

Nutrient Management Criteria Used to Apply Manure or Organic By- Products in Agriculture

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Key Points

- ▶ NRCS Policy for managing nutrients in compost
- ▶ What is a Conservation Practice Standard
- ▶ Overview of the 590 Nutrient Management Conservation Practice Standard and how it applies to organic byproducts
- ▶ Mineralization and Plant Available Nitrogen from Compost
- ▶ Compost on Rangeland Interim Standard and Field Trials

Nutrient Management (590)

DEFINITION

Managing the amount (rate), source, placement (method of application), and timing of plant nutrients and soil amendments.

PURPOSE

- To budget, supply, and conserve nutrients for plant production.
- To minimize agricultural nonpoint source pollution of surface and groundwater resources.
- To properly utilize manure or organic by-products as a plant nutrient source.
- To protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen), and the formation of atmospheric particulates.
- To maintain or improve the physical, chemical, and biological condition of soil.

Analysis Criteria

- ▶ Manure and other organic by-product analyses must include:
 - ▶ Total nitrogen (N)
 - ▶ Ammonium N
 - ▶ Total Phosphorus (P) or P₂O₅
 - ▶ Total Potassium (K) or K₂O
- ▶ Percent Moisture
- ▶ If the material is measured and applied by volume (i.e., yd³), the bulk density must be determined to be able to convert to pounds of nutrients applied.
- ▶ Manure, biosolids, and other organic by-product samples must be collected and analyzed at least annually.



Application Criteria

- ▶ Planned nutrient application rates for nitrogen, phosphorus, and potassium must not exceed land-grant university guidelines or industry practice when recognized by the university.
- ▶ In the absence of crop-specific nutrient requirement values, application rates must be based on plans that consider realistic yield goals and associated plant nutrient uptake rates.

