Task 7 Overview to PES WG

4.5.22

Eight Tools

Holos

DayCent

COMET-Farm

COMET-Planner

Integrated Farm System Model

DNDC

EPIC/APEX

COOL-Farm

Methods

Systematic Literature Review

Interviews

SWOT Analyses

Tool Characteristics

Model Type

Emissions Factors (Empirical)

Process Based (Biogeochemical)

Time Step

Inclusion of Forests, Wetlands, Land-Use Change

Absent/Present

Decoupled

Follows IPCC guidelines

Methodology

Tiers 1, 2, & 3

Life Cycle Analysis (LCA)

Used to evaluate the full impact of a product or practice on the environment

Model Type

Emissions Factors:

    Holos

    COOL-Farm

    COMET-Planner

User friendly, but less accurate/site specific

Process Based:

    DayCent

    IFSM

    DNDC

    EPIC/APEX

    COMET-Farm

More sophisticated, can be highly accurate depending on accuracy of inputs

Outputs

All tools:

Carbon dioxide and nitrous oxide

Carbon sequestration

Manure management

Enteric Emissions:

DayCent

COMET-Farm

EPIC/APEX

DNDC

Forest/Wetlands:

EPIC/APEX

COMET-Farm

DNDC

IFSM (as LUC)

Holos- "lineal tree plantings"

Upstream Emissions:

Holos

IFSM

EPIC/APEX

Opportunities

All tools except DNDC and DayCent are freely available and easily downloaded.

DayCent, EPIC/APEX, and IFSM receive robust support for their host organizations.

Holos, IFSM, EPIC/APEX have economic analyses.

Many of the tools are used in other programs or by other organizations that may work synergistically with Vermont policy

For PES:

Most measure water quality (Holos forthcoming)

COOL-Farm- only one measuring biodiversity

Threats

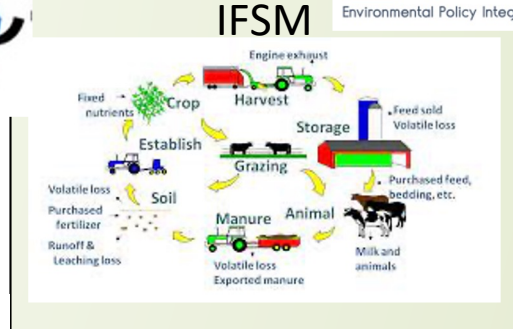Difficulty:

DNDC, DayCent, EPIC/APEX, IFSM, COMET-Farm–require users to have advanced training.

Are there enough qualified technicians?

Enough researchers?

Need for ongoing updates

High
-Field based
-Complex

Level of Accuracy

Low
-Regional
-Simple

Low
-Data entry
-Time
-Technical Assistance
-Program Management

Level of Requirements

High
-Data entry
-Time
-Technical Assistance
-Program Management

DNDC

IFSM

EPIC
Environmental Policy Integrated Climate model

DayCent: Daily Century Model

COMET-Farm

Cool Farm Tool
CFT

COMET PLANNER

Holos

Larger Context Considerations

Available Data

- More data=greater accuracy, but large investment
- What tools can use existing data sources? (ex. farm records, NMP)
- What data is accounted for elsewhere? (ex. emissions from transportation)

Consider cross-over between GWSA, PES and other uses

- APEX in PfP

Socio-economic, Environmental factors

- Look outside of "carbon tunnel"

Steps for Selecting Tools

Anass Toudert et al., "Carbon Accounting Tools for Sustainable Land Management," World Bank Group, 122 (2018), https://openknowledge.worldbank.org/handle/10986/31062.