

# Agriculture and Global Carbon Markets New Opportunities and Challenges

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# Presentation Overview

**Introduction of the GIC Group**

**Agriculture and the Carbon Market**

**Opportunities to Expand Agriculture's Role**

**Capturing Agriculture's Carbon Value: the GIC-ACI**



# GIC's Carbon Advisory Services

## Three Core Areas

### Market Consulting & Policy Analysis

- Climate Change Policy
- Kyoto Protocol
- US & International Legislation
- Carbon Markets
- Carbon Credit -- Allowance Trading Schemes

### Financial & Advisory Services

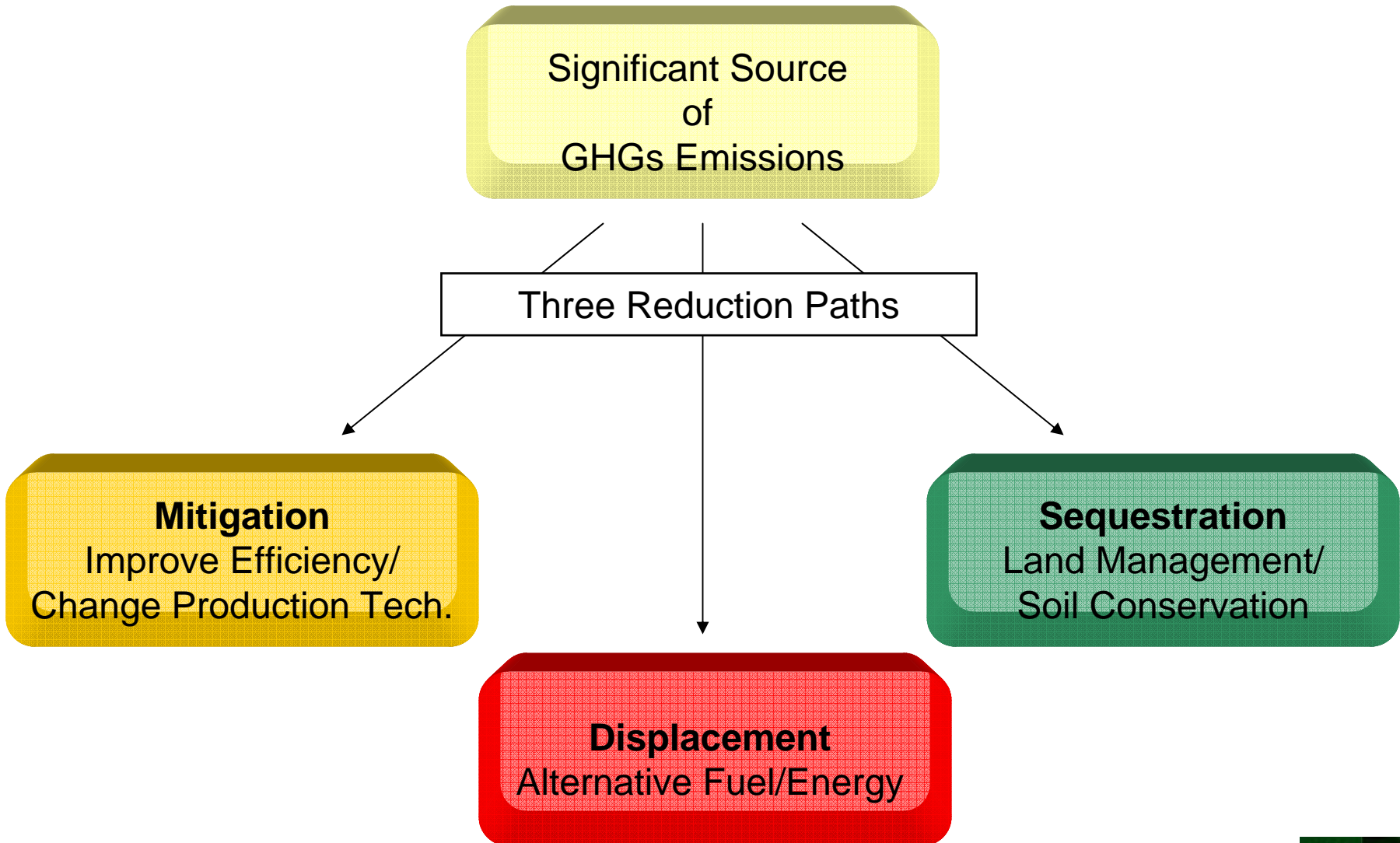
- Risk Management
- Investment Strategies
- Due Diligence
- Valuation Analysis
- Carbon Credit Offset Transaction Services
- Carbon Market Indexes

