Animal Ag Demo Project

(Dairy)

For more information on getting started with COMET–Farm™ please see the following pages:

-Navigating COMET-Farm™

-Creating an Account

-Creating New Projects

How to Use Demo Projects

Each demo project helps users navigate:

- COMET-Farm™ data entry pages

- Help tools and windows with information on the site or the management practices that have been selected.

Help along the way...

- Search for solutions to common questions or submit a help-desk ticket for COMET-Farm™ support.

-Blue question mark icons provide information on categories and what can be evaluated

WHAT INFORMATION WILL I NEED?

For a detailed list of information needed, click HERE

BASELINE MANAGEMENT

↓

"Business as Usual"

What are your current practices for dairy cattle management?

FUTURE SCENARIO MANAGEMENT

↓

What changes will you make to the following cattle management practices for 10 years after baseline?

ANIMAL AGRICULTURE (DAIRY) DEMO PROJECT SCENARIO

Cattle management impacts on greenhouse gas emissions

ANAEROBIC LAGOONS

↓

Large production of methane (CH4)

LIVESTOCK MANURE

↓

Converted to safe, high quality soil amendment and fertilizer

ANAEROBIC DIGESTERS

↓

Methane can be captured and burned in generators to generate electricity or heat water

Photos courtesy of USDA and NRCS

Animal Agriculture (Dairy) Demo Project

Selected Activities for the Current Project:
Animal Ag Demo Project

- ☐ All Categories - Full Accounting
  - ☐ Cropland, Pasture, Range, Orchards/Vineyards
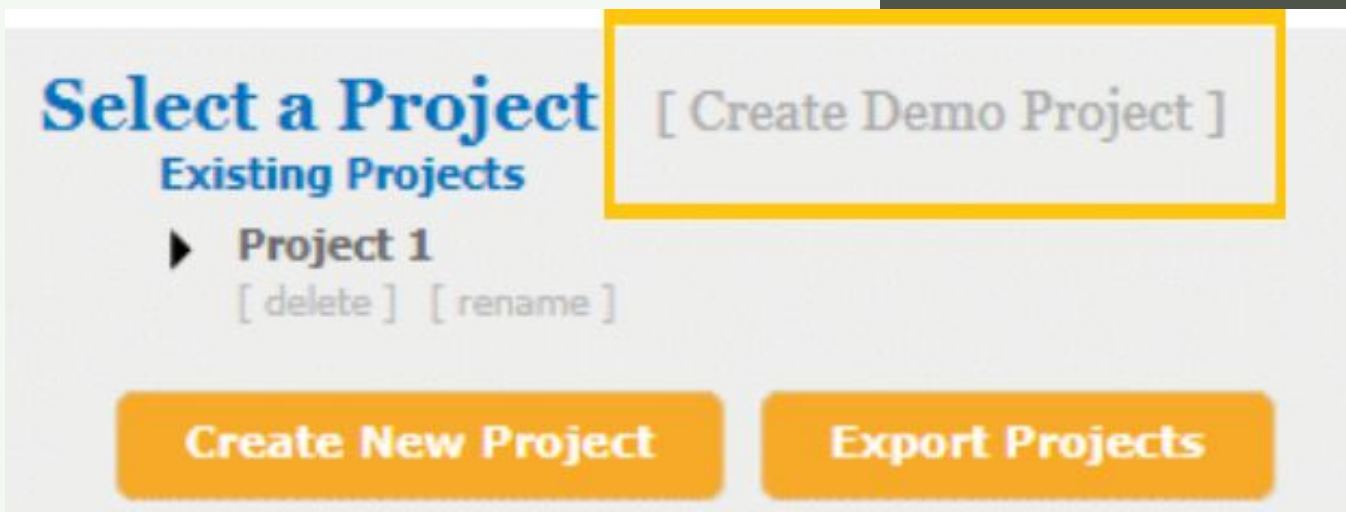 - ☑ Animal Agriculture
  - ☐ Agroforestry
  - ☐ Forestry

Define Activities >>

This demonstration project is based on the dairy at the California Polytech Institute in San Luis Obispo, California. The university converted their manure management system to an anaerobic digester in 2013, using the methane to generate electricity and reducing their overall system greenhouse gas emissions by hundreds of tons of carbon dioxide.

