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# **Private Capital Market Perspectives in Agriculture**

Climate Change & Mitigation in Agriculture  
FAO, Rome  
19-20 April 2010



# Agriculture's promise?

1. Reducing emissions/increasing stocks
2. Increasing agricultural productivity and yields
3. Contributing to climate change adaptation for farmers

Maybe. Evidence is still scarce *at scale*.



- I. Private markets after Copenhagen
- II. Agriculture under UNFCCC
- III. Evidence and examples
- IV. How move forward?



# State of the Carbon Markets

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## C market performance: 2007-2008

	Total voluntary market			Total compliance market		
	% Increase	2007	2008	% increase	2007	2008
Volume (MtCO <sub>2</sub> e)	+86%	66	120	+42%	2,920	4,150
Value (US\$ billion)	+210%	0.3	0.7	+185%	64.7	117.6

## C market performance: 2009-2010

Markets up in volume, flat in value

- VOLUME, \$136 billion (2009)
- VOLUME, \$170 billion (2010) – 33% projected increase
- Growth amid uncertainty; price retrenchment



# Post-COP15: Stall, not crash

- EU-ETS prices hits 6-month low but not lowest levels
- Uncertainty chilling new investments
- Policy process unclear entering COP16 period

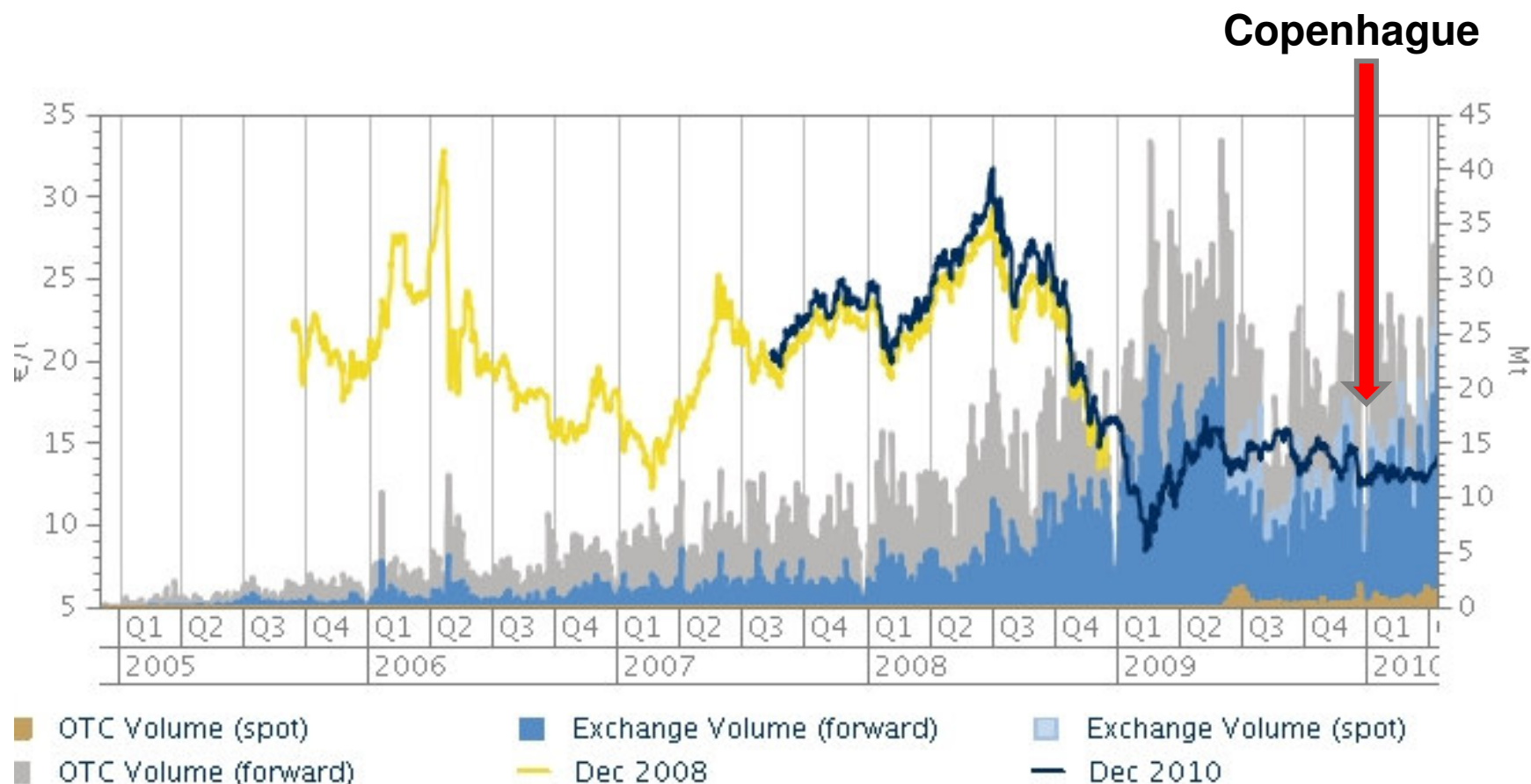
**Post-Copenhagen verdict:** Failure priced in market.....or long-term prospects remain reasonable and humble