### Carbon Emissions Assessment

- Carbon Footprint Measurement
- Carbon Emissions Monitoring & Tracking
- Mitigation Strategies
- Analysis & Valuation of Carbon Mitigation Technologies & Products



# Agriculture's Unique Position





# Agriculture's GHG Profile

## Agricultural Greenhouse Gas Breakdown by Industry Sub-Segment:

| Agriculture Industry Subsector  | Developed Countries | Advanced Developing Countries |
|---|---------------------|-------------------------------|
| <b>Production Agriculture</b><br>Livestock, field crops, horticulture.  | 5 to 25%*           | 5 to 25%                      |
| <b>Secondary Industries</b><br>(Input/Production Enhancement & Value-Added/Processing Sectors)<br>Fertilizer manufacturers, feed companies, food and beverage producers, and biofuels | 5 to 15%            | 2 to 8%                       |

**\*Production Ag in New Zealand represents 48% of total GHG emissions**

The principal GHGs in both sectors → CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub>

**\*Data based on GIC's analysis of National GHG Inventory Reports Submitted to the UNFCCC**



# Forest Products Industries and Land Use Categories



## Forest Products also highly integrated

- Timber production (primary)
  - Lumber
  - Pulp & Paper
  - Flooring
  - Biomass/Biofuels
- (secondary)