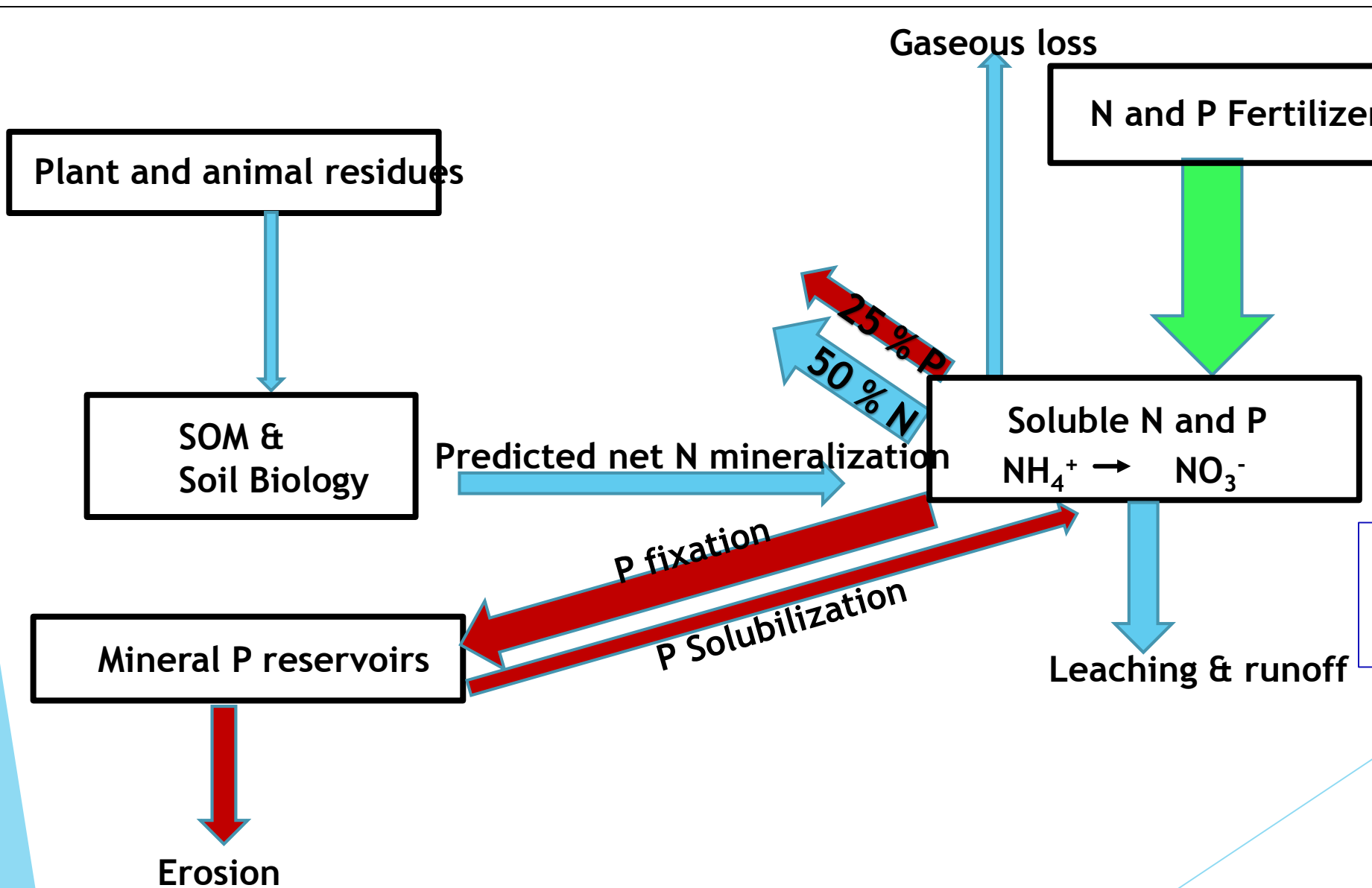
Nutrient Transport Risk Assessments

- The Nitrate Groundwater Pollution Hazard Index
- USDA-ARS Nitrogen Index
- California P-index

Other Considerations

- ▶ C:N ratio and Feedstock drive the quantity of the application of Compost and Manures.
- ▶ Salts
- ▶ Nitrogen Based Application vs. a Phosphorus Based Application