*“If you are not in the market then it’s rational to wait...If you are confident ...you invest where value will be found.”*

- Climate Change Capital

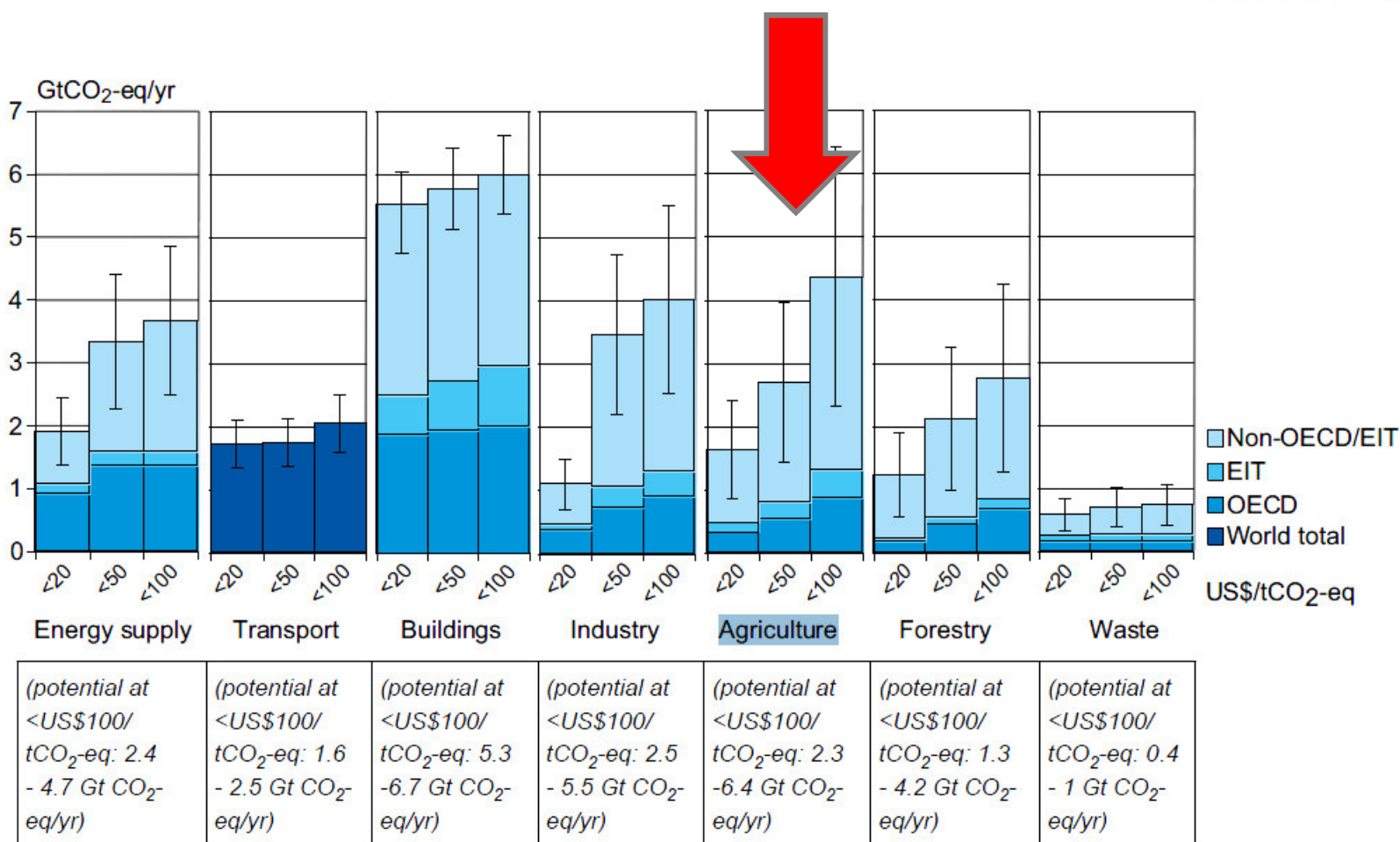


# EUA Prices: 2005-10





# IPCC (2007): AG Potential



**Figure SPM.6:** Estimated sectoral economic potential for global mitigation for different regions as a function of carbon price in 2030 from bottom-up studies, compared to the respective baselines assumed in the sector assessments. A full explanation of the derivation of this figure is found in Section 11.3.

Notes:



# IPCC: Agriculture Potential

## **Agriculture: 12% of global GHGs → 18% with AFOLU**

- Land use/change, and forestry (LULUCF): 40%
- Growth in direct emissions (1970 -1990) was 27%

## **Large possible agricultural contribution (IPCC)**

“Agricultural practices collectively can make a significant contribution at low cost to increasing soil carbon sinks, to GHG emission reductions, and by contributing biomass feedstocks for energy use (medium agreement, medium evidence).”

## **No best practice (IPCC)**

“There is no universally applicable list of mitigation practices.”

# VERs and Agriculture



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## Agricultural OTC trades: 2008-2009

	VERs ( <sup>'000</sup> )	% total	Price \$/tCO <sub>2</sub> e
Methane (livestock)	1,279	2.5%	\$10.00*
A/R Plantation	632	1.2%	\$6.40
Forest management	431	0.8%	\$7.70
Ag soil /land	256	0.5%	\$3.40
Other (terrestrial)	130	0.3%	n/a
<b>Total</b>	<b>2,728</b>	<b>5.3%</b>	<b>\$6.88</b>

## CCX: Higher proportion AFOLU credits

- ag soil (15%), ag methane (1%), forestry (22%)
- Rise in forestry (21%), drop in ag soil (33%).

