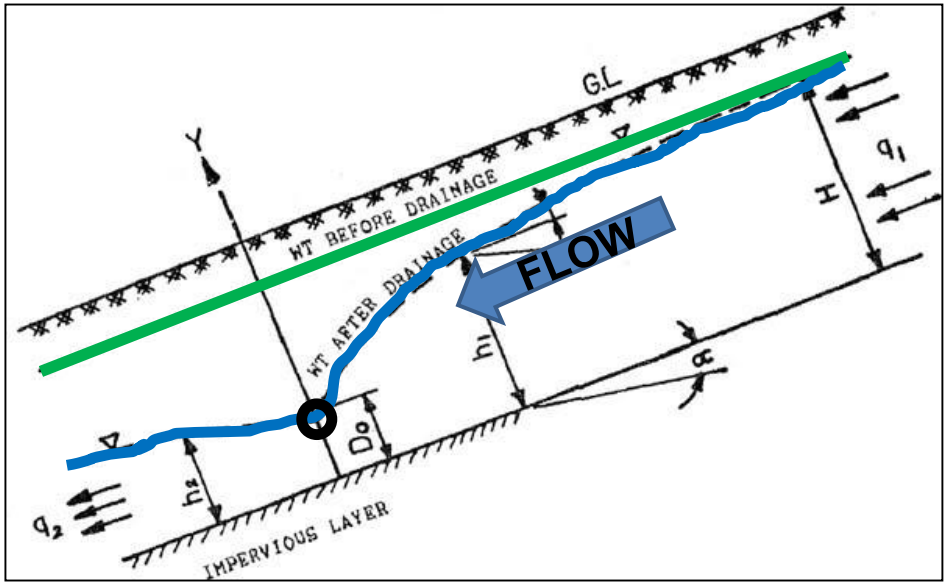
Ag Drainage: Interceptor

- Surface water or groundwater (a.k.a. diversion drains)
- Water originating off-site in sloping terrain



