ALU Software Lesson

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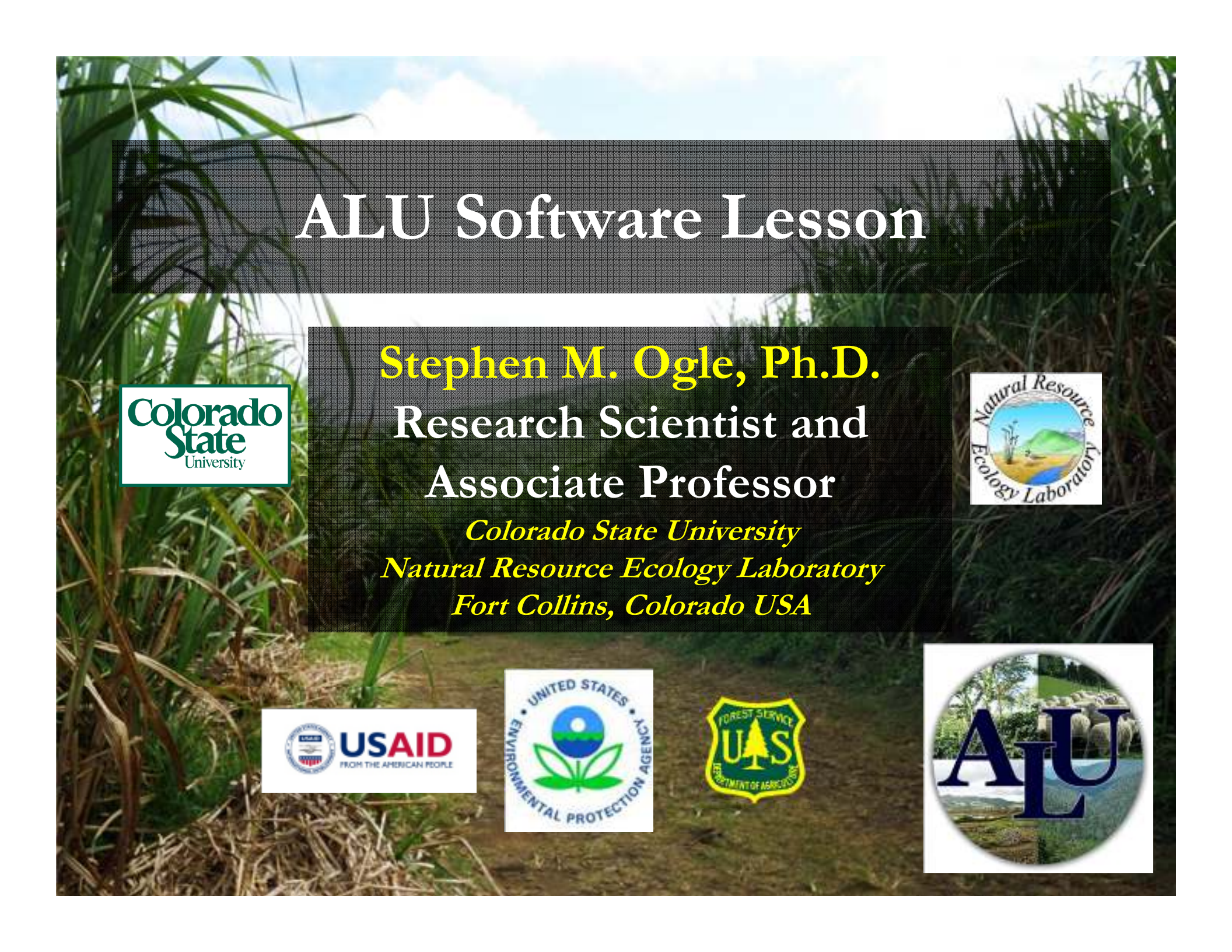
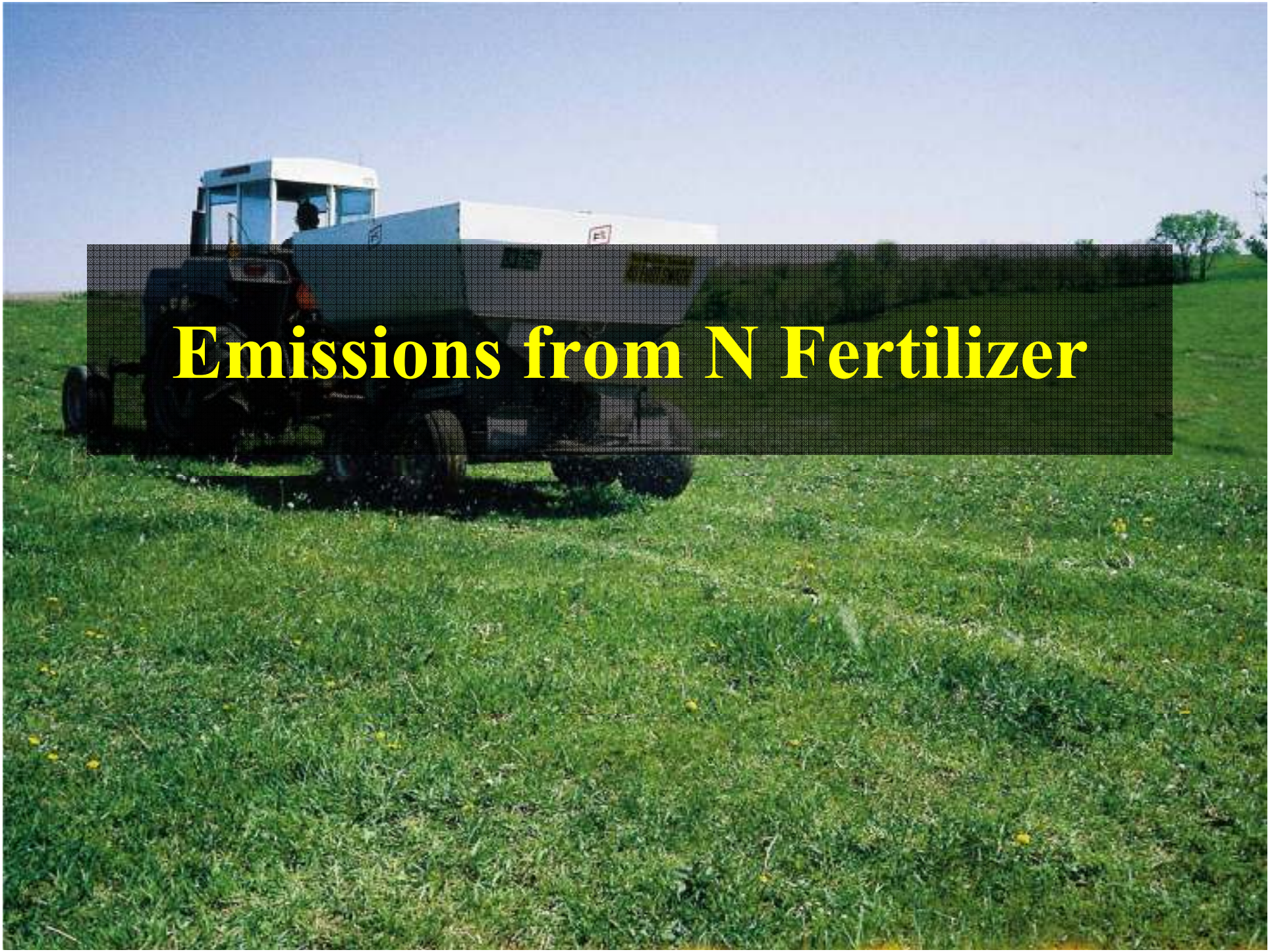


