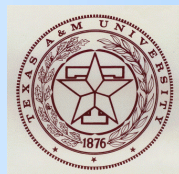


Measurement & Quantity Uncertainty



Measurement & Quantity Uncertainty

Yields from land based activities are widely dispersed and fraught with uncertainty.

To trade one needs a tradable quantity.

When considering trading this leads to a number of issues

- Carbon sequestration or nutrient loading can never be measured but must be estimated
- How do we quantify the uncertainty
- How does uncertainty change with scale of project
- Given an uncertainty estimate how does this enter into a trading system – again a discount



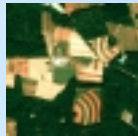
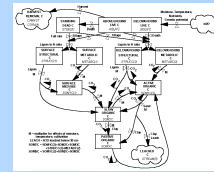
Measurement & Quantity Uncertainty

We cannot measure so we estimate

Landscape is can be divided into an infinite number of places
each of which is a reservoir of carbon and source of runoff



So we estimate using a mixture of
In situ measurement
Modeling
Remote imaging



Measurement & Quantity Uncertainty

Estimating Uncertainty and Accounting for Scale

Agricultural activity changes with climate

Year to year coef. of variation in US corn yield is ~10%
95% confidence interval ranges from 80% to 120%

Changes profoundly with scale

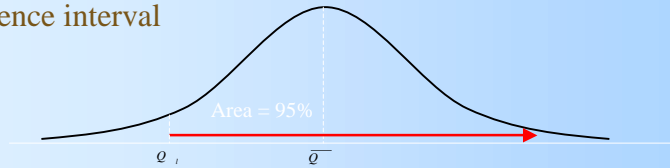
Region	Sorghum	Rice	Soybean
Single site	50%+	50%+	50%+
Brazoria county, TX	21.4	14.2	23.1
TX crop reporting district 9	17.0	7.4	18.1
State of TX	10.4	7.5	15.6
US	8.8	5.2	7.0

Need repeated measurement or modeling
and spatial extrapolation



Measurement & Quantity Uncertainty Uncertainty in a Trading System

- Purchaser of faces risk of having the quantity bought falling below claimed level incurring shortfall penalty)
 - Example: US SO₂ trading - penalty for excess emissions set at \$2000/ton - 3-5 times offset price
- Creates substantial interest directed toward ensuring that the potential offset credits acquired can be safely relied upon to exceed commitments
- In Kyoto, Canada proposed discounting quantity to a 95% confidence interval



Our Speakers

Dr. Sandra Brown is senior scientist in the Ecosystem Services unit of Winrock International. She has extensive experience in planning, developing, implementing, and managing forest projects in relation to climate change and mitigation. She will discuss the measurement and uncertainty topic in the GHG arena.

Mr. Eric Strecker of GeoSyntec Consultants is a recognized expert in the area of stormwater management, especially in the design, monitoring, and evaluation of best management practices (BMPs) and in development of watershed management plans. Mr. Strecker was awarded the American Society of Civil Engineering's "2003 State-of-the-Art in Civil Engineering" Award for his contributions as a Principal Investigator to the International BMP Database project, funded by EPA. He will discuss the measurement and uncertainty topic in the water quality arena.