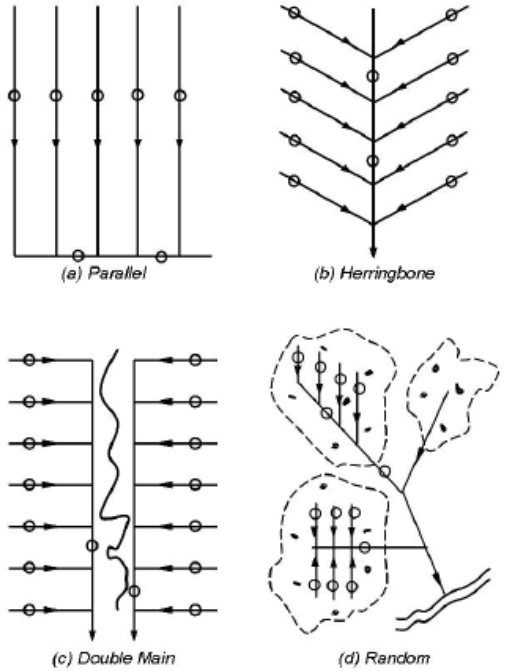


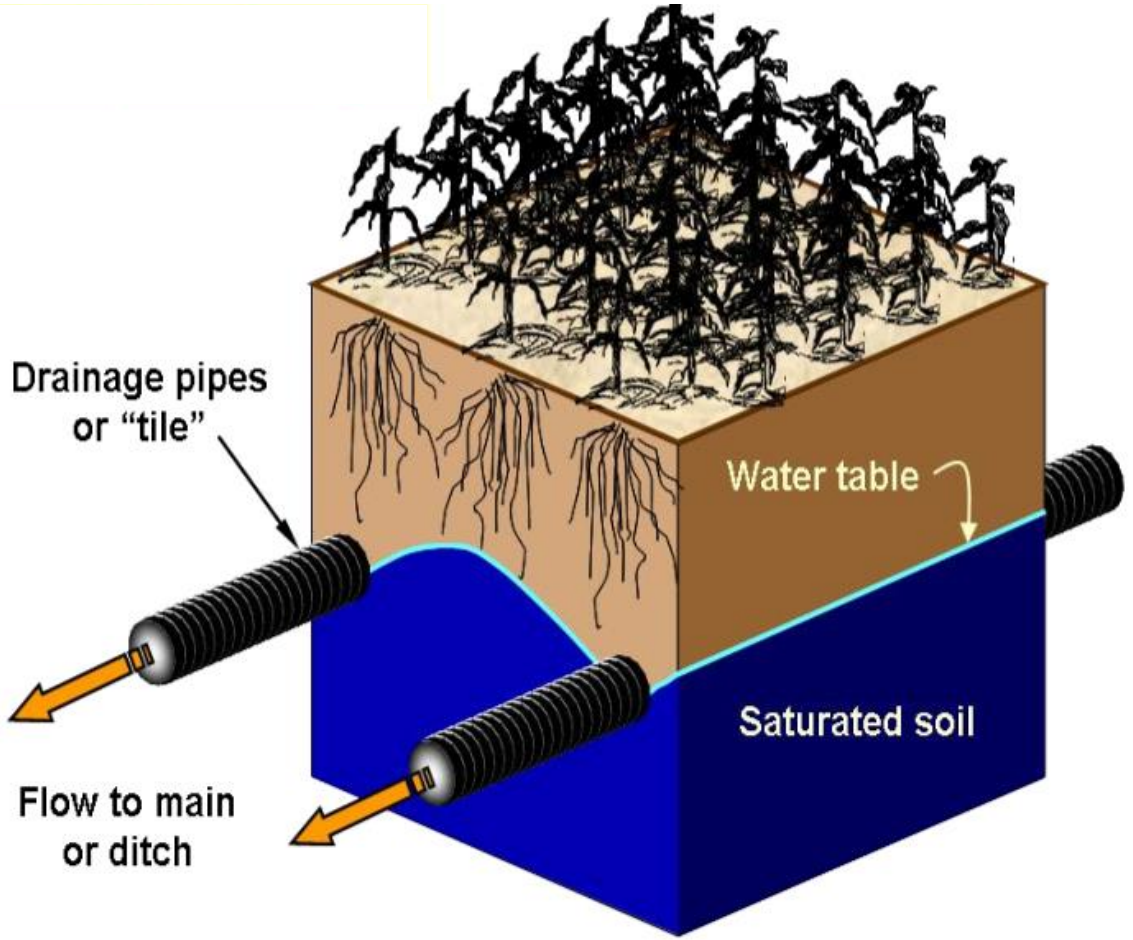
(Source: law.resource.org)