To Select Animal Agriculture (Dairy) Demo Project

On the Tool page, select "Create Demo Project"

Select a Project [Create Demo Project]
Existing Projects
▶ **Project 1**
[delete] [rename]

Create New Project   **Export Projects**

Select "Animal Agriculture" and "Create"

New Project

Animal Ag Demo Project

Select a demo project to create:

○ Cropland, Pasture, Range, Orchards/Vineyard
◉ Animal Agriculture
○ Animal Agriculture - Beef
○ Agroforestry
○ Forestry

Cancel   **Create**

Selected Activities for the Current Project:
Animal Ag Demo Project

☐ All Categories - Full Accounting

☐ Cropland, Pasture, Range, Orchards/Vineyards
☑ Animal Agriculture
☐ Agroforestry
☐ Forestry

Define Activities >>

Property Location:

Navigation Bars

Step 1
Activities

Step 2
Animal Agriculture ▼

Step 3
Report

Property Location → **Animal Types** → **Animal Characteristics**

Current Step

Select Property Location

Select Property Location

Enter your Zip code 93407

What are your preferred units of measure? English ▼

Please enter all data in Pounds except where noted

Units are pre-selected for demo

<< Back

Save & Continue >>

Move to Next Management Activity

Animal Types:

A help window will appear when the animal types page is opened. This defines the scenario in the Animal Agriculture (Dairy)- Demonstration Project.

Step 1
Activities

Step 2
Animal Agriculture ▼

Step 3
Report

Property Location → Animal Types → Animal Characteristics

Current Step

Select Animal Types

Select Animal Types ❓

☐ ▲ Cattle

Demo - Animal Types

Animal Agriculture
Demo

The dairy milks 180 cows with a total population of over 350 animals, including heifers and calves.

Ok

☐ ▲ Other

American Bison ☐

Goats ☐

<< Back

Save & Continue >>

Animal Types:

There are many different animal types available.

For the purposes of the demo project, the following animal types are already selected:

- Dairy-Dry Cows
- Dairy-Heifer Replacements
- Dairy-Lactating Cows

Animal Characteristics:

The Demo-Current Management window explains the project details.

The details explained will reflect the selected options for the animal characteristics for the three animal categories throughout the demo project.

Step 1 Activities

Step 2 Animal Agriculture ▼

Step 3 Report

Property Location → Animal Types → **Animal Characteristics**

Current Step

Enter Animal Details

Current Category Selection
✓ **Dairy-Heifer Replacements**
Dairy-Dry Cows
Dairy-Lactating Cows

Number Herds

Scenarios

Scenario List [new] [delete]
✓ Baseline
Digester Install

Demo - Current Management

Most of the herd is housed in free stall barns. About 90 percent of the manure is deposited on concrete and flushed with fresh or recycled water to a single-cell lagoon. The remaining ten percent is deposited in the corrals and collected only seasonally. Solids are separated from the flushed wastewater prior to storage in the lagoon, which has a volume of 19,000 m3, translating to 50 to 90 days of storage, depending upon the water used by the dairy.

Ok

Read through the management details, and click "ok" to continue.

<< Back

Save & Continue >>

Animal Characteristics:

Step 1
Activities

Step 2
Animal Agriculture ▼

Step 3
Report

Property Location → **Animal Types** → **Animal Characteristics**

Current Step

Enter Animal Details

Current Category Selection
✓ **Dairy-Heifer Replacements**
Dairy-Dry Cows
Dairy-Lactating Cows

This is the current Animal Category you are working with

Animal Details   Housing Details   Manure System Details

● — ○ — ○ — ○ — ○ — ○ — ○

Number of Herds   Types of Feed   Manure System Types   Manure Details

Road map of Animal Characteristics; the page you are on will be **bolded**

Scenarios

Scenario List [new] [delete]
✓ **Baseline**
Digester Install

Current Scenario you are working with

Enter Animal Characteristics - Dairy-Heifer Replacements

How many unique herds do you have?   1 ▲▼

Assign unique labels to each of your herds

What are Herds?
A group of animals managed within the same category but with different vegetation types or different manure handling methods

Replacements

<< Back   Save & Continue >>

⊙ Need Help?