Goal of Session

- Distribute and load software
  - for those who have laptops
- Introduce interface to the program
- Create a session and enter data
  - Using N fertilizer data as an example
- Enter activity data in Module I
  - Using ALU workbook
- Assign emission factors in Module II
- Review calculations in Module III
- Conduce Quality Control/Quality Assurance
- Create an emissions report

Loading ALU Software

- Distribute software and workbook example
- Load software
  - Follow instructions file
- Open software and create database file
  - NOTE: can create multiple databases
- Enter user name
- Distribute workbook example
  - N Fertilization
- Ready to use the software!


Emissions from N Fertilizer

Background for N Fertilizers

- Fertilizer application to soils influences soil N_2O emissions
- Direct soil N_2O emissions
  - Processes of nitrification and denitrification
- Indirect soil N_2O emissions
  - Processes of volatilization, leaching and runoff of N
  - Leads to N2O emissions at other sites or in waterways
- Mineral N fertilizer additions are a key driver of these processes

Equation: Direct Soil N_2O

EQUATION 11.1
DIRECT N_2O EMISSIONS FROM MANAGED SOILS (TIER 1)

$$N_2O_{Direct}\text{–}N = N_2O\text{–}N_{N\,inputs} + N_2O\text{–}N_{OS} + N_2O\text{–}N_{PRP}$$

Where:

$$N_2O\text{–}N_{N\,inputs} = \left[\begin{array}{l}\left[\left(F_{SN}+F_{ON}+F_{CR}+F_{SOM}\right)\bullet EF_1\right]+\\ \left[\left(F_{SN}+F_{ON}+F_{CR}+F_{SOM}\right)_{FR}\bullet EF_{1FR}\right]\end{array}\right]$$

$$N_2O\text{–}N_{OS} = \left[\begin{array}{l}\left(F_{OS,CG,Temp}\bullet EF_{2CG,Temp}\right)+\left(F_{OS,CG,Trop}\bullet EF_{2CG,Trop}\right)+\\ \left(F_{OS,F,Temp,NR}\bullet EF_{2F,Temp,NR}\right)+\left(F_{OS,F,Temp,NP}\bullet EF_{2F,Temp,NP}\right)+\\ \left(F_{OS,F,Trop}\bullet EF_{2F,Trop}\right)\end{array}\right]$$

$$N_2O\text{–}N_{PRP} = \left[\left(F_{PRP,CPP}\bullet EF_{3PRP,CPP}\right)+\left(F_{PRP,SO}\bullet EF_{3PRP,SO}\right)\right]$$

IPCC 2006 GL

Equation: Indirect Soil N_2O Volatilization

EQUATION 4.32

N_2O FROM ATMOSPHERIC DEPOSITION OF N (TIER 1b)

$$N_2O_{(G\text{-}SOIL)}\text{-}N = \{(N_{FERT} \bullet Frac_{GASF}) + [\sum_T (N_{(T)} \bullet Nex_{(T)}) + N_{SEWSLUDGE}] \bullet Frac_{GASM}\} \bullet EF_4$$

IPCC 2003 GPG

Equation: Indirect Soil N_2O Leaching/Runoff

EQUATION 4.36

DEPOSITED N FROM LEACHING/RUNOFF (EXPANDED AS TO SEWAGE SLUDGE)

$$N_2O_{(L\text{-}SOIL)}\text{-}N = \left(N_{FERT} + \left\{\sum_T (N_{(T)} \bullet Nex_{(T)}) \bullet [1 - (Frac_{FUEL\text{-}AM} + Frac_{FEED\text{-}AM} + Frac_{CNST\text{-}AM})]\right\} + N_{SEWSLUDGE}\right) \bullet Frac_{LEACH} \bullet EF_5$$

