

EXPLORING VERMONT DAIRY

SOILS AND NUTRIENT MANAGEMENT



THE UNIVERSITY OF VERMONT
EXTENSION

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Our social code:

- Please remain muted unless you are talking.
- Click “Raise Your Hand” if you would like to speak, then unmute yourself when called on.
- Share on-topic thoughts & questions in Chat. (Remember that private and public
- Chat are recorded and are visible to the presenters.)
- Be courteous, respectful & brave!
- Manage your video and sound to be present and minimize distractions
- Ask questions and share your ideas!



Soils and Dirt

- What is soil?

Soil is the medium for growing plants



- What is dirt?

Dirt is what you drag in on your shoes



Soil

Outer surface of the earth

- Natural medium for the growth of plants
- Source of macro nutrients

BIG THREE

Nitrogen (N)
Phosphorus (P)
Potassium (K)

Calcium (Ca)
Magnesium (Mg)
Sulphur (S)

- Source of micro nutrients
Iron (Fe)
Manganese (Mn)



Why are the big three important:

Nitrogen -

A lack of nitrogen
causes plants to turn
yellow

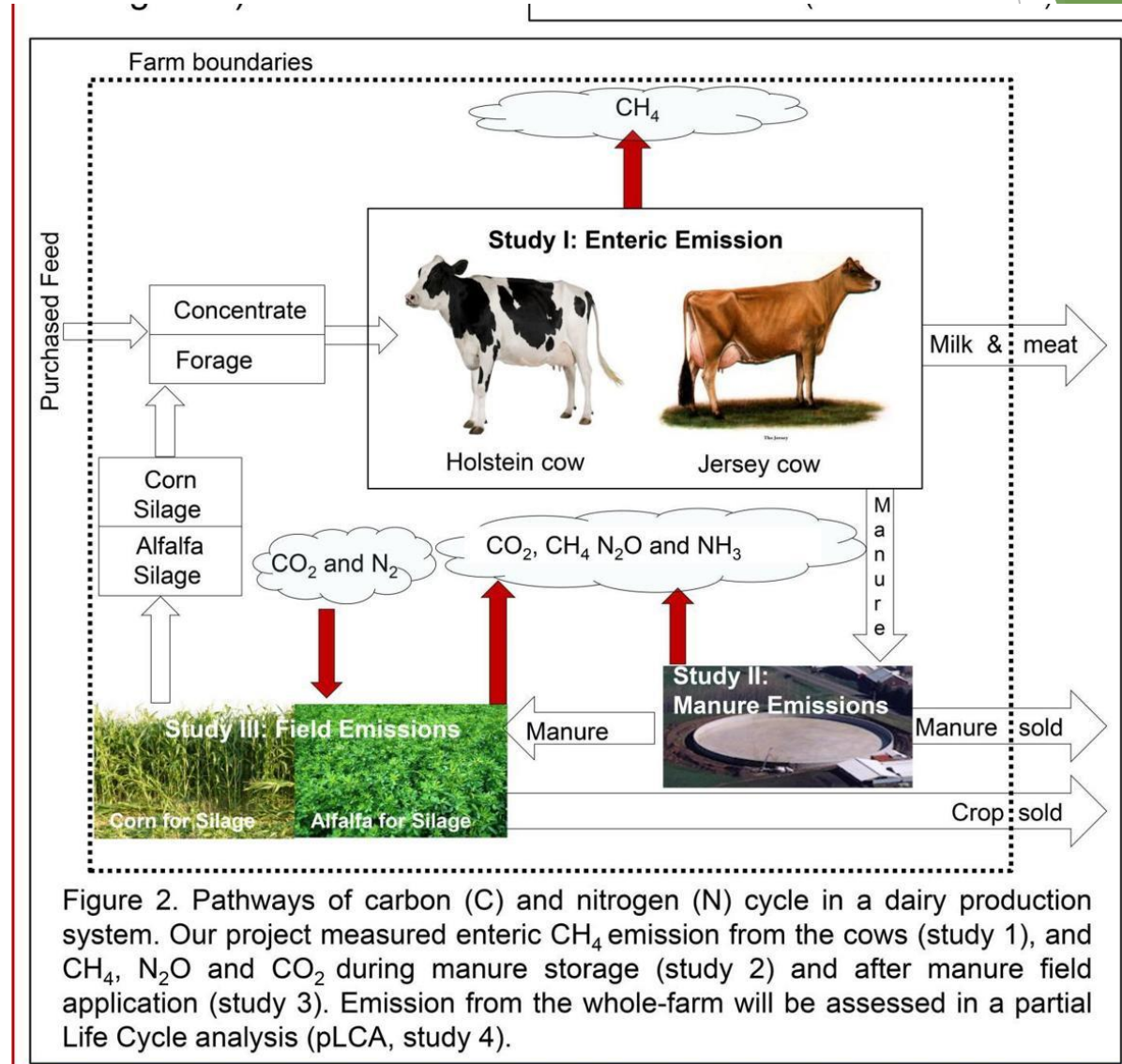
Several forms

Liquid

Solid

Gas

Photo credit: ag update.com



Phosphorus (P)

- ▶ Plants need Phosphorus for cell division and enlargement (growth)
- ▶ Phosphorus is a key part of plants being able to convert sun into energy
- ▶ Phosphorus is important in the role of how plants store energy and transfer
Phosphorus is found in plant DNA and RNA