Help Tool

Animal Characteristics: Number of Herds

Step 1
Activities

Step 2
Animal Agriculture ▼

Step 3
Report

Property Location → Animal Types → **Animal Characteristics**

Current Step

Enter Animal Details

Current Category Selection
✓ Dairy-Heifer Replacements
Dairy-Dry Cows
Dairy-Lactating Cows

Animal Details   Housing Details   Manure System Details

Number of Herds   Types of Feed   Manure System Types   Manure Details

Scenarios

Scenario List [new] [delete]
✓ Baseline
Digester Install

Assign label to each unique herd. This is already assigned in Demo Project

Enter Animal Characteristics - Dairy-Heifer Replacements

How many unique herds do you have?   1

Assign unique labels to each of your herds

Replacements

What are Herds?
A group of animals managed within the same category but with different vegetation types or different manure handling methods

Unique herds: Groups of animals in the same category, but are fed different feed rations

<< Back   Save & Continue >>

⊘ Need Help?

Animal Characteristics: Number of Herds

Unique herd label

Move to Next Management Activity

Animal Details: Dairy-Heifer Replacements

Users will enter the number of cattle they have based on the average number in the herd per month. There are three housing options for dairy cows.

This is the current Animal Category you are working with

Housing options for Dairy Cows

Dairy Cow feed intake & Average Body Weight

Animal Details: Dairy-Dry Cows

If animal populations are the same throughout the year, users can click on the icon to the right of "Jan" to populate the same value into all other months.

Current Step

Enter Animal Details

Current Category Selection

Dairy-Heifer Replacements

✓ Dairy-Dry Cows

Dairy-Lactating Cows

Current Herd Selection
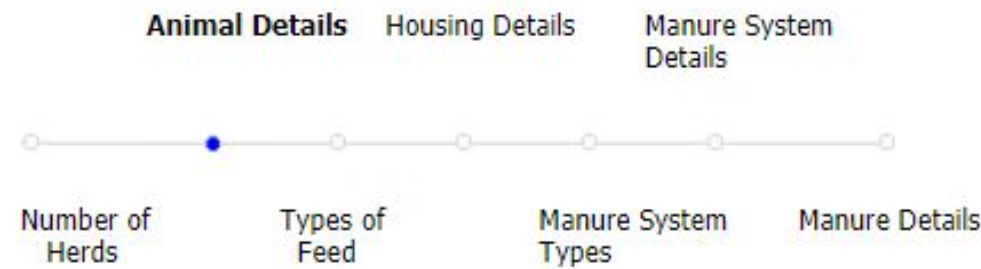✓ Dry Cows

Scenarios

Scenario List [new] [delete]
✓ Baseline
   Digester Install

Current Animal Category

Animal Details   Housing Details   Manure System Details

Number of Herds   Types of Feed   Manure System Types   Manure Details

Housing options for Dairy Cows

Enter Animal Characteristics - Dairy-Dry Cows

How many Dairy-Dry Cows do you have, on average, per month?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Roofed Facility	85	85	85	85	85	85	85	85	85	85	85	85
Dry Lot	0	0	0	0	0	0	0	0	0	0	0	0
Pasture Range	0	0	0	0	0	0	0	0	0	0	0	0

Average Daily Feed Intake *(lbs)*   25

Average live body weight *(lbs)*   1500

Dairy Cow feed intake & Average Body Weight

Average Daily Feed Intake
If you are unable to provide the average daily feed intake default will be used (leave field 0).

Animal Details: Dairy-Lactating Cows

Note measurement units for which feed intake is reported. If the average daily feed intake is not known, users can cleave the field "O" and an average default value will be calculated.

