South Dakota
Life Cycle Analysis (LCA)

Heidi Sieverding
Devin Moeller
James J. Stone

Civil and Environmental Engineering
South Dakota School of Mines & Technology

Life Cycle Analysis (LCA)

- Follows a Reproducible Method: "Standard"
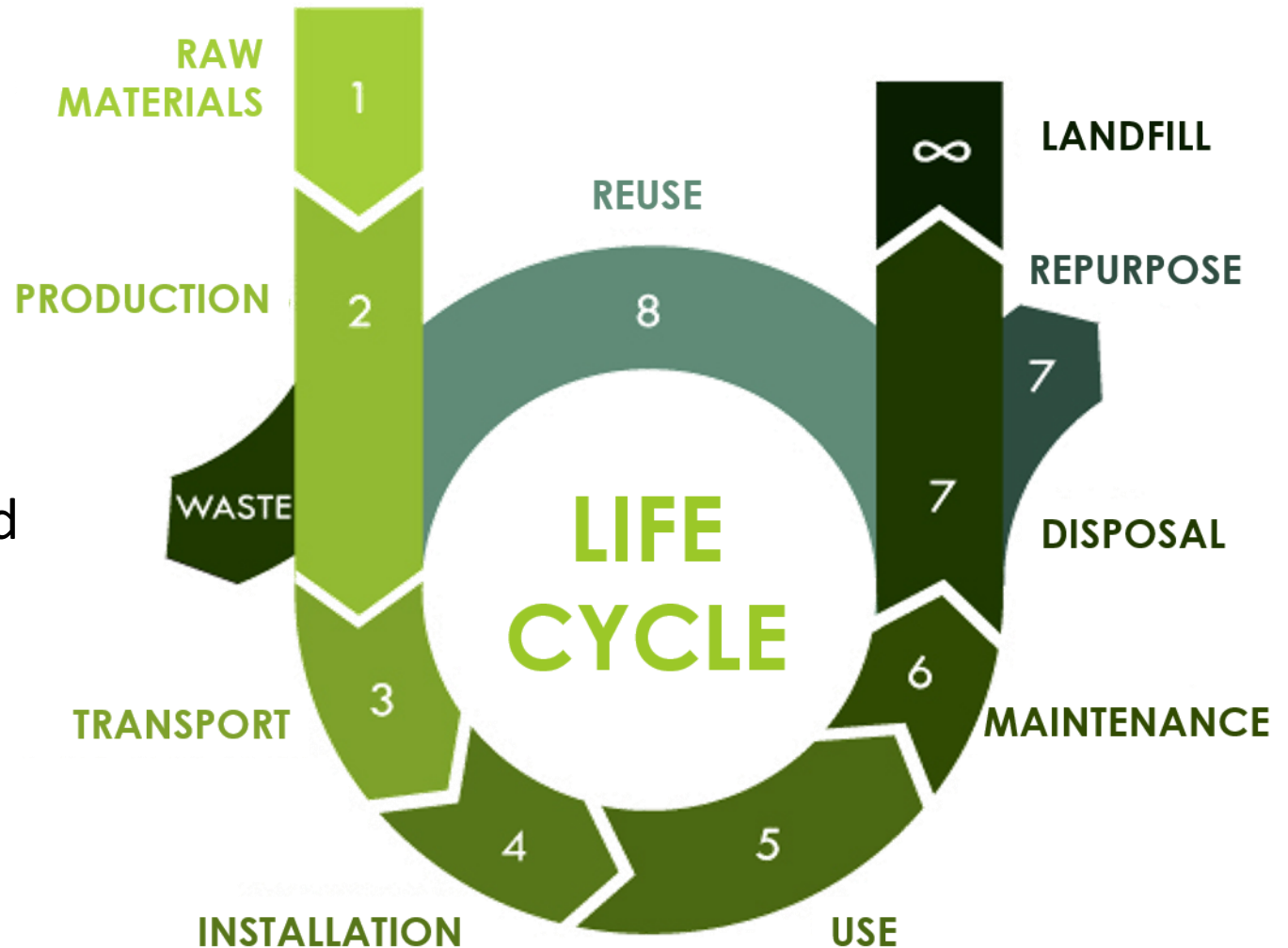
- Impact of Processes and Products

