Applying the Numbers for Credible Outcomes

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Overview

1) Site specific measures of carbon change are highly variable, expensive, and limited
2) Estimating impacts of management changes requires extrapolation beyond measured conditions
3) Calibrated models provide a means to systematically estimate change factors
4) Credibility influenced by: quality of measurements, expertise, peer review
5) Collaboration is key to assurance
Alberta’s Regulated Offset System

Additional, Real
- Management improvements beyond business as usual
- Permanent

Quantifiable
- Solid foundation
- Peer reviewed
- Consistent, repeatable

Verifiable
- Records, data management
- Accountants, engineers

Policy

Science

Practice
Standardized Approach:
Offset Quantification Protocols

- Follows ISO 14064 - 2 process
- Internationally compatible, standardized
- Based on most recent science, conservativeness, technical review
- Quantify emission factors and calculations to track practice change
- Describes monitoring and verification
- Reduces costs by prescribed process
- Assured by government approval of protocols, 3rd party verification, Alberta Emissions Offset Registry (CSA)
- Provides stability, certainty about GHG tonnes reduced
Example: Soil Carbon Change Factors

- 38 prairie studies measured carbon change due to Full Till vs No Till management, but only 13 of quality to calibrate Century
- Modelled results of variations in representative conditions at soil landscape polygon scale
- Regional management change factors estimated from aggregate
- Adjustments to account for baseline adoption and reversals
Success Factors

Sound Science Basis
• Research on sequestration rates
• High quality data to calibrate Century model
• Experts applied Century to model specific estimates, rolled up to regional change factors (McConkey and 23 others, 2007)
• Results accepted in literature (Vanden Bygaart et al. 2008, Can. J. Soil Science), National Inventory Report (Environment Canada, 2014)

Practice
• Enabled use of records (not measures) to demonstrate improvement
• Role of professional agrologists to sign-off on farm evidence
• New business of aggregation to compile and verify records
Challenges.....

High uncertainty and variability, requires

✓ Commitment - many years to build knowledge base
✓ Funding - amounts, stability
✓ Expertise – dedicated careers
✓ Consistency - compare between studies, e.g. how address repeated samples? which measures - horizon vs depth?
✓ Integrate new knowledge/ technology, e.g. GPS, indicators

Management characterization, requires

✓ Records – lack at farm-scale, cost, verification, compliance
✓ Generalization to level where farm-scale records make sense
✓ Many farms to make project, agricultural GHGs are diffuse

Knowledge gaps

✓ Rates of reversal, equilibrium....