Crop-based Nutrient Management- 4R strategy



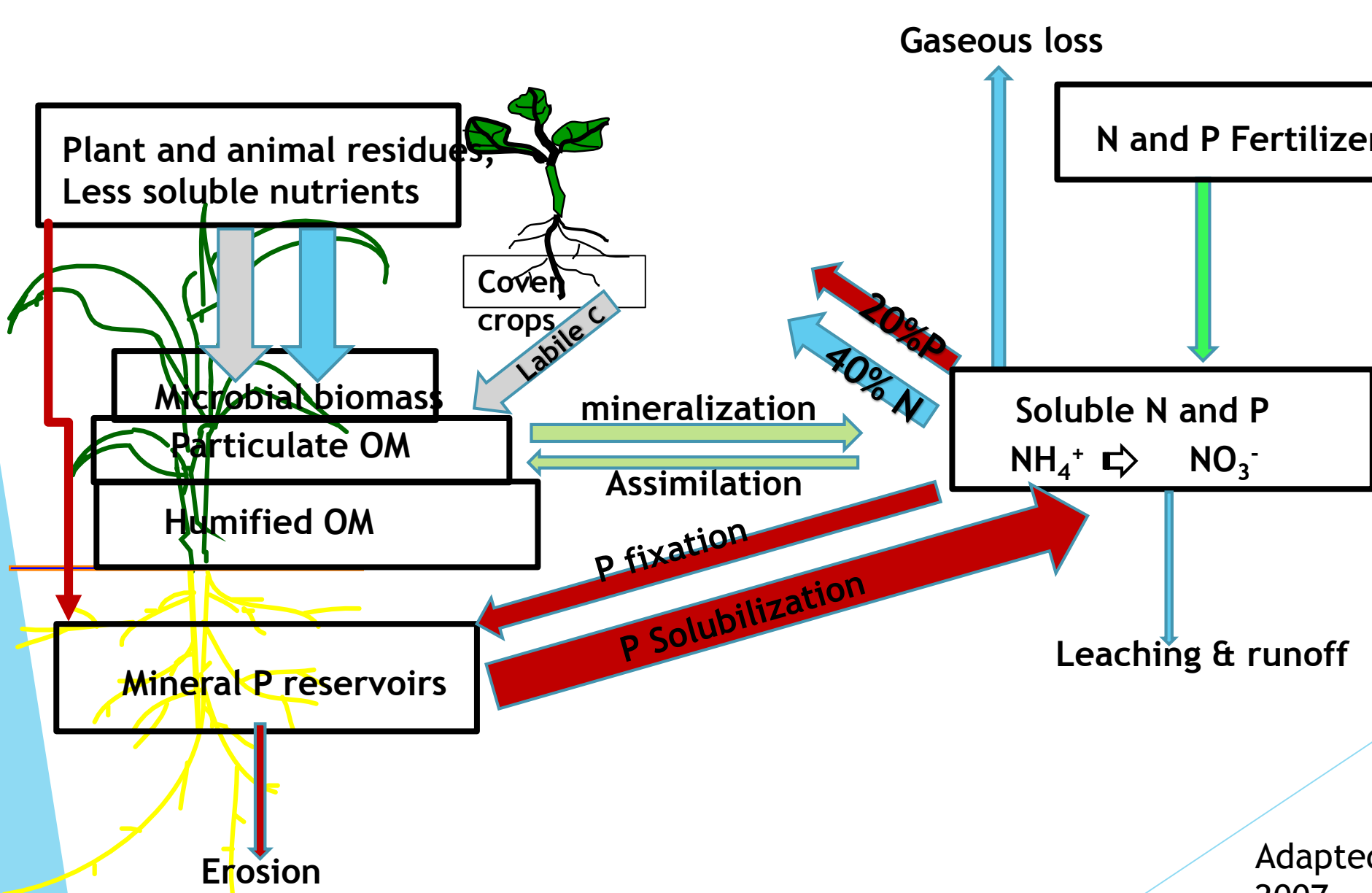
Several methods such as side dressing, banding, fertigation, split application & nitrification inhibitors increase the efficiency but do not eliminate nutrient losses

Fallow land is maintained for 4-8 months thus created a C-limiting conditions for microbes