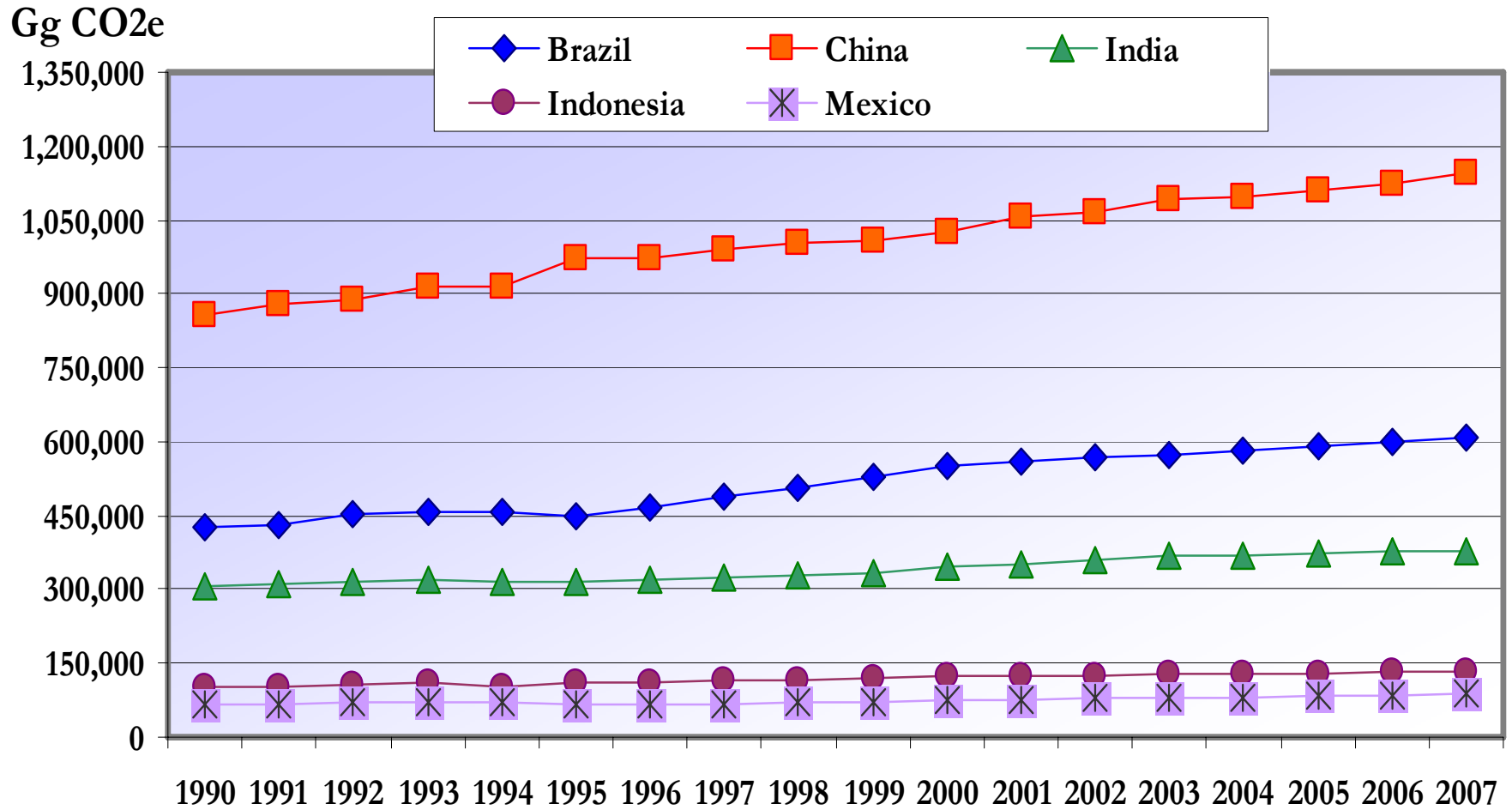
## Land use, Land use change, and Forestry (LULUCF)

- Forest lands
  - Crops lands
  - Grasslands and Pasture
- Potential Carbon Sink

- U.S. forest and ag lands provide a sink for more than 800 million tons of CO<sub>2</sub>e.
- In Brazil and Indonesia deforestation accounts for over 60% of their GHG emissions.