# CDM and Agriculture



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## Agricultural CDM trades: 2004-2010

	<b>CERs (‘000s)</b>	<b>Market share</b>	<b>Investment (USD, million)</b>	<b>Total projects</b>
Biomass	15,167	4.0%	\$5,441	1,037
Methane avoidance	5,969	2.0%	\$222	328
Forests	0	0.0%	\$58	52
Agriculture	0	0.0%	0	0
<b>Total</b>	<b>21,136</b>	<b>6.0%</b>	<b>\$5,721</b>	<b>1,417</b>

\* Agriculture = irrigation, alternative fertilizers, rice crop CH4 (Biogas under methane avoidance)

# US and AUS Prospects



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US (110 <sup>th</sup> -112 <sup>th</sup> Congress)	Australia
Kerry-Graham, Lieberman-Warner.....etc, etc, etc.	<i>Australian Climate Change Regulatory Authority Bill 2009.</i>
<b>Outlook:</b> “50-50 chance” Senate will pass simpler, moderate bill this year – <i>W. Post</i>	<b>Outlook:</b> Bill defeated on three separate occasions in the Australian Senate, tax floated

- Failed in both countries thus far
- Int’l forestry offsets and domestic AFOLU prominent
- Shift offset market dominated by EU-ETS
  - ag and forests, new players, new locations, new sources.
- **BUT lack of demand without regulation....**



# Update on Copenhagen

- Accord does not expressly refer to agriculture
  - Developing countries (13 of 33) submitted NAMA plans to adopt mitigation actions in the agricultural sector.
  - Non-quantified agricultural mitigation activities submitted (grassland restoration, fertilization techniques etc.)
- Negotiations ongoing through Working Group on Long-term Cooperative Action (AWG-LCA)
  - activities to “improve the efficiency and productivity of agricultural systems in a sustainable manner”
  - next AWG-LCA meeting to be held in April 2010 in Bonn.