Phosphorus Cycle

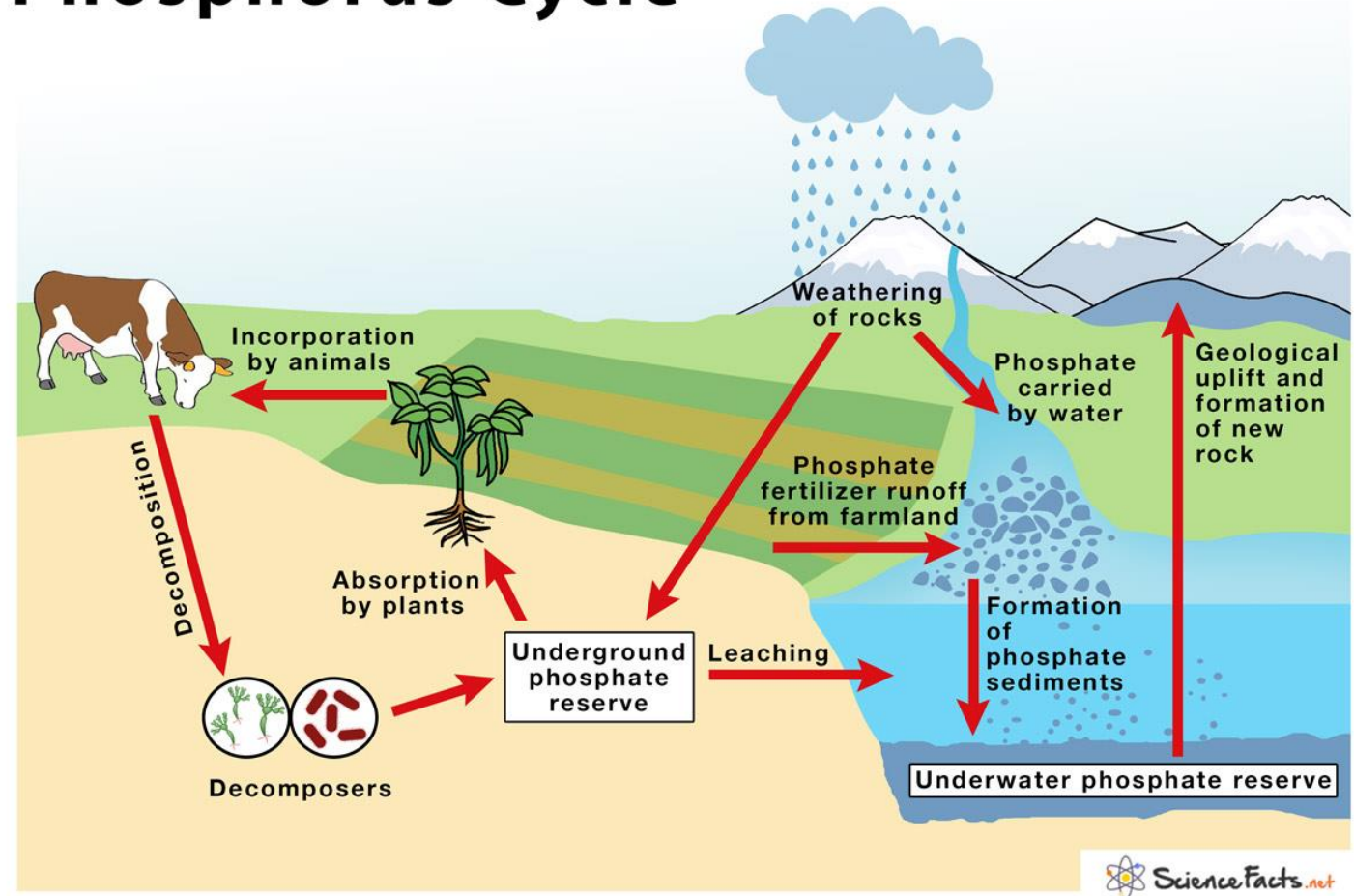


Photo credit: ScienceFacts.net

Potassium (K)