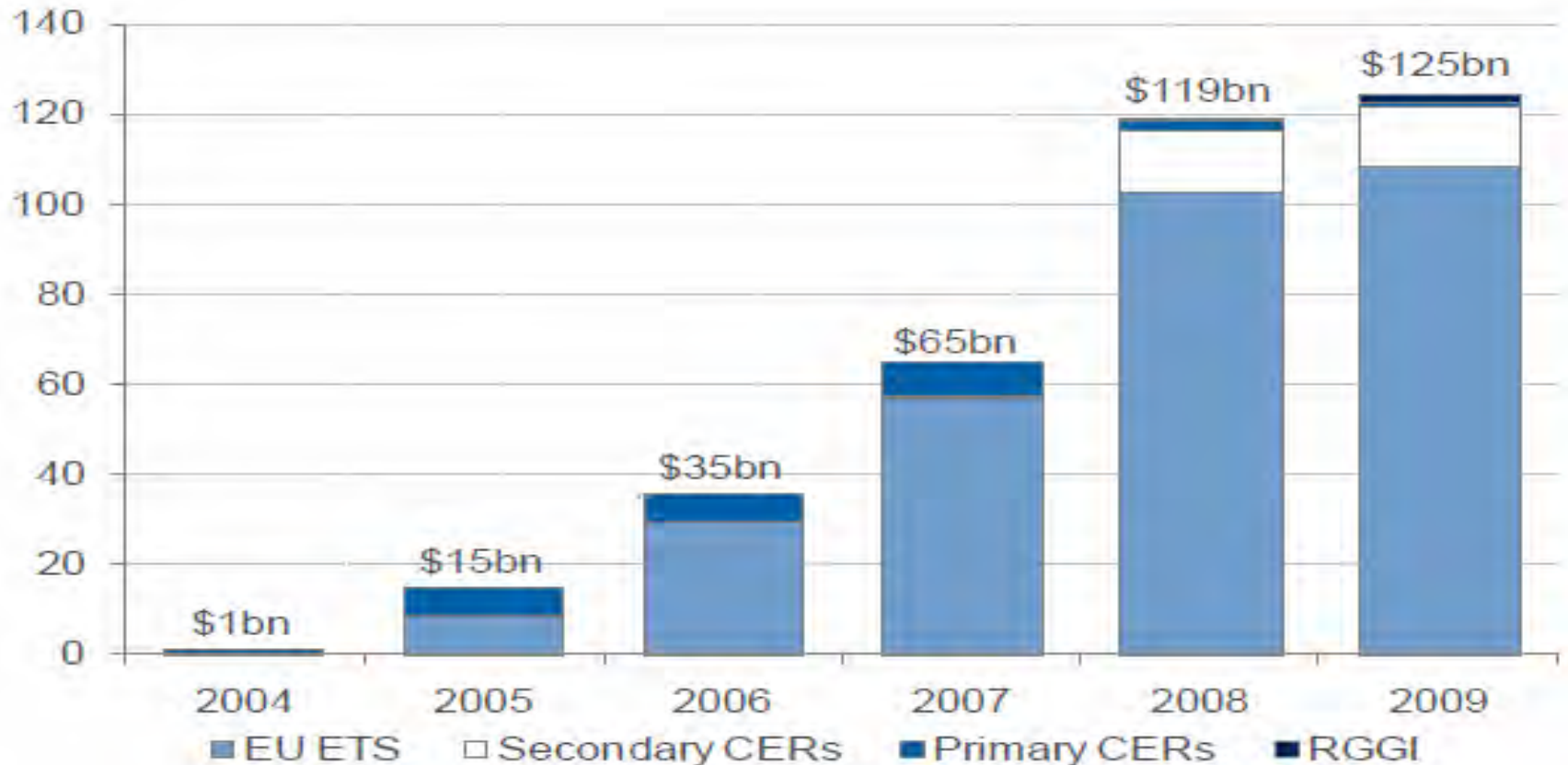


# Production Ag Emissions ADCs 1990 – 2007





# Global Carbon Market Continues Grow Despite Slowdown



## Carbon Markets Are Here to Stay

- The global carbon market increased 5% in 2009 in terms of value, compared with 83% in 2008
- U.S. voluntary carbon market continued to expand **despite the recession**, growing to \$75 million
- HSBC reports a 15% drop in new climate investment in first half 2010 compared to 2009.



# Position of Ag in Carbon Markets

## Compliance regimes

- EU-ETS
  - (9% of all EUAs issued)
  - Secondary Ag Industries
- Kyoto CDM/JI
  - 36% of all CERs issued
  - 20% of all ERUs issued
  - Production & Secondary Ag
- New Zealand
  - Plans to launch ETS for ag in 2015
- RGGI
  - Offset categories for livestock and afforestation

## Voluntary Regimes

- CCX
  - No till/soil conservation, biogas, livestock methane, forestry
- Climate Action Reserve (CAR)
  - Forestry, livestock methane, organic waste
- Voluntary Carbon Standard (VCS)
  - Ag/forestry land use, livestock, and organic/wastewater management.
- American Carbon Registry (ACR)
  - Forestry, livestock manure, wastewater management.
- Alberta
  - 12 ag categories/methodologies
  - Reductions based on adoption of best practices rather than measurement.