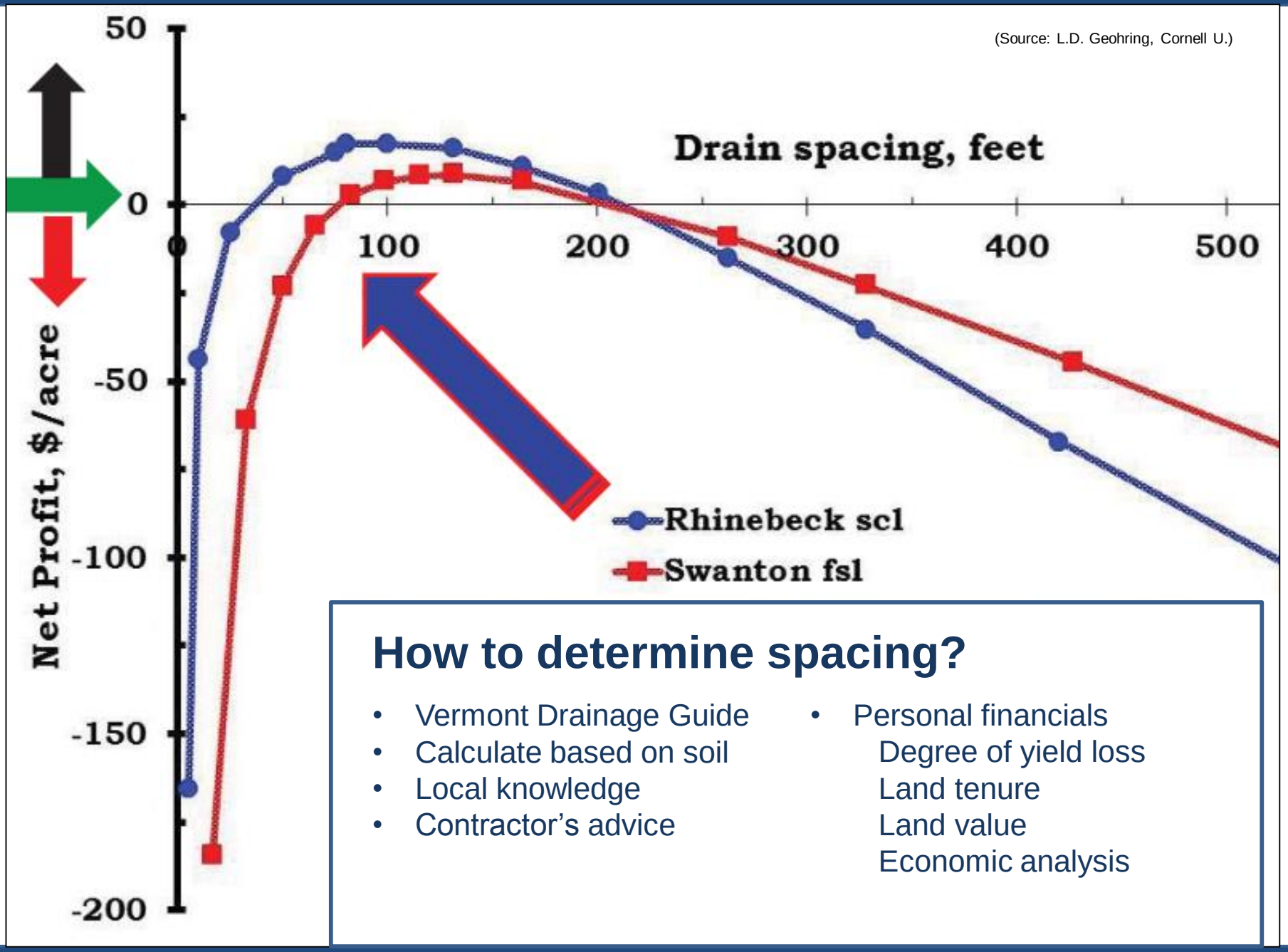
(Source: law.resource.org)

Ag Drainage: Subsurface, i.e. 'Tile'





(Source: G. Sands, UMN)



How to determine spacing?

- Vermont Drainage Guide
- Calculate based on soil
- Local knowledge
- Contractor's advice
- Personal financials
  - Degree of yield loss
  - Land tenure
  - Land value
  - Economic analysis

Ag Drainage: Subsurface – Misc.

- **Ensure adequate outlet!**
- Depth: at least 2.5’
- Pipe material: double/single wall
- Slope: at least 0.2%
- Main pipe size
- Rodent guard
- Filter needed?
- Surface inlets?

Ag Drainage: Installation

Backhoe vs. Tile plow vs. Trencher

Maintaining grade line is critical

Timing matters

Ag Drainage – Precision Technology

GPS – RTK

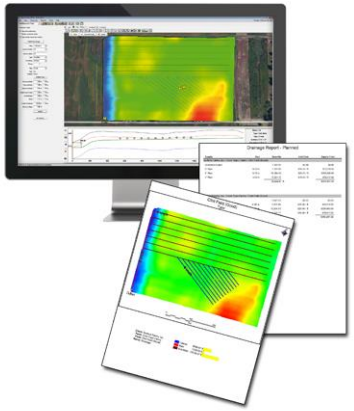
- Sub-inch accuracy
- Fast
- Good for
  - Bigger jobs
  - Any length run
  - Large grade change
- Precise map produced
- Software supported

RTK Video

Tile Drainage Installation (Tile Drainage Installation.webm)

Laser Transit

- Slower
- Good for
  - Small jobs
  - Short runs
  - Limited grade change



Drainage: Cost? DIY?