IMAGE FROM: CLEMSON UNIVERSITY

Ag LCA Controlling Factors:
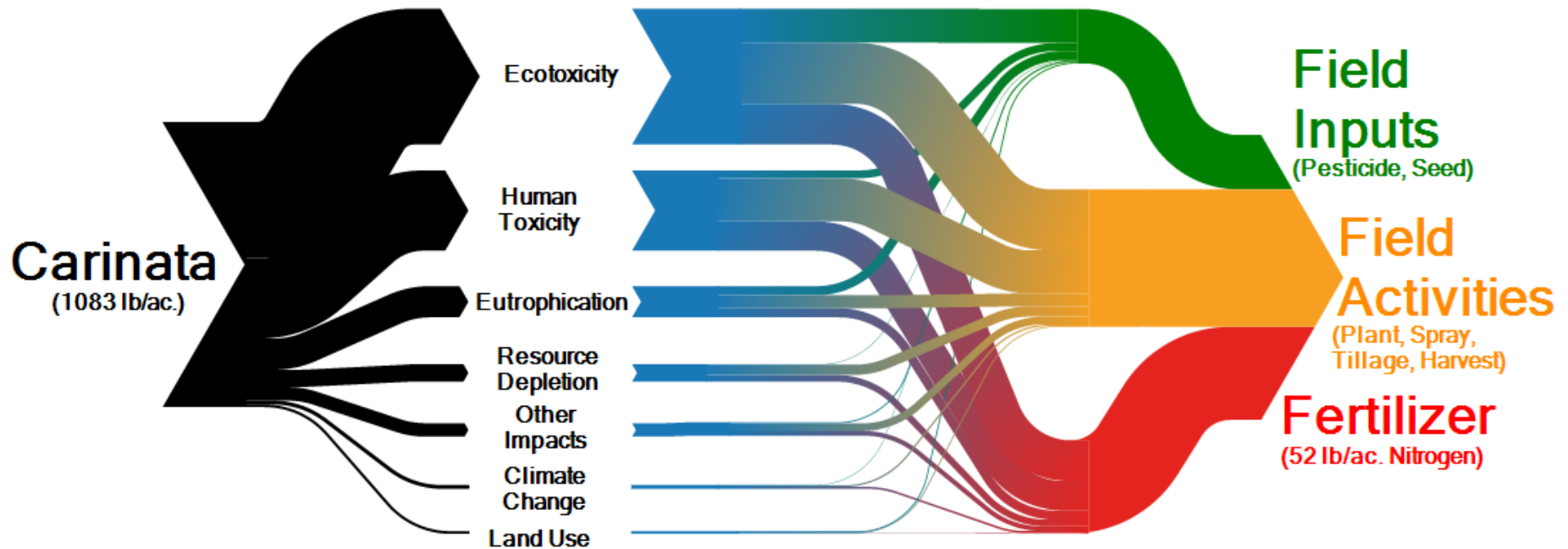
Yield — **Resource Use**

Fuel

Fertilizer

Water

2016 *Average* SD Carinata Impacts...