Current Animal Category

Current Step

Enter Animal Details

Current Category Selection
Dairy-Heifer Replacements
Dairy-Dry Cows
✓ Dairy-Lactating Cows

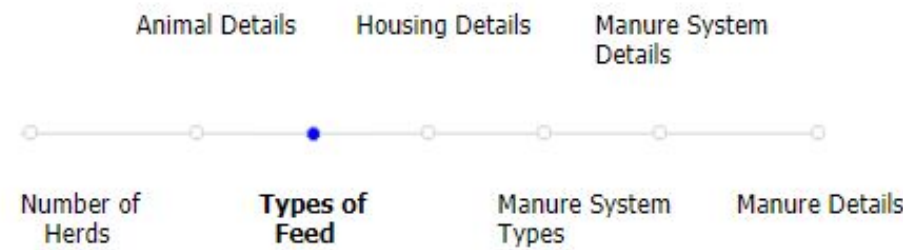Current Herd Selection
✓ Lactating Cows

Scenarios

Scenario List [new] [delete]
✓ Baseline
Digester Install

Animal Details   Housing Details   Manure System Details

Number of Herds   Types of Feed   Manure System Types   Manure Details

Housing options for Dairy Cows

Enter Animal Characteristics - Dairy-Lactating Cows

How many Dairy-Lactating Cows do you have, on average, per month?

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Roofed Facility	180	180	180	180	180	180	180	180	180	180	180	180
Dry Lot	0	0	0	0	0	0	0	0	0	0	0	0
Pasture Range	0	0	0	0	0	0	0	0	0	0	0	0

Dairy Cow feed intake & Average Body Weight

Average Daily Feed Intake *(lbs)*   55
Average live body weight *(lbs)*   1500
Days in milk   305
Milk production per day *(lbs)*   75

Average Daily Feed Intake
If you are unable to provide the average daily feed intake default will be used (leave field 0).

<< Back   Save & Continue >>

Move to Next Management Activity

Types of Feed

This page allows users to create feed rations to reflect varying diets than can occur for Dairy cattle during different stages of productions.

The feed types for the demo project have already been added for each category and herd.

This column indicates if the feed type is completed for that month

A closer look at types of feed:

A closer look at types of feed:

The third step you will define the percentage of each feed type that makes up a ration for the unique herd. Total percent must add up to 100%.

Remember, values are pre-populated for the demo project.

3. Enter the percentage of each feed for your Dairy-Heifer Replacements in Replacements.

Feed	%
Cottonseed Hulls	6
Soybean Meal, Solv. Ext. 44% CP	8
Corn Grain, Whole	10
Corn Silage, Mature Well Eared	37
Grass Hay	39

Total % of Diet 100

Done - Save feed types for current selected date

Move to Next Management Activity

<< Back

Save & Continue >>

Housing Details:

Used to determine how manure is managed within buildings and covered areas.

Current Step

Enter Animal Details

Current Category Selection
✓ **Dairy-Heifer Replacements**
Dairy-Dry Cows
Dairy-Lactating Cows
- -
Current Herd Selection
✓ **Replacements**

Scenarios

Scenario List [new] [delete]
✓ **Baseline**
   Digester Install

Animal Details   **Housing Details**   Manure System Details

Number of Herds   Types of Feed   Manure System Types   Manure Details

Enter Animal Characteristics - Dairy-Heifer Replacements

How is manure handled within your housing type?

☑ Roofed Facility   ☐ Dry Lot   ☐ Pasture Range Paddock

Determined on animal details page

◉ Pit Storage   ◉ Bedded Pack   ◉ Flushed Or Scraped

Area of the Barn floor covered with **Dairy-Heifer Replacements** manure (ft²)   25000

Demo project information already pre-selected.

Move to Next Management Activity

<< Back   **Save & Continue >>**

Selecting either Pit Storage or Bedded Pack require further criteria that needs to be entered to evaluate the manure management.

Manure System Type:

Used to determine how manure is managed within animal housing

Management details pre-selected for demo project

User can modify any default values

Move to Next Management Activity

Manure System Details:

Used to determine how liquids and solids are further managed.

The options on this page are generated based on previous options selected on the Manure System Type Page.

If lagoon's level is managed through evaporation and there are not annual cleanouts, enter "zero" for solid removal.

Animal Details   Housing Details   **Manure System Details**

Number of Herds   Types of Feed   Manure System Types   Manure Details

Enter Animal Characteristics - Dairy-Heifer Replacements

What are your manure system details for Dairy-Heifer Replacements?