# Global Prices for Carbon Allowances/Offsets

Global weighted price for all GHG allowances and offsets

| Carbon Regime              | Spot Price | Total Ag Credits     | Total Ag Value             | Market Share   | Weighting Factor |
|----------------------------|------------|----------------------|----------------------------|----------------|------------------|
| CCX (CFIs)                 | \$0.10     | 82,307,000           | \$8,230,700.00             | 0.02%          | \$0.0000         |
| CAR (CRTs)                 | \$4.25     | 3,232,121            | \$13,736,514.25            | 0.04%          | \$0.0015         |
| VCS (VCUs)                 | \$3.00     | 27,821,346           | \$83,464,038.00            | 0.21%          | \$0.0064         |
| ACR (ERTs)                 | \$3.00     | 27,786,111           | \$83,358,333.00            | 0.21%          | \$0.0064         |
| VERs                       | \$3.00     | 3,088,053            | \$9,264,159.00             | 0.02%          | \$0.0007         |
| RGGI (per 1)               | \$1.91     | 204,085,721          | \$353,623,992.83           | 0.91%          | \$0.0173         |
| RGGI (per 2)               | \$1.58     | 8,035,080            | \$11,517,097.10            | 0.03%          | \$0.0005         |
| JI (ERUs)                  | \$11.40    | 3,844,779            | \$53,473,186.33            | 0.14%          | \$0.0156         |
| CDM (CERs)                 | \$13.01    | 300,615,952          | \$4,779,258,540.41         | 12.23%         | \$1.5914         |
| EU-ETS (EUAs)              | \$15.12    | 1,822,649,853        | \$33,676,445,179.93        | 86.19%         | \$13.0319        |
| <b>Total Carbon Market</b> |            | <b>2,483,466,016</b> | <b>\$39,072,371,740.85</b> | <b>100.00%</b> | <b>\$14.67</b>   |



# Global Prices for Ag Carbon Allowances and Offsets

## Global Weighted Priced Used for GIC-ACI Index

| Carbon Regime                 | Spot Price | Total Ag Credits   | Total Ag Value            | Market Share | Weighting Factor |
|-------------------------------|------------|--------------------|---------------------------|--------------|------------------|
| CCX (CFIs)                    | \$0.10     | 45,192,984         | \$4,519,298.40            | 0.13%        | \$0.0001         |
| CAR (CRTs)                    | \$4.25     | 1,310,153          | \$5,568,150.25            | 0.16%        | \$0.0067         |
| VCS (VCUs)                    | \$3.00     | 4,428,709          | \$13,286,127.00           | 0.38%        | \$0.0113         |
| VERs                          | \$3.00     | 2,520,126          | \$7,560,378.00            | 0.21%        | \$0.0064         |
| ACR (ERTs)                    | \$3.00     | 129,959            | \$389,877.00              | 0.01%        | \$0.0003         |
| JI (ERUs)                     | \$11.40    | 800,000            | \$11,144,640.00           | 0.32%        | \$0.04           |
| CDM (CERs)                    | \$13.01    | 25,439,287         | \$404,439,381.37          | 11.49%       | \$1.49           |
| EU-ETS (EUAs)                 | \$15.12    | 166,385,454        | \$3,074,244,135.99        | 87.31%       | \$13.20          |
| <b>Total Ag Carbon Market</b> |            | <b>246,220,910</b> | <b>\$3,521,415,058.41</b> | <b>100%</b>  | <b>\$14.76</b>   |



# Current Approaches Limit Ag's Potential

- Majority of mitigation options limited to previous examples.
- No till and ag soil sequestration methodologies not universally accepted. Debate over how to monitor, quantify, and aggregate.

**\*CCX has fallen due to questions on methodology and validity of offsets. Alberta's approach also lacks rigor.\***

- Methodologies focused on the dual benefit of increased production efficiency and lower GHG emissions have been explored but not yet implemented.

**\*Ex: Biotechnologies, alternative feeds, and enzymes for improving biofuel production.\***

- On average, takes 3 years before a CDM project receives first offset credits. Financing difficult for small projects.