IPCC 2003 GPG

Session: A Key Concept

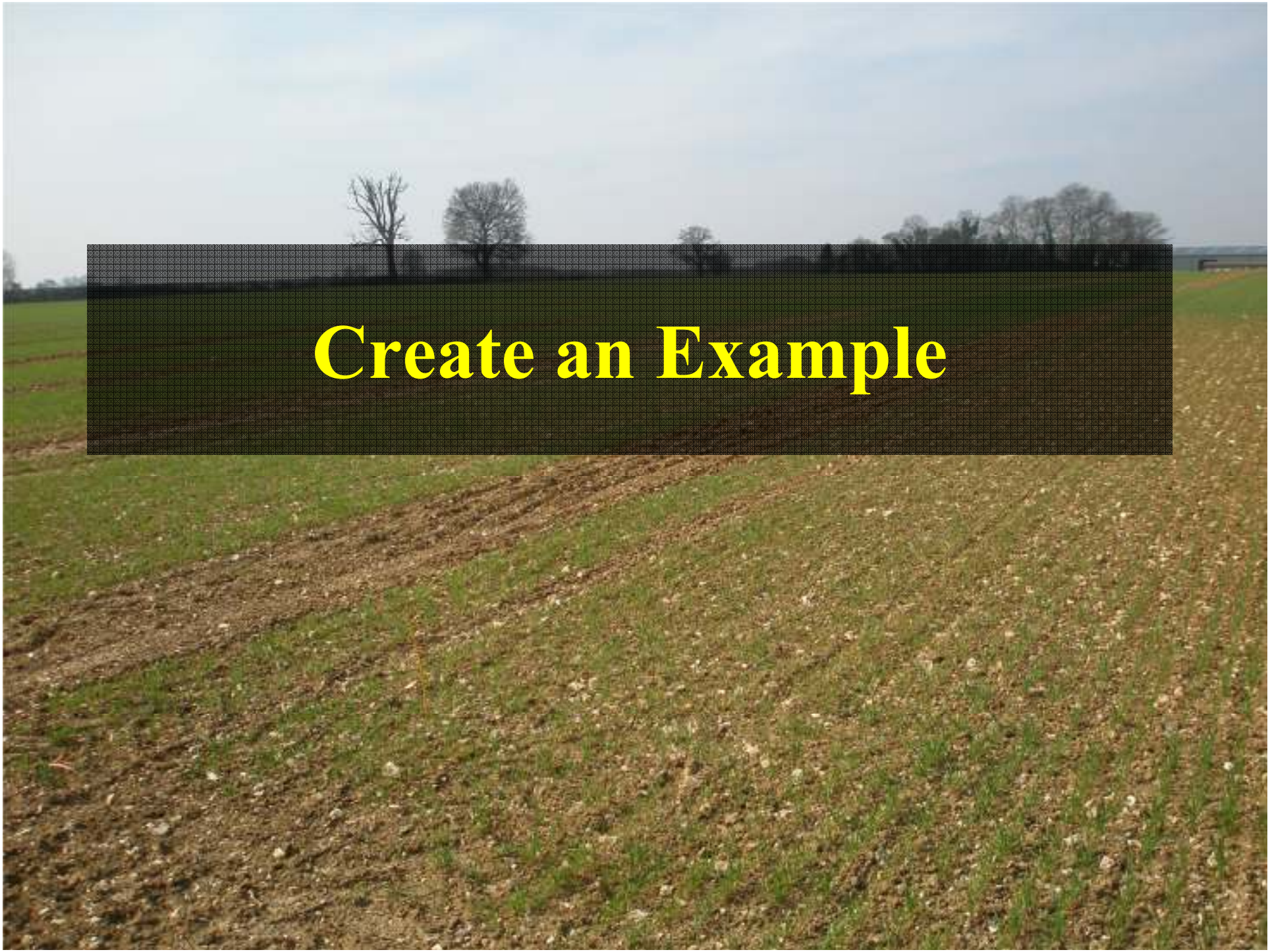
- Three steps for completing an inventory for emission sources in ALU software
  - Enter activity data
  - Assign emission factors
  - Calculate emissions using IPCC equation
- All steps are accomplished through a session that is created when initiating data entry in a primary data element for ALU
- Each session includes a specific spatial domain
  - Entire country or regions within the country
  - Trade-off between one session for country relative to sessions for different regions
- Each session is for a specific year
  - i.e., an inventory year

Quality Assurance/Quality Control

- Review the inventory data for errors
  - Typographical errors/data processing errors
  - Poor data
  - Inappropriate use of data
  - False assumptions
- Quality Control – Review by inventory compiler
- Quality Assurance – Review by expert (s) who is not involved with the inventory
  - Experts from another ministry, universities, international organizations
- QA/QC will often uncover errors before reporting to the UNFCCC

Creating Emission Reports

- ALU software has two options for creating emissions reports
  - Standard reports – provide all calculations from the program
  - UNFCCC reports – follow the format of the secretariat's software for Modules 4 and 5
- Reports are exported in a format that can be opened in MS Excel
  - Can do additional operations in excel, such as graphing
- Reports can be included as supplementary material to national communication with the UNFCCC or in national inventory report


Create an Example