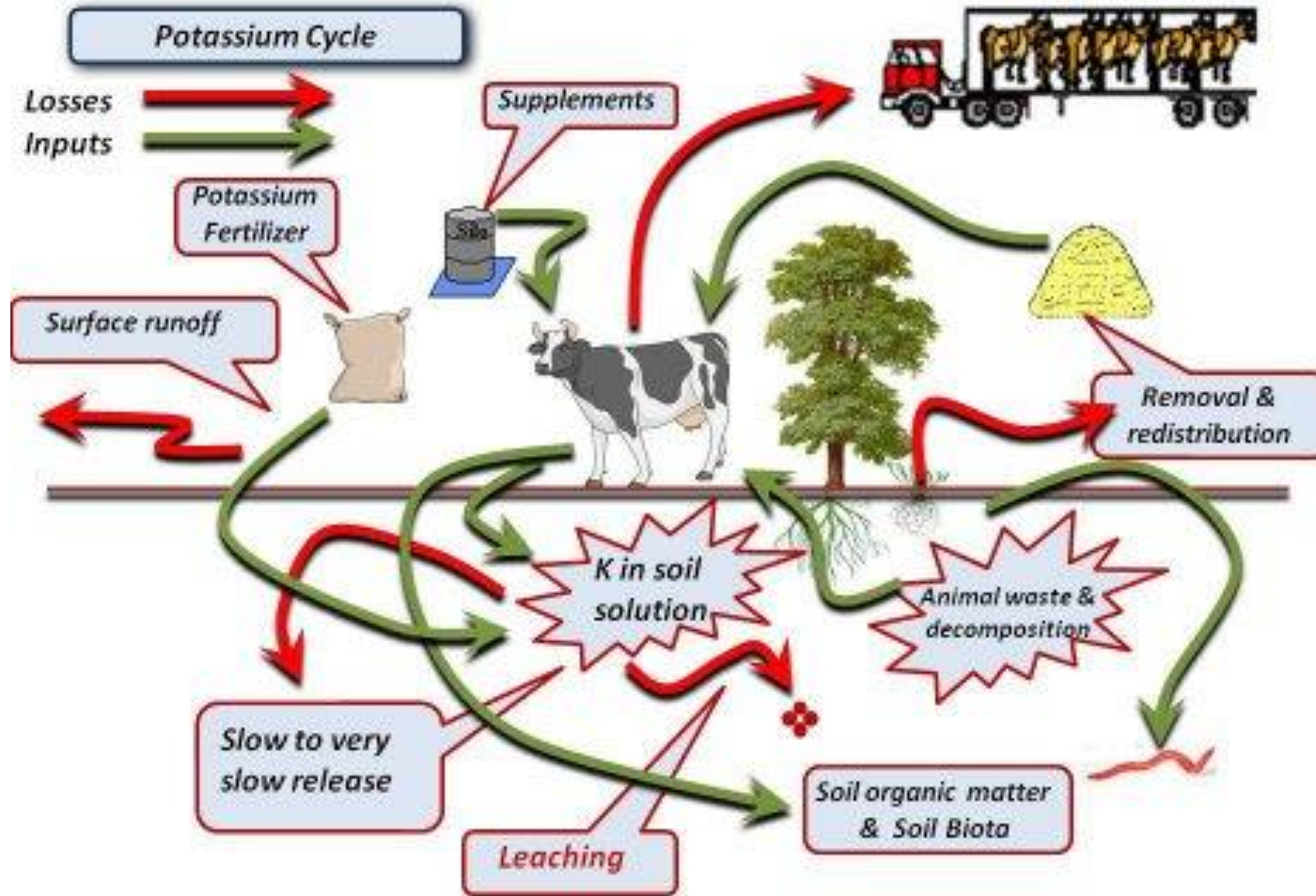