- Average results from all SD trials
  - Aurora, Felt, & Pierre
- Low spring precipitation affected yields
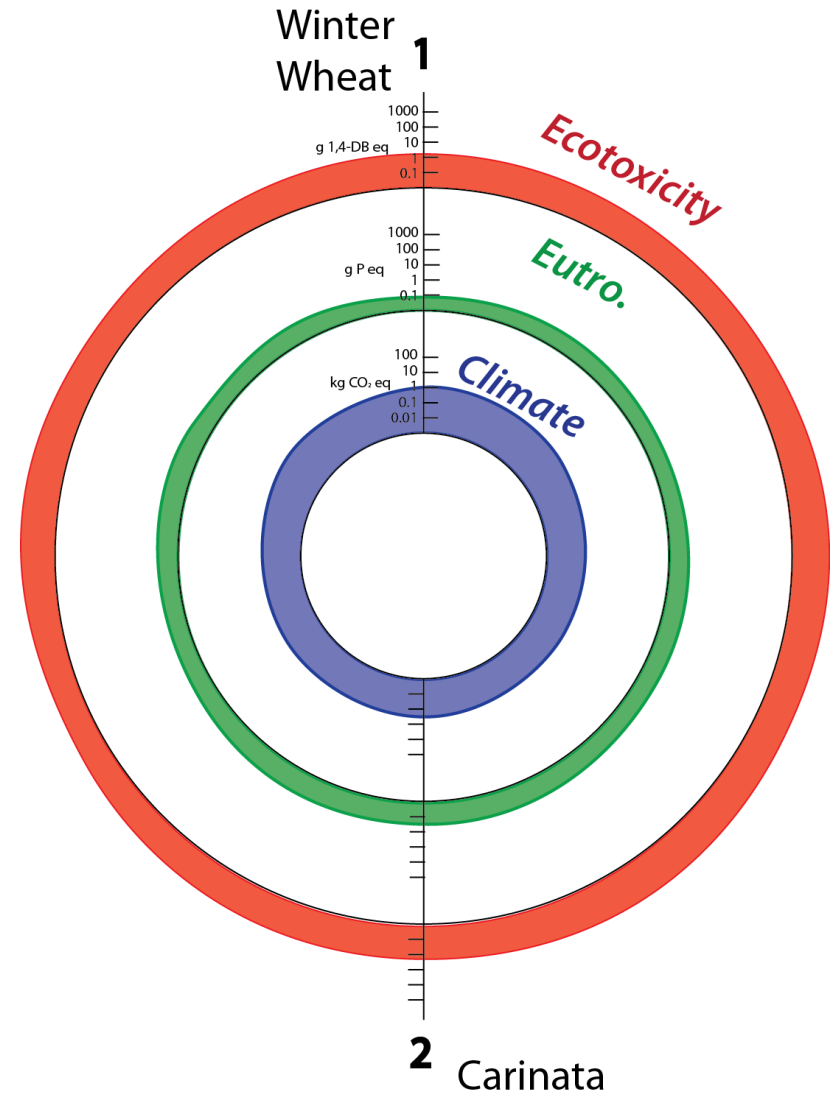
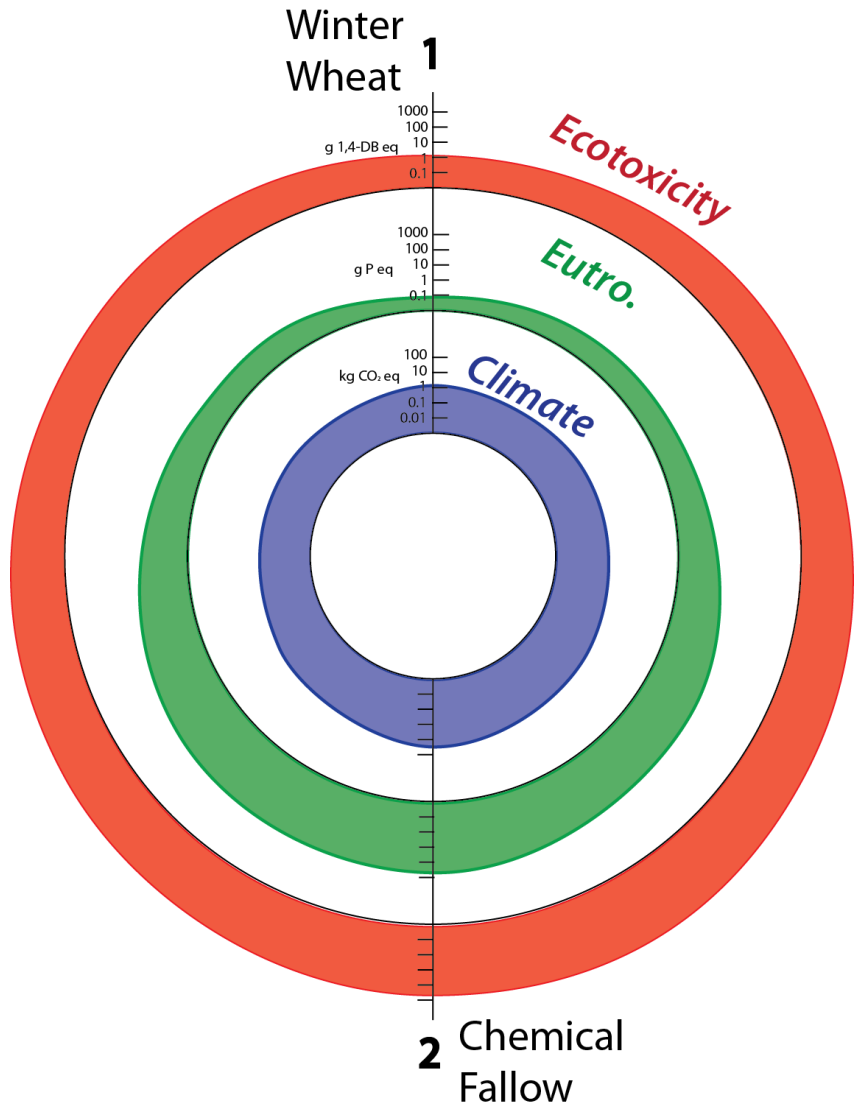# Where does *carinata* fit in SD?
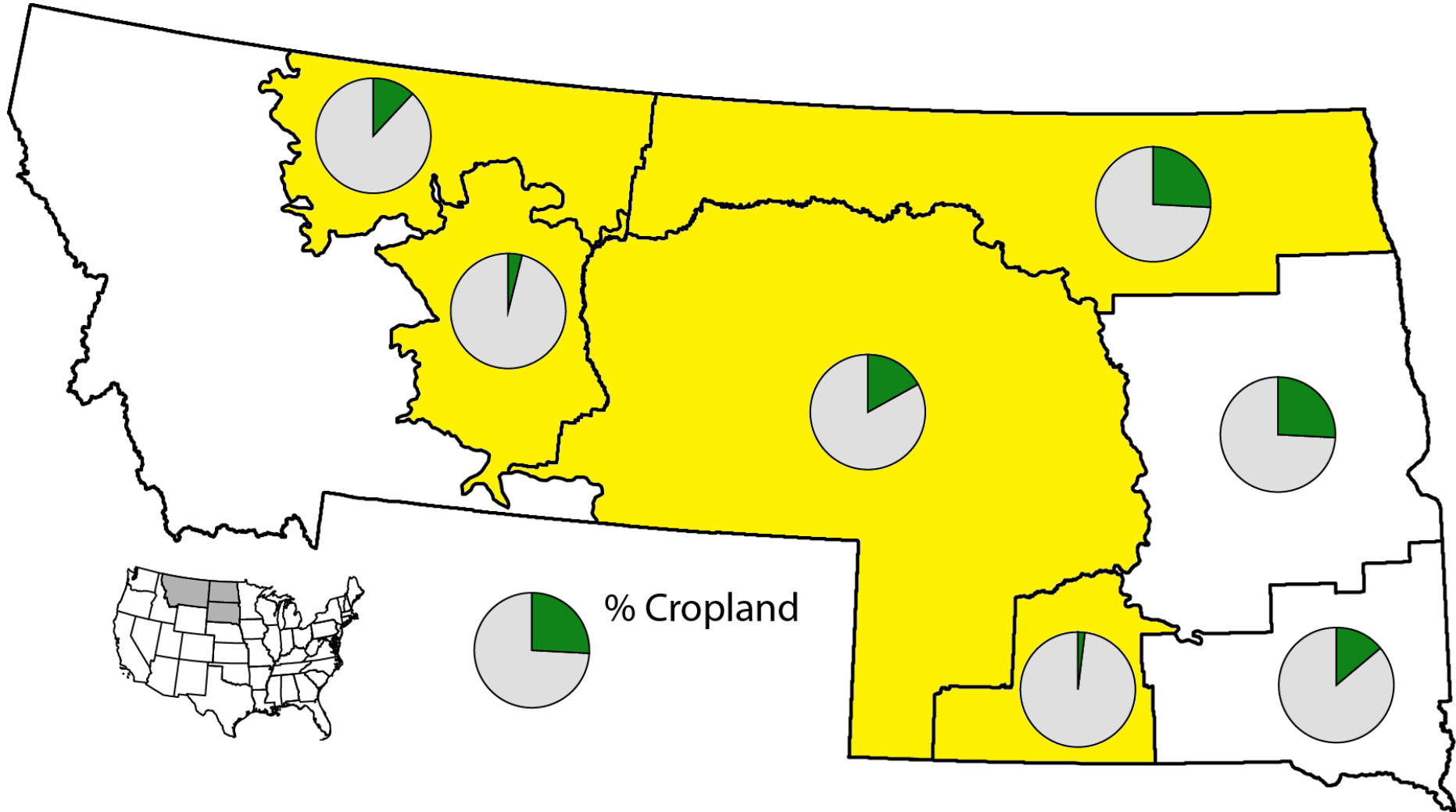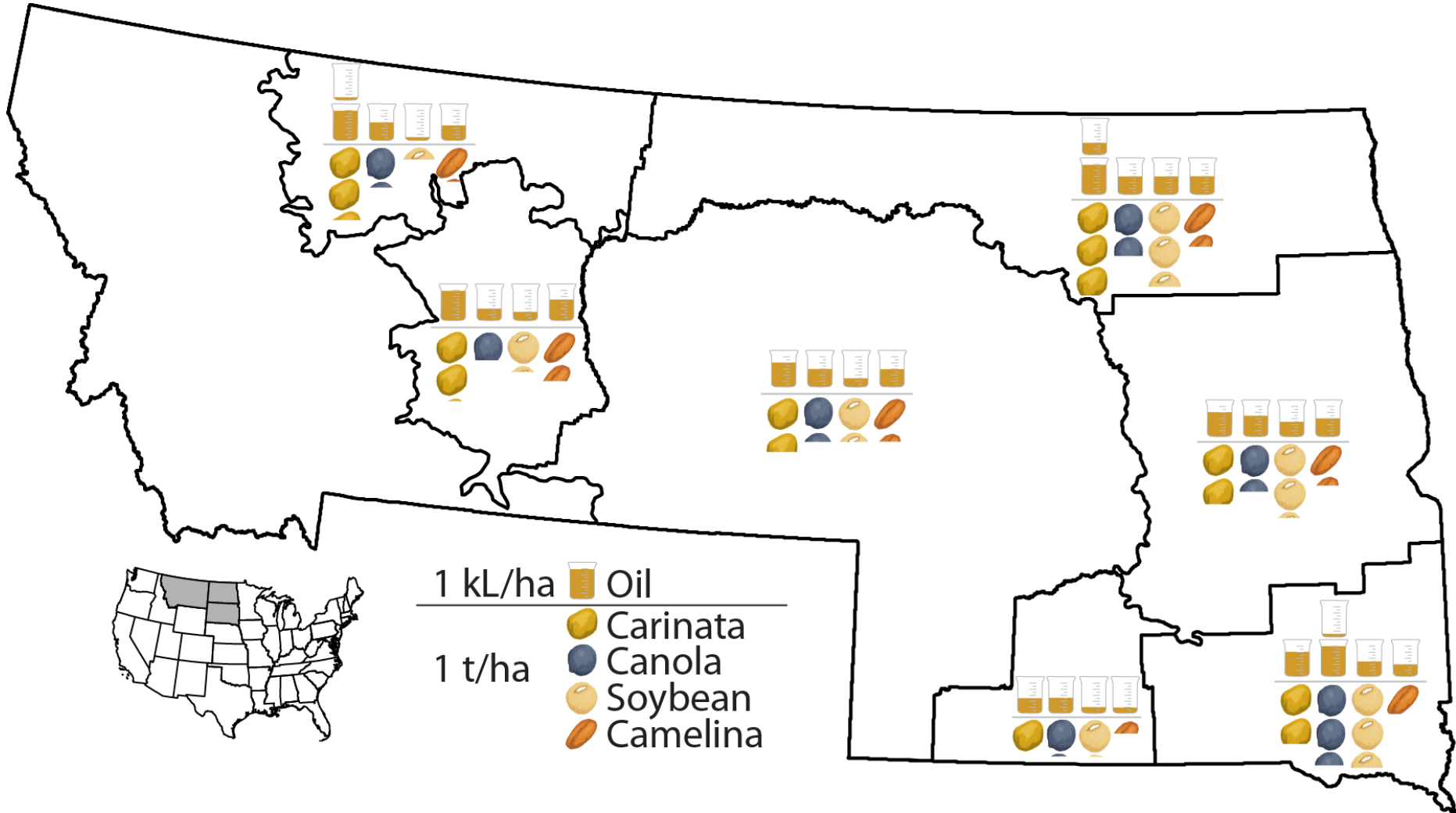