# Agriculture activities

## Emission Reduction

- Enteric fermentation ( $\text{CH}_4$ )<sup>†</sup>
- Manure management ( $\text{CH}_4$  and  $\text{N}_2\text{O}$ )<sup>†</sup>
- Reduced or no tillage<sup>†</sup>
- Use of nitrification inhibitors and efficient use of fertilizer ( $\text{CO}_2$ )
- Water management and waste residue management ( $\text{CH}_4$ )
- emissions from rice cultivation ( $\text{CH}_4$ )
- Emissions associated with conversion of land (all)

## Carbon stock enhancement

- Grassland management
- Cropland management
- Agroforestry
- Agronomic practices such as perennial species

<sup>†</sup> Also enhances carbon stocks.

## To deliver....

1. Higher yields / productivity
2. Carbon stocks / carbon benefits
3. Ecological resilience and food security benefits.



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# An African Agricultural Carbon Facility

## Feasibility Assessment and Design Recommendations

Forest Trends, The Katoomba Group, Ecoagriculture Partners, and Climate Focus  
with support from The Rockefeller Foundation

February 1, 2010





# Agriculture: Moving ahead?

## Barriers

- Aggregation and coordination
- Project methodologies
- Scientific certainty (permanence, MRV, GHG, co-benefits)
- Technical constraints and capacity
- Few financing mechanisms , market access
- Country risk: legal, financial and political

## Still, there are opportunities.....

- Huge potential
- Multiple revenue streams
- Co-benefits of investments in SLM (carbon & co-benefits) very high
- strong additionality
- lack of competition with Annex I countries/sectors.



# Critical Questions

- 1) Promising agricultural practices?
- 2) Incentives needed for farmers to change practices?
- 3) Institutions, financing & management to sustain practices?
- 4) How can they access the benefits? How distribute them?

## Outputs

What design and function of agriculture carbon facility and financing mechanism?

# Scenarios



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<b>WHAT? Farming System</b>	<b>HOW? Carbon-Friendly Practices</b>
<b>Maize mixed</b>	<ul style="list-style-type: none"><li>• Agroforestry</li><li>• Conservation tillage</li><li>• Riparian revegetation</li><li>• Bio-char (<i>possibly</i>)</li></ul>
<b>Millet/sorghum-based agropastoral</b>	<ul style="list-style-type: none"><li>• Conservation tillage</li><li>• Fodder banks</li><li>• Pasture rehabilitation</li></ul>
<b>Smallholder commercial coffee</b>	<ul style="list-style-type: none"><li>• Agroforestry</li><li>• Riparian revegetation</li></ul>



# What examples exist?

- **Ethiopia:** Humbo Assisted Regeneration
- **Kenya:** Green Belt Tree-Planting Project
- **Kenya:** Smallholder Coffee Carbon Project
- **Zambia:** ICRAF
- **Kenya:** Western Kenya Smallholder Agriculture Carbon Project
- **Tanzania:** Uchindile and Mapanda Forest Project
- **Uganda:** Trees for Global Benefits

# Case studies



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	<b>W. Kenya Smallholder Agriculture C. Project</b>	<b>Kenya Smallholder Coffee Carbon Project</b>
<b>Region</b>	Western Kenya	Central Kenya
<b>Area</b>	86,000 ha	~ 10,000 ha
<b>Aggregator</b>	80,000 farms (assoc.)	9,000 members (smallholders)
<b>Ag Objectives</b>	Restoring ag production, adopting farm enterprise approach, Reducing vulnerability	Restoring coffee production & specialty/ best coffee practices. Reducing vulnerability
<b>Expected VERS*</b>	516,000 tCO <sub>2</sub> e/yr (max)	~30,000 tCO <sub>2</sub> e/year, phase I
	1.5tCO <sub>2</sub> e soil C /ha/y 4.5tCO <sub>2</sub> e biomass C/ha/y	2.4 tCO <sub>2</sub> e soil C/ha/yr 1.6tCO <sub>2</sub> e biomass C/ha/yr