Define primary composting method

Composting

What is the composting method?   Passive Windrow

Anaerobic lagoon, liquid/slurry storage pond, storage tanks

What is the system cover type?   Uncovered Without Crust

What is the exposed surface area (ft²)?   66736

In what year was the Anaerobic lagoon, liquid/slurry storage pond, storage tanks established   2014

Length of time between pumpdowns or cleanouts   12-month

Percent solid removal   100

Move to Next Management Activity

<< Back   Save & Continue >>

Manure Details:

- What is the total dry manure produced per head per day?

  AND

- What is the average percent nitrogen content of the manure each month?

These values have been calculated based on information that has been entered in the previous modules. There is no need to modify unless user has actual measurements from laboratory reports.

Move to Next Scenario

Baseline Scenario Complete

After the baseline scenario has been completed, the "Scenario Complete!" window will appear.

For the purpose of the demo click the "Close" button. This will return the user to the manure details page.

Any management practices in the current management can be copied to future scenario

Scenario Management

Select "Digester Install" Scenario and management window will appear

This aspect of COMET–Farm™ allows users to see how changes in management practices can impact greenhouse gas emissions and carbon sequestration.

After reading the future management description, click the "ok" button in the bottom right corner of the window.

Current Step

Enter Animal Details

Current Category Selection
✓ Dairy-Heifer Replacements
Dairy-Dry Cows
Dairy-Lactating Cows

Current Herd Selection
✓ Replacements

Animal Details   Housing Details   Manure System Details

Number of Herds   Types of Feed   Manure System Types   **Manure Details**

Scenarios

Scenario List [new] [delete]
Baseline
✓ **Digester Install**

Demo - Scenario Management

Animal Agriculture Demo

A methane recovery system has been constructed at the dairy. The initial design was based upon the present and anticipated herd size. The new lagoon, which has a liquid volume of 14,000 m3, was constructed next to the existing one. The first lagoon is being used for storage and the second for methane recovery. The new lagoon was covered with a flexible membrane incorporating buoyant material so that the cover floats on the surface, and a gas collection system was attached. The project will reduce odors, keep greenhouse gas out of the atmosphere, and cut down on water pollution through reduction of organic matter in the lagoon.

Biogas that is captured from the anaerobic digester will be used to fuel a biogas-fired microturbine that can generate electricity that can be used on the dairy.

Move to Next Scenario

Ok

Scenario Management:

For this Demo project, there is one future management scenario, using the same animal types, unique herds, management practices.

Current Step

Enter Animal Details

Current Category Selection

✓ **Dairy-Heifer Replacements**

Dairy-Dry Cows

Dairy-Lactating Cows

Current Herd Selection

✓ Replacements

Animal Details Housing Details Manure System Details

Number of Herds   Types of Feed   **Manure System Types**   Manure Details

Select "Manure System Types" to view the only management change from the baseline"

Scenarios

Scenario List [new] [delete]

Baseline
✓ **Digester Install**

Enter Animal Characteristics - Dairy-Heifer Replacements

For **Dairy-Heifer Replacements** which manure management systems are currently in use? ❓

Do you use a solid/liquid separator?	⦿ Yes ○ No
What is the separator type?	Roller press ▼
Percentage of Solids Removed?	25 ▲▼
What is the primary solid treatment method?	Composting ▼
What is the primary liquid treatment method?	Anaerobic Digester with Biogas Utilization o ▼

Change to the primary liquid treatment

Click to see changes in manure management on "Manure Systems Details" page

<< Back   **Save & Continue >>**

Scenario Management:

For this Demo project, there is one future management scenario, using the same animal types, unique herds, management practices.

Current Step

Enter Animal Details

Current Category Selection

✓ **Dairy-Heifer Replacements**

Dairy-Dry Cows

Dairy-Lactating Cows

Current Herd Selection

✓ **Replacements**

Scenarios

Scenario List [new] [delete]

Baseline

✓ **Digester Install**

Animal Details   Housing Details   **Manure System Details**

Number of Herds   Types of Feed   Manure System Types   Manure Details

Enter Animal Characteristics - Dairy-Heifer Replacements

What are your manure system details for **Dairy-Heifer Replacements?**

Composting

What is the composting method?   Passive Windrow

Change in drop down menu to describe the digester type

Anaerobic Digester

What is the digester type?   Up-flow Anaerobic Sludge Blanket (UASB) type with floating gas holders and no

<< Back   **Save & Continue >>**

Next Management activity

Scenario Manure Details:

Manure details have not changed in the demo project.