Should I invest in drainage?

- Is drainage a problem on regular basis? Will it be in future?
- Economics very favorable for high-value crops
- Don’t forget benefit of improved trafficability on yield
- Do the worst, first.

DIY?

- Small jobs, random layouts
- For big jobs, contractors are cheap or cheaper than self-installation
- Experience and design know-how is valuable

Regulatory Issues

USDA

- Federal farm program benefits withheld from anyone who:
  - plants an agricultural commodity on a converted wetland that was converted by drainage, dredging, leveling, or any other means after December 23, 1985
  - converts a wetland for the purpose of or to make agricultural commodity production possible after November 28, 1990

EPA and USACE

- Section 404 regulates discharge of dredged or fill material in waters of US, including wetlands
  - Most routine farming activities exempt, but bringing wetlands into production may require permit

Be in touch with USDA before draining or clearing wet areas

Environmental Issues – Nutrient Loss

Ahead Of New Rules, Environmental Groups Seek To Halt New Tile Drainage System

By MELODY BODETTE • FEB 5, 2016

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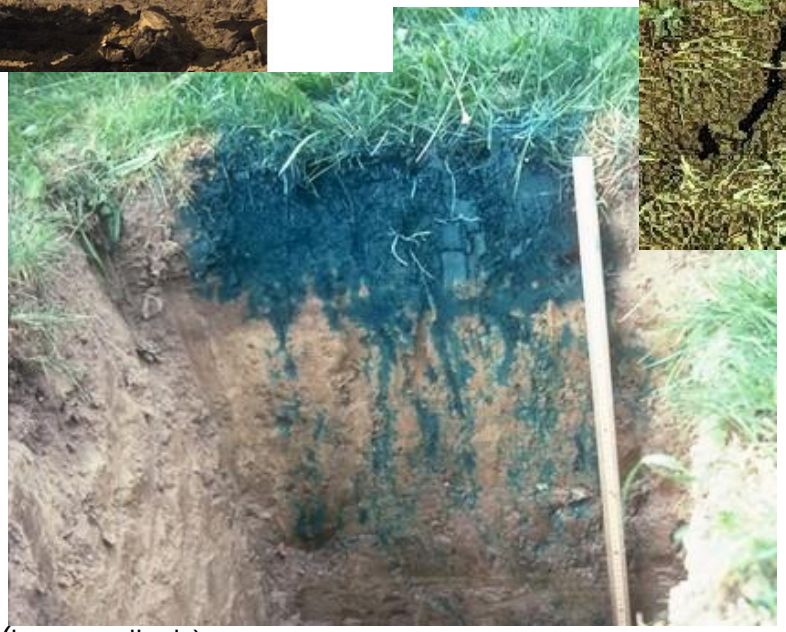

In-field and edge-of-field BMPs

(bee.cornell.edu)

Drainage Contractors

Altona, NY

- Steve Mahoney
  - 518-569-6441
  - Very Experienced
  - Will travel
  - Small farms and diversified crops

West Chazy, NY

- Redline Drainage
  - 518-578-2738
  - RTK, tile plow
  - Will travel
  - On-site pricing

Medina, NY

- BCA Ag Technologies
  - 802-870-0850
  - www.bcagtech.com
  - RTK, tile plow
  - Experience with tiling in orchards

Ferrisburgh

- Van Wyck Bros.
  - 802-870-0850
  - www.vwdrainage.com
  - RTK, tile plow
  - Travel for 50 acres or many farms
  - $1000/acre @ 40’ ($1/ft)
  - Interested in serving fruit and veg producers

Morrisville

- HA Manosh
  - 802-888-5722
  - GPS-guided
  - Will travel;
  - On-site pricing

Randolph

- Larry Pickett
  - 802-685-4455
  - Backhoe installation
  - Travel 50 miles
  - On-site pricing


Farm Business
Tile Shapes
PLEASE
DO NOT TOUCH TILE


Mike Weaver
DRAIN TILE MUSEUM
Home of John Johnston
"Father of Tile Drainage in America"