# Carbon benefits



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## Western Kenya Smallholder Agriculture Carbon Project      Kenya Smallholder Coffee Carbon Project

**Table 3.7: High production t/CO<sub>2</sub>e/ha**

	N	R	NM	NM2	NM4	RM	RM2	RM4
N		0.99	0.40	1.61	3.19	1.39	2.60	4.22
R			-0.62	0.59	2.20	0.40	1.61	3.19
NM					2.79	0.29		3.81
NM2								
NM4								
RM						-1.80		0.99
RM2								2.79
RM4								

Acronyms	
N	all residues removed from the field
R	all residues left in the field
M	1 tC/ha of manure distributed during the year
M2	2 tC/ha of manure distributed during the year
M4	4 tC/ha of manure distributed during the year
Residues and manure scenarios are combined. For example:	
NM	all residues removed+and 1tC/ha distributed in the field



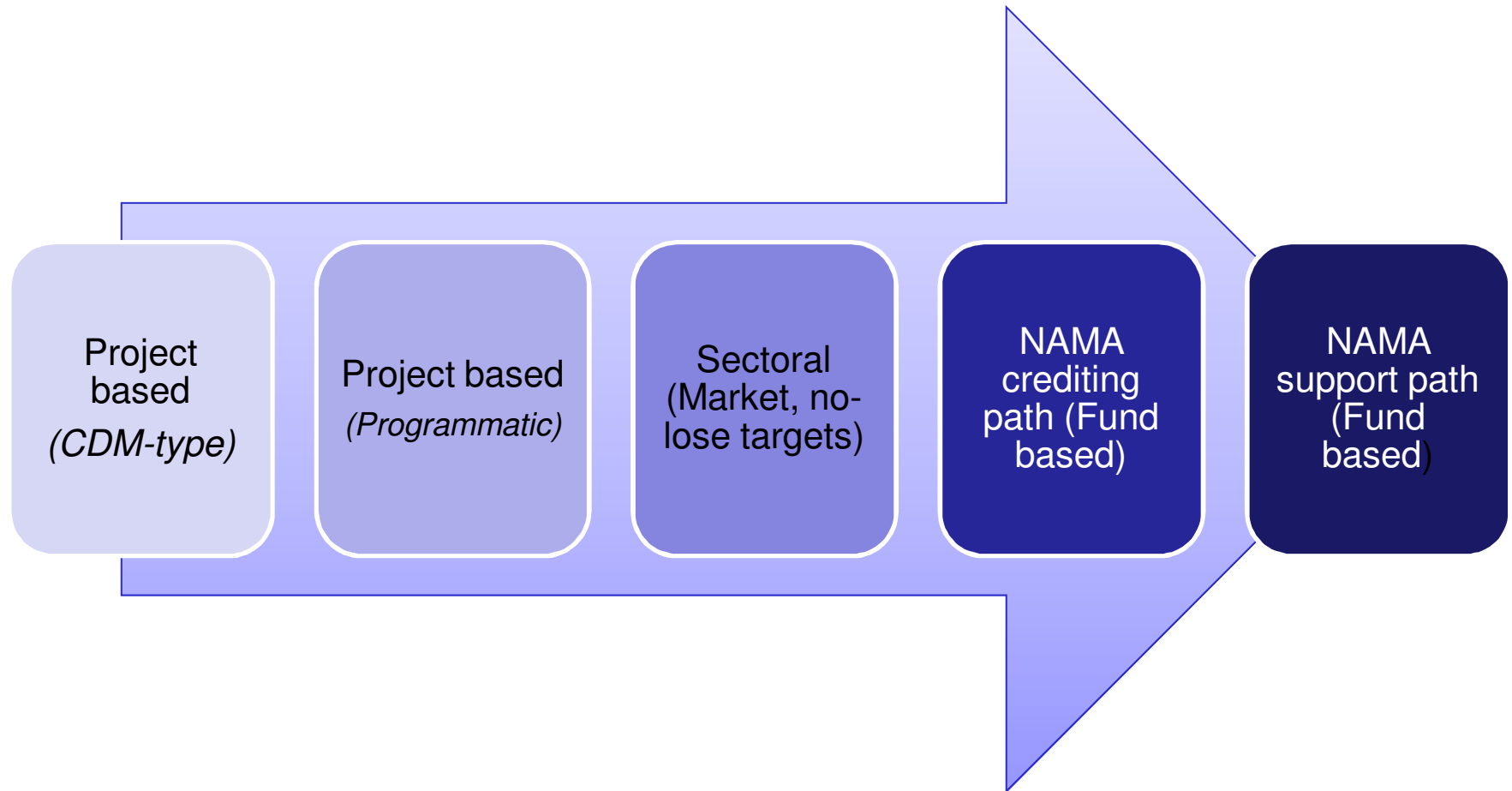
# Project size and potential

Project size (ha)	Project size (mi <sup>2</sup> )	Annual revenue ('000s)	
		<i>Low</i> (\$5/tCO <sub>2</sub> e)	<i>High</i> (\$30/tCO <sub>2</sub> e)
5,000	19	\$41	\$244
62,500	241	\$508	\$3,050
100,000	386	\$813	\$4,880
200,000	772	\$1,600	\$9,760
500,000	1930	\$4,100	\$24,400