Continue to continue to **Future Scenario** window.

Move to Next Scenario

Scenario Manure Details:

At this point, the Baseline and Digester Install scenario are complete, the user can continue to the report

The time to generate a report for demo projects is typically less than a minute. However, for user's projects, depending on the number and complexity of scenarios, results make take several minutes to load.

Report

The user may navigate his or her browser away from the page as the information entered has been saved. The reports will be available to **registered users** when they return later to the tool and open the project, by clicking on the "Report" option in the navigation bar at the top of the page

Nonregistered users can access the reports of demo projects but any changes to the projects will not be saved for future review and analysis.

	Step 1	Step 2	Step 3
	Activities	**Animal Agriculture**	**Report** ▼

Animal Agriculture | Animal Agriculture Graphical Report

NAME: Haley Nagle
PROJECT: Animal Ag Demo Project
Version: Cloud deployment version 2.3.3, build 3.2.7509.29935 (23-Jul-2020)

TIME: 7/27/2020 3:49:49 PM

USDA United States Natural Resou

Source	Baseline Emissions	Digester Install	
		Emissions	Change
Dairy-Heifer Replacements			
Methane *(tonnes CO₂ equiv./yr.)*	205.0	112.1	-92.8
Nitrous oxide *(tonnes CO₂ equiv./yr.)*	4.0	4.0	0.0
Total	**208.9**	**116.1**	**-92.8**
Dairy-Dry Cows			
Methane *(tonnes CO₂ equiv./yr.)*	0.0	151.1	+151.1
Nitrous oxide *(tonnes CO₂ equiv./yr.)*	0.0	8.8	+8.8
Total	**0.0**	**159.9**	**+159.9**
Dairy-Lactating Cows			
Methane *(tonnes CO₂ equiv./yr.)*	1038.3	567.9	-470.4
Nitrous oxide *(tonnes CO₂ equiv./yr.)*	33.7	33.7	0.0
Total	**1072.0**	**601.6**	**-470.4**
Total (all animals)	***1280.9***	***877.6***	***-403.3***

<< Back To Management **Print** **Export Livestock Verification** GHG Equivalencies Calculator

Report

The demo project compares the baseline scenario, which liquid manure is stored in an uncovered anaerobic lagoon, to the emissions related to managing the liquid manure with the installation of an anaerobic digester.

Source Categories

Change in emissions

While different practices impact different greenhouse gas fluxes, the results are simplified in terms of Metric Tonnes of CO2 eq.

Negative results indicate emissions reductions OR carbon sequestration

Baseline "Business as Usual" results

Future Management Scenario Results

Step 1
Activities

Step 2
Animal Agriculture

Step 3
Report ▼

Animal Agriculture | **Animal Agriculture Graphical Report**

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<< Back To Management | **Print** | **Export Livestock Verification** | [GHG Equivalencies Calculator](#)

Report

By selecting each source category, the sub-source category for each will extend.

Report

Users may ask the question **"If there is a greenhouse gas benefit to installing an anaerobic digester, why are methane emissions higher with the digester installed?"**

The methane generated by anaerobic digesters is usually burned in a generator to produce on-farm electricity, is burned to heat water and buildings, or is piped to be used elsewhere to offset burning fossil methane (natural gas) in another location. These avoided fossil fuel emissions are a significant part of the overall life cycle benefit of installing anaerobic digesters, and that is the main greenhouse gas benefit to installing an anaerobic digester.

Step 1
Activities

Step 2
Animal Agriculture

Step 3
Report ▼

Animal Agriculture	Animal Agriculture Graphical Report

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USDA United States
Natural Resou

Change in emissions

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<< Back To Management   Print   Export Livestock Verification   GHG Equivalencies Calculator

Graphical Report

The graphical report can be found in the tab at the top of the reports page.

Reports will be available to registered users when they return late to the tool and open the same project.

The user may navigate away from this page as the information entered has been saved.

Navigate Animal Types

Hover mouse over bars to emissions

Both tabular and graphical reports can be exported and downloaded. Multiple file formats are provided.