N budgeting dilemma

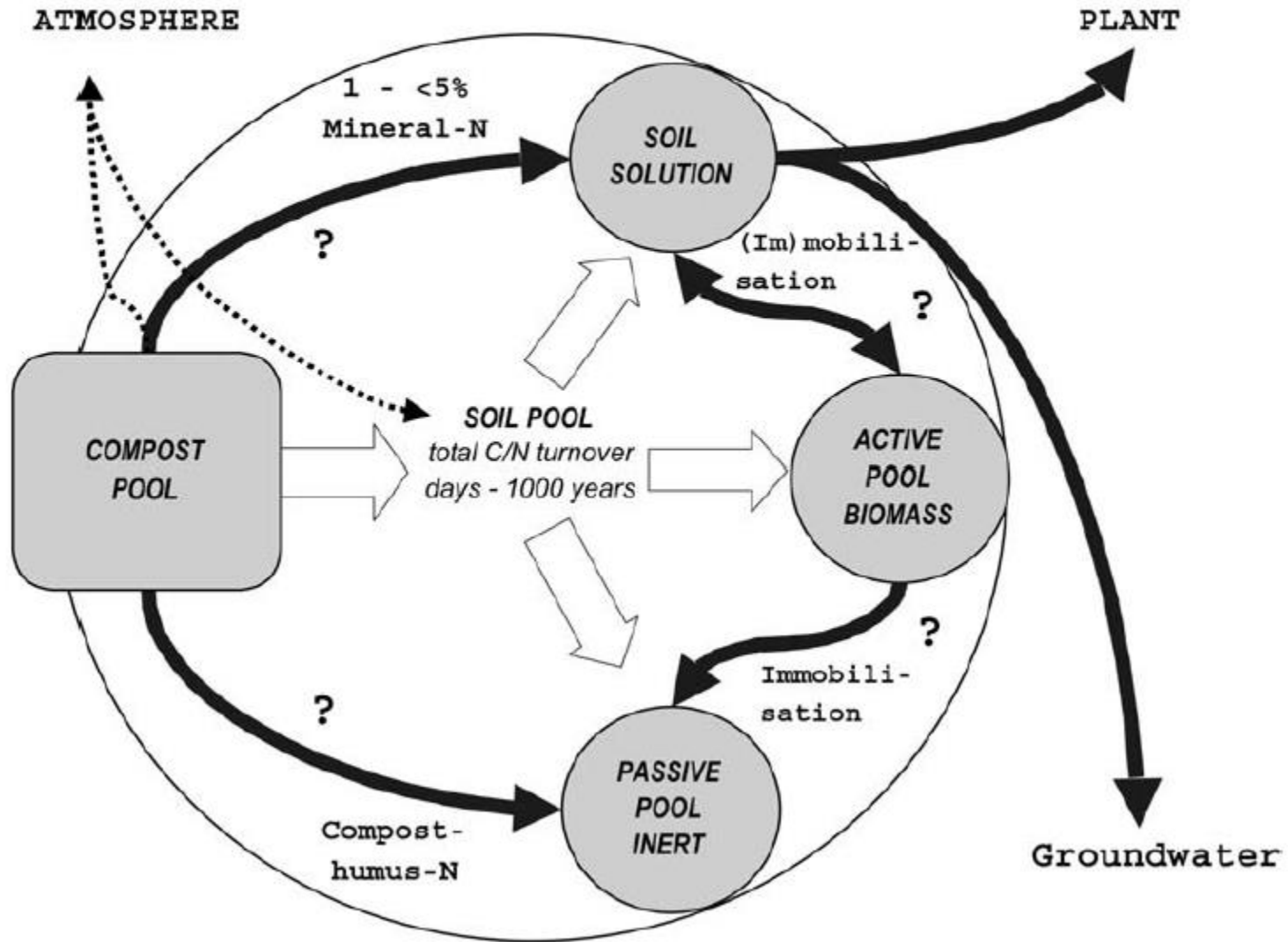
- ▶ The crop needs PAN (plant available N).
- ▶ Manure and compost has a lot of non-PAN.
- ▶ PAN ranges from 5% to 20% in the first year following application of Compost and 2 - 8% the following years.

Ecological Approach to Nutrient Management



This model is to find how to best achieve yields while minimizing fertilizer use and minimizing harm to the environment. Yields and soil reservoirs are maintained with nutrient inputs that are approximately equal to harvested export.

Diversification of inputs as adding carbon, diversifying cropping system, cover crops, slow release N & P. Increase soil buffering capacity. Measure all pools of N & P.



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Chapter 2 Composting



CA Rangeland Trust Photo

Compost on Rangeland

Interim Practice Standard

- ▶ Submitted an Interim Practice Standard to the NRCS NHQ for review.
- ▶ Response:
 - ▶ Too many un-answered environmental questions related to water quality and plant species dynamics.
 - ▶ Work with existing 590-Nutrient Management and 484-Mulching Standard to use Compost on Range and Pasture
 - ▶ Do Not Apply on Slopes Greater than 10%



Next Steps

- ▶ Developed a Cooperative Agreement with East Stanislaus RCD to investigate Compost-on-Rangeland Trials.
- ▶ 14 Sites.