# Climate Finance

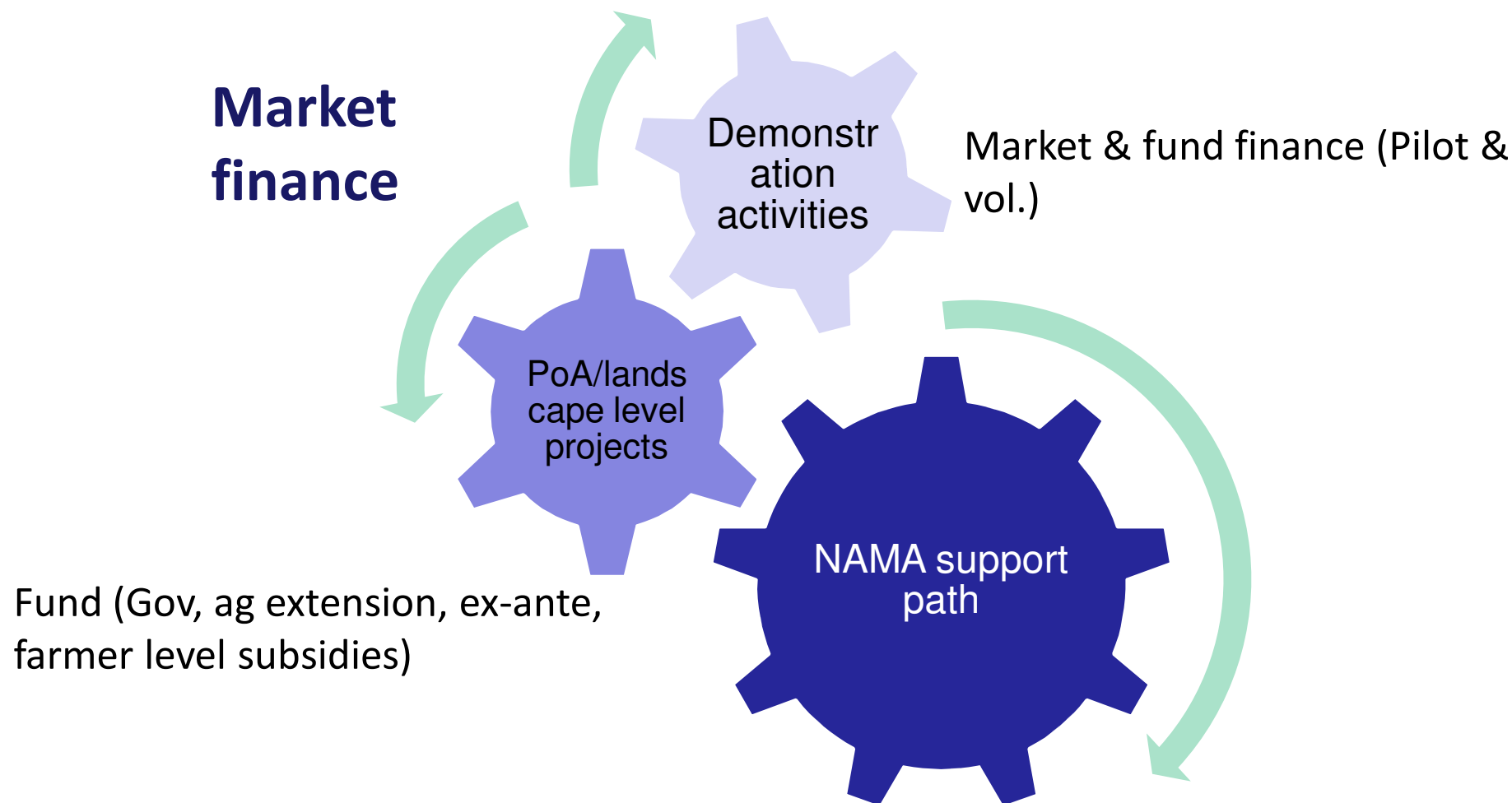


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# A basket of approaches



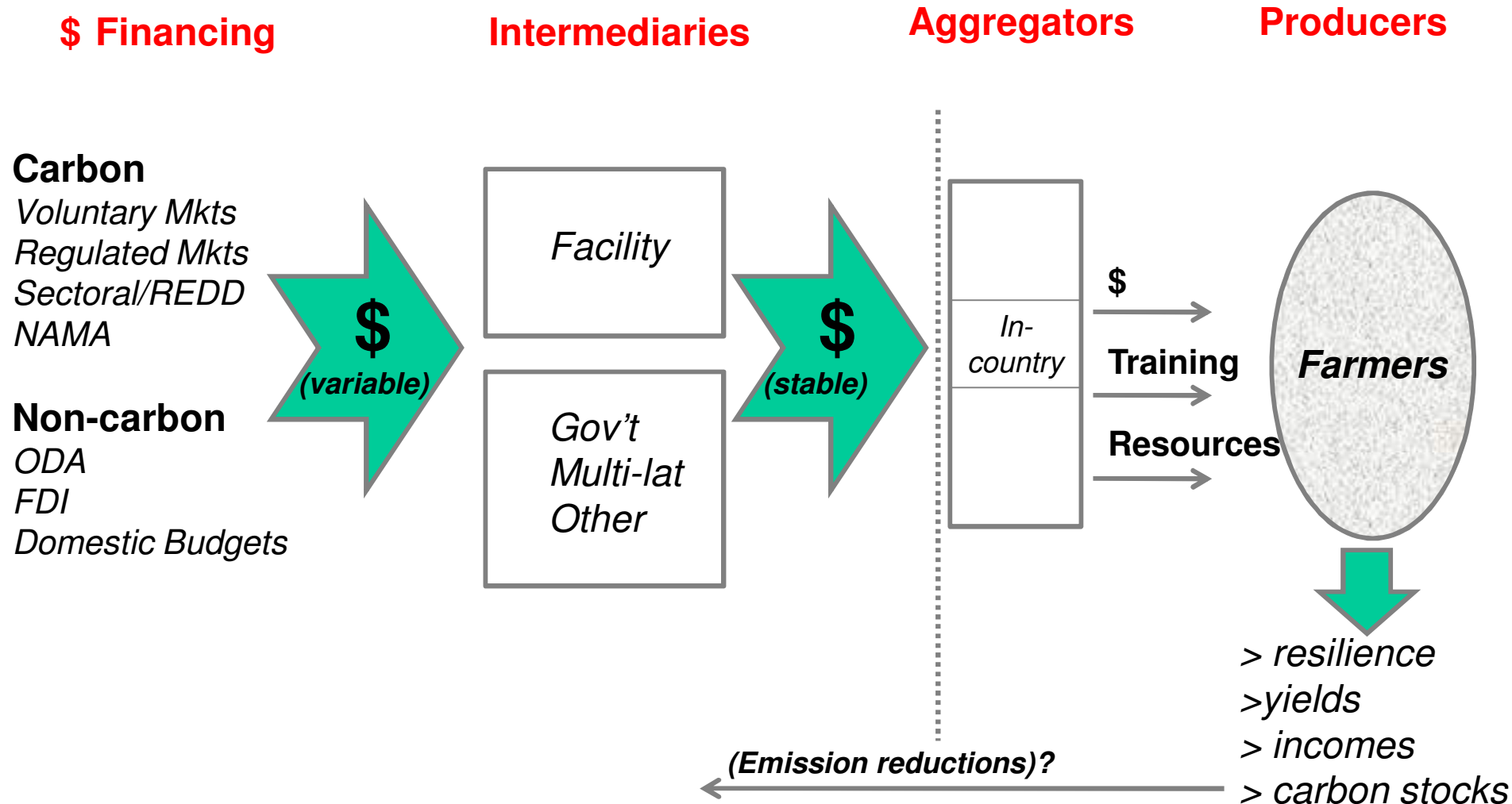


# Risks and Opportunities

	CDM type	PoA/ landscape	Sectoral/ market	NAMA (crediting)	NAMA (support)
Ultimate beneficiary	Farmer – beneficiary				
Level of change	Incentives on the project level	Incentives for changes at the landscape level	Policy change Incentives for the gov to adopt PoMs (can involve project incentives) Policy change		Policy change Enabling activities
Contractual partner	Project owner	Aggregator	Govmnt	Govmnt	Govmnt
Finance	Ex post  Directly to the farmer	Ex post  To be distributed by aggregator	Ex post  To be distributed by gov	Ex post  To be distributed by gov	Ex ante  To be distributed by gov
MRV	Project level	Project level but standardized	Sector (MRV, high tier)	Sector (possibly lower tier)	Policy level MRV



# Facility Benefits Flow



# Next Steps



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<b>Phase 2: Demonstration (2010-2012)</b>	<b>Phase 3: Bridging (2012-2015)</b>	<b>Phase 4: Commercialization (2015 onward)</b>
<i><b>Activity:</b> Demo projects &amp; capacity</i>	<i><b>Activity:</b> Project scaling &amp; commercialization</i>	<i><b>Activity:</b> Establish equity funds to finance, VERs</i>