# New Developments and New Opportunities

- Regional schemes on the rise in the absence of a global agreement.
- China preparing launch of national voluntary regime.
- China and California discuss link of WCI and Tianjin for possible future exchange of allowances and offsets.
- Chile and Mexico exploring national ETS schemes.
- Voluntary markets in development for REDD programs in several Latin American countries.
- VCS and ACR reviewing proposed methodology for reducing N<sub>2</sub>O emissions through improved fertilizer management.
- CAR exploring new offset methodologies in crop land management, rice cultivation, and fertilizer management.





# Capturing New Opportunities: Measuring Reductions in Ag

## Life-cycle Analysis

- Tool for measuring a product's GHG emissions from cradle to grave.
- Helps identify where GHGs occur and where they can be reduced.
- Not eligible for offset credits and don't form basis for reduction protocols. Can help target areas for implementing protocols/reductions.
- Ag input providers using LCAs to promote green benefits of products.

Ex: **Evonik Degussa** increased feed conversion efficiency and nitrogen waste reduction w/ **DL-Methionine**.

## Developing an Offset Project

- Estimate emissions based on publicly available data and established emissions factors (default values).
- Direct measurement – source monitoring through emissions sensors/gas sensors.
- Sampling/Process Models lower costs
- Use established quantification protocol/develop new method for quantifying baseline emissions and impact of reduction method.
- Gain approval of new method/proposed project.



# Measurement Challenges & Market Integrity

- Ongoing direct measurement costly, particular for soil based emissions (new technologies may change this).
- Standardized measurements/emissions factors based on published data fine for baseline.  
> **Significant uncertainty levels and discounting of emissions reduction impact.**
- Sampling and process models require large data sample and robust area specific information—i.e., DNDC.
- New focus: Integrated approaches → Sampling of emissions with input of key production/environmental factors in process models.
- Aggregation of groups of projects. Applying methodology across group reduces measurement uncertainty and creates better economies of scale.





# Challenges to Expanding Opportunities

- Meeting Additionality Requirement
  1. Project not required by law
  2. Practice not common/widespread, i.e. business as usual (BAU)
  3. Presence of obstacles – economic, technical, social
  4. Comparison of proposed practice to other alternatives (CDM)
- Downside of additionality
  1. How to account for early adopters?
  2. At a certain point practice/new approach is BAU
  3. Limits the ability to create economies of scale
- Performance Tests/Benchmarks Newer Idea
  1. BAU becomes defined by common business practice.
  2. Additionality is then defined as going beyond the industry benchmark.
  3. Being considered in new fertilizer management protocol, where crop records and fertilizer usage widely available.



# Redesigning Carbon Markets for Ag

- Methodologies, regimes, and regulatory structure must evolve.
  - **Need approaches/technologies that improve production efficiency and reduce emissions.**
- Ag industry should follow REDD example
  - **Push for greater role in carbon markets.**
- Ag has huge potential to be a driver of low cost carbon reductions (mitigation and sequestration.)
- Ag carbon offsets and allowances need to be linked to production of commodities through new aggregation strategies and use of sector specific carbon pricing instrument.
- Grain merchandisers are now introducing carbon trading desks (recent official announcement by ADM), opening up the eventual merchandising strategy of pricing grain origination and carbon content jointly.
- Linking offset methodology and commodities and implementing them across producers groups will reduce measurement uncertainty and increase participation in carbon market.



# GIC's Ag Carbon Index – Overview

## GIC Agriculture Carbon Index GIC-ACI

- Captures GHG footprint of agribusiness worldwide
  - Input sector
  - Production agriculture
  - Value-added sector
- Transparent, ag sector-specific carbon price discovery tool.
- Hedging instrument for carbon offsets and allowances.
- Due diligence tool for balance sheet valuation in M&A transactions.
- Instrument for estimating and valuing ag-related carbon mitigation technologies.

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**The GIC Group**

- **Agribusiness consulting services**
- **Investment advisory services**
- **Global Food Safety Forum (GFSF)**
- **Carbon advisory services**