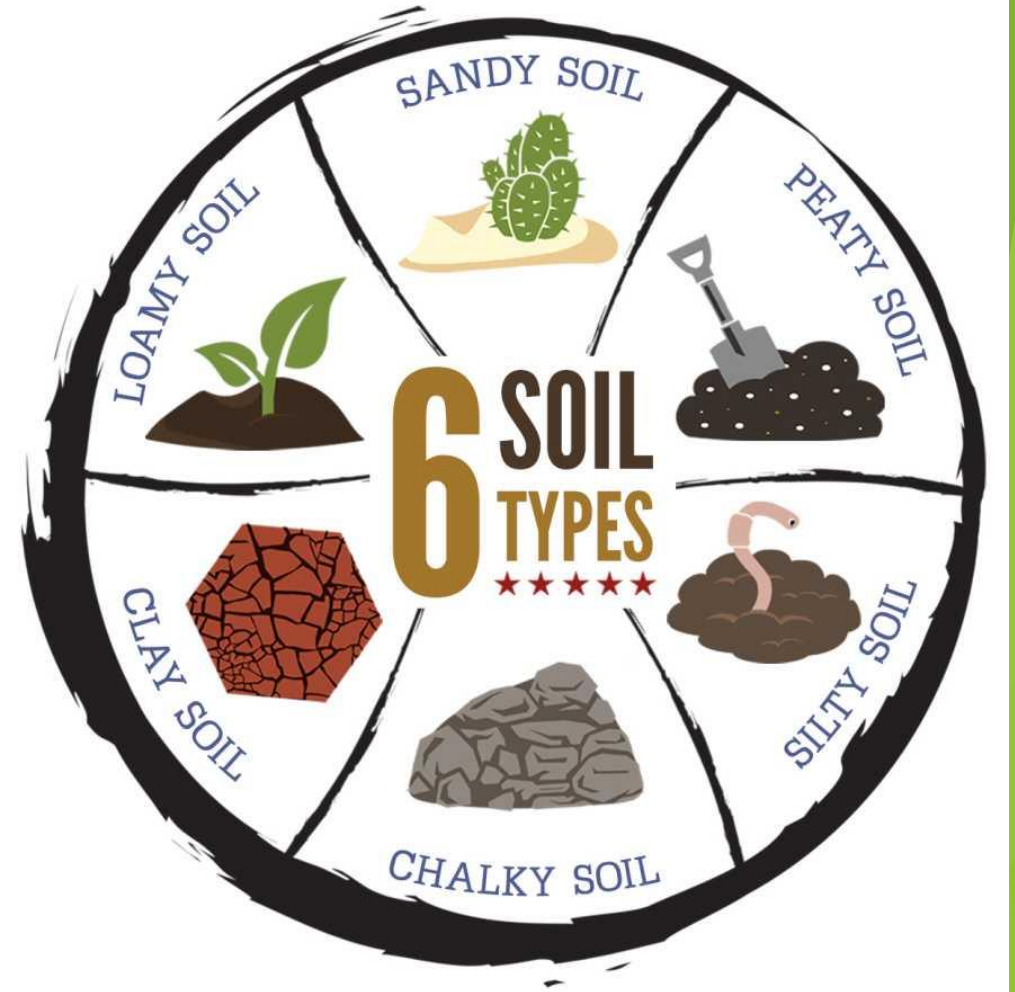


Photo credit Litchfield Planter Co.