<i><b>Objectives:</b> Collect data, establish methodology, identify project types and intermediaries</i>	<i><b>Objectives:</b> Prove and expand agricultural and terrestrial carbon projects, Attract private capital , Build supply chains, manage training and MRV</i>	<i><b>Objectives:</b> Direct private capital into landscape-scale activities, minimal transaction costs</i>
<i><b>Finance:</b> High proportion of public finance</i>	<i><b>Finance:</b> Public finance, decreasing fraction</i>	<i><b>Finance:</b> Mostly private investment, with ongoing public finance for certain infrastructure and services</i>

# Case Study: Danone Europe



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## Problem

Dairy GHG emissions, health, sustainability, milk quality

## Approach

LCA of supply chain → identify sources → develop MRV → technologies → launch pilot program (2005, 20 French farms) → scale program (> 500 farms)

## Results

Milk composition (Omega 3); Reduced GHG (methane) by 20-30%; Yield increases 8-10%, better cow health

# Contact



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# ANNEX



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# Why Terrestrial Carbon in Africa?



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- Poverty, resource degradation, and rural livelihoods are highly correlated
  - > 60% of poor in ecologically vulnerable areas; 250 million face desertification
- Productivity in Africa's arid regions among lowest in the world: low agro-potential, minimal inputs, scarce markets & investment.



# Agriculture Carbon Facility



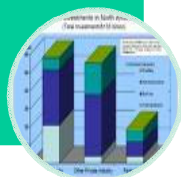
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## Functions

- to create new vehicle for bringing carbon finance to Africa to enable low carbon agricultural approaches as well as carbon and environmental benefits
- to reduce timeline for project development to implementation
- to lower transaction costs, remove barriers

- African Agriculture has 17% of global potential
- GHG emissions reduced: 2.0–3.5 mtCO<sub>2</sub>e/ha/ya
- 970mtCO<sub>2</sub>e/yr by 2030; another 4% from forestry

### Mitigation



- >\$3 billion, higher average annual aid to Africa
- Payments for ecosystem services radically change project level economics

### Financial



- Increased ag yields
- Higher resilience to environmental stresses
- Higher quality, consistent harvests
- Reduced inputs over long-term

### Co-benefits