Small Grain Rotations

Fallow Replacement

Fallow Replacement

Cropland Areas

% Cropland

Production Variation

Greenhouse Gas (GHG) Emissions

Legend:
- 100 g — CO_2 eq.
- 1 kg
- Carinata
- Canola
- Soybean
- Camelina
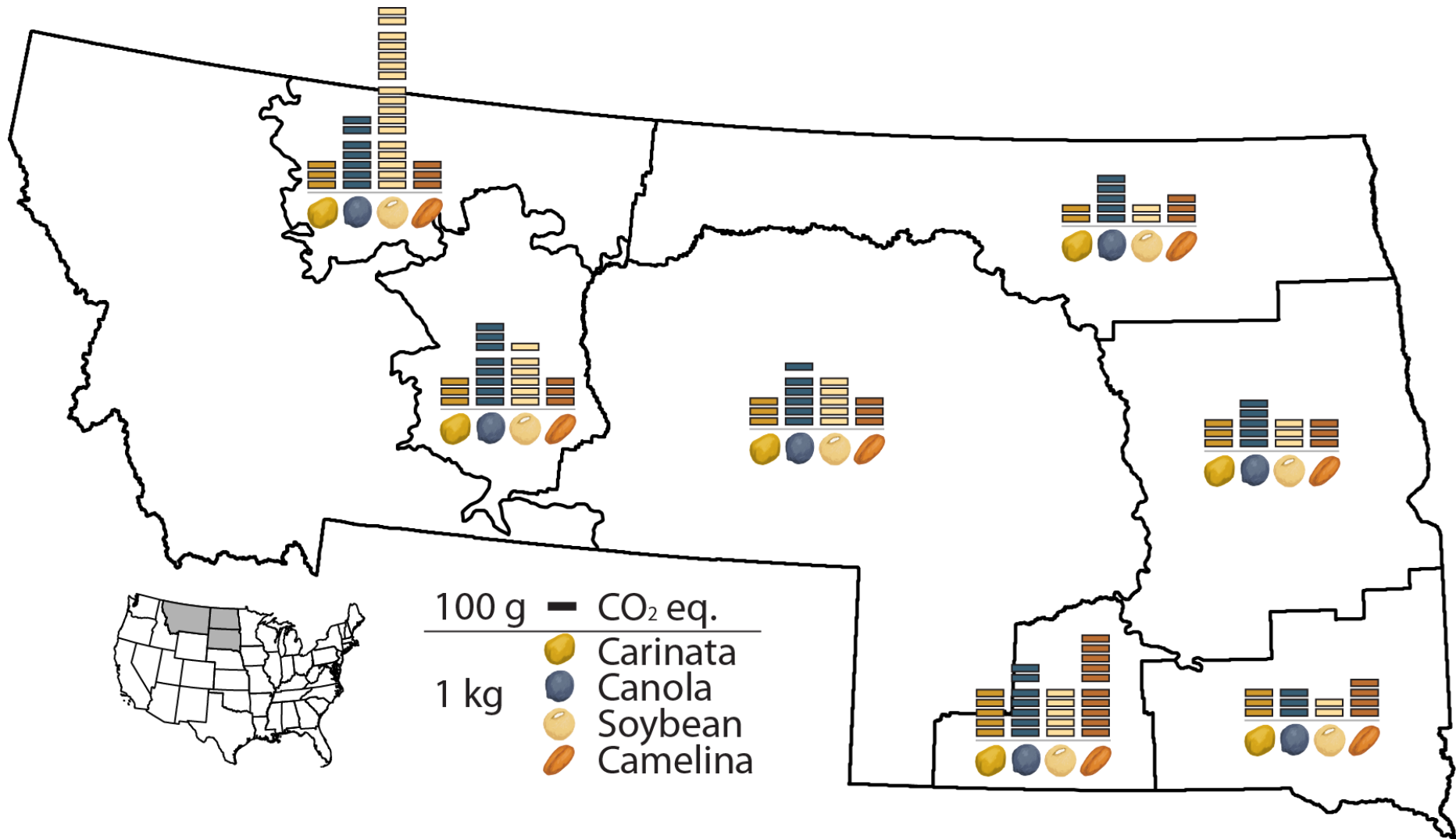
Optimized Production = Low LCA Impact

Sustainable farming practices:

• Planning good rotations

• Managing fertility and moisture

• Maintaining soil health

• Planting climate appropriate crops

Questions?

Contact Information:

South Dakota School of Mines & Technology
Civil and Environmental Engineering
501 E. St. Joseph St.
Rapid City, SD 57701
www.sdsmt.edu
605-394-2439

SOUTH DAKOTA
M
SCHOOL OF MINES
& TECHNOLOGY

Heidi Sieverding	**Devin Moeller**	**Jim Stone**
Heidi.Sieverding@sdsmt.edu	Devin.Moeller@sdsmt.edu	James.Stone@sdsmt.edu

Eutrophication

Freshwater
100 mg ▭ P eq.

🟡 Carinata
🔵 Canola
🟠 Soybean
🟤 Camelina

1 kg

100 mg ▭ N eq.
Marine