Basic types of soils

- ▶ Sand
- ▶ Loam
- ▶ Clay
- ▶ What are favorable characteristics of each of the above
- ▶ What are possible undesirable characteristics of the above
- ▶ Think about what types of plants you want to grow and how each type of soil might impact their growth



Soil maps

- <https://websoilsurvey.nrcs.usda.gov/app/>

Connect to the web soil survey link above to learn more about soils in your area. How might the soils along a river differ from the soil found on a mountain?



Why are some soils better than others for agricultural production ??

What are characteristics of prime agricultural land?

- ▶ Not highly erodible -
- ▶ Not saturated with water for long periods of time
- ▶ Protected from flooding or does not flood frequently
- ▶ Adequate soil moisture to sustain commonly grown crops in 7 out of 10 years
- ▶ Water moves readily through the soil
- ▶ No root restricting layers in top 20 inches of soil
- ▶ Not too stoney or rocky less than 10% of surface layer consists of rock fragments larger than 3 inches in diameter
- ▶ Favorable slopes (less than 8%)
- ▶ Deep soils that allow for unimpeded root growth

What is soil erosion?

Soil erosion is when soil is worn away by natural forces like wind and water but it may also be caused by agricultural practices such as tillage. Implementing good conservation practices can reduce erosion.

- ▶ How can farmers limit or reduce soil erosion?
- ▶ Why is it important for farmers to limit erosion?

What are cover crops?

How can cover crops reduce erosion?

How can cover crops improve soil health?

Photo credit: nrcs.usda.gov



What are RAPs? (Required Agricultural Practices)

- ▶ Act 64 Vermont Clean Water Act was enacted in June 2015 it updated AAP (Accepted Agricultural Practices)
- ▶ Agriculture was one of several major contributors of non-point source pollution in Lake Champlain and other waterways
- ▶ •Establish requirements for a Small Farm Certification Program;
- ▶ •Establish nutrient, manure, and waste storage standards;
- ▶ •Make recommendations for soil health;
- ▶ •Establish requirements for vegetated buffer zones;
- ▶ •Establish requirements for livestock exclusion from surface water;
- ▶ •Establish nutrient management planning standards; and
- ▶ •Establish standards for soil conservation such as cover cropping

Refer to the Vermont Department of Agriculture web site for a complete listing of Vermont RAPs <https://agriculture.vermont.gov/rap>

What RAPS do you feel are important? Is preserving our soil important?



Photo credit: [fineartamerica.com](https://www.fineartamerica.com)

What are nutrient management plans?

- ▶ Created by or for a farmer
- ▶ Look at current soil tests
- ▶ Examine nutrient level needed to grow the desired crop
- ▶ If soil test indicate low levels of nutrients, then you can also add additional nutrients to improve the soil
- ▶ To avoid overuse of manure and fertilizers (organic and non-organic)
- ▶ Track crop production
- ▶ Track fertilizer and manure being added

Why is nutrient management important?



Limit / reduce
pollution

\$

Nutrient loss
means a loss of a
valuable product -
Nutrients cost
money

Want to know more about soils on Vermont Dairy Farms ?

Understanding Phosphorus and the Phosphorus cycle in soils

https://www.aces.edu/wp-content/uploads/2019/04/ANR-2535-Phosphorus-Basics_041719L.pdf

Find your farm or community on the soil survey maps

<https://websoilsurvey.nrcs.usda.gov/app/>

Vermont Required Agricultural Practices

<https://legislature.vermont.gov/Documents/2020/WorkGroups/House%20Agriculture/Clean%20Water%20Initiative/W~Ryan%20Patch~Required%20Agricultural%20Practices%20Rule%20for%20Ag%20Nonpoint%20Source%20Pollution%20Control%20Program~1-16-2019.pdf>

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Vermont Dairy”



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