“Environmental Externalities”

Bundling Carbon into the Price of Commodities

- Jason Clay
- SVP Markets, WWF-US

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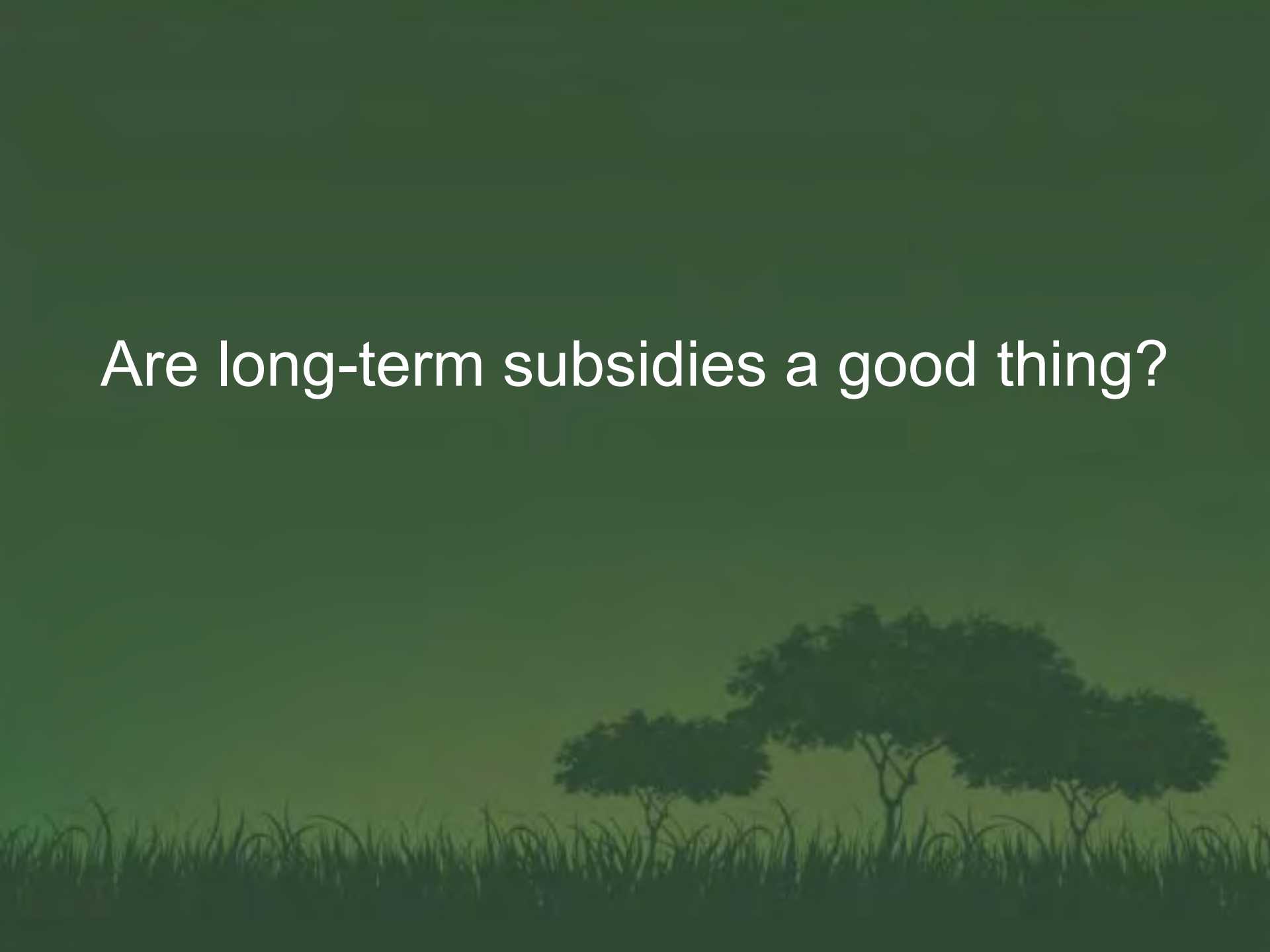
Are long-term subsidies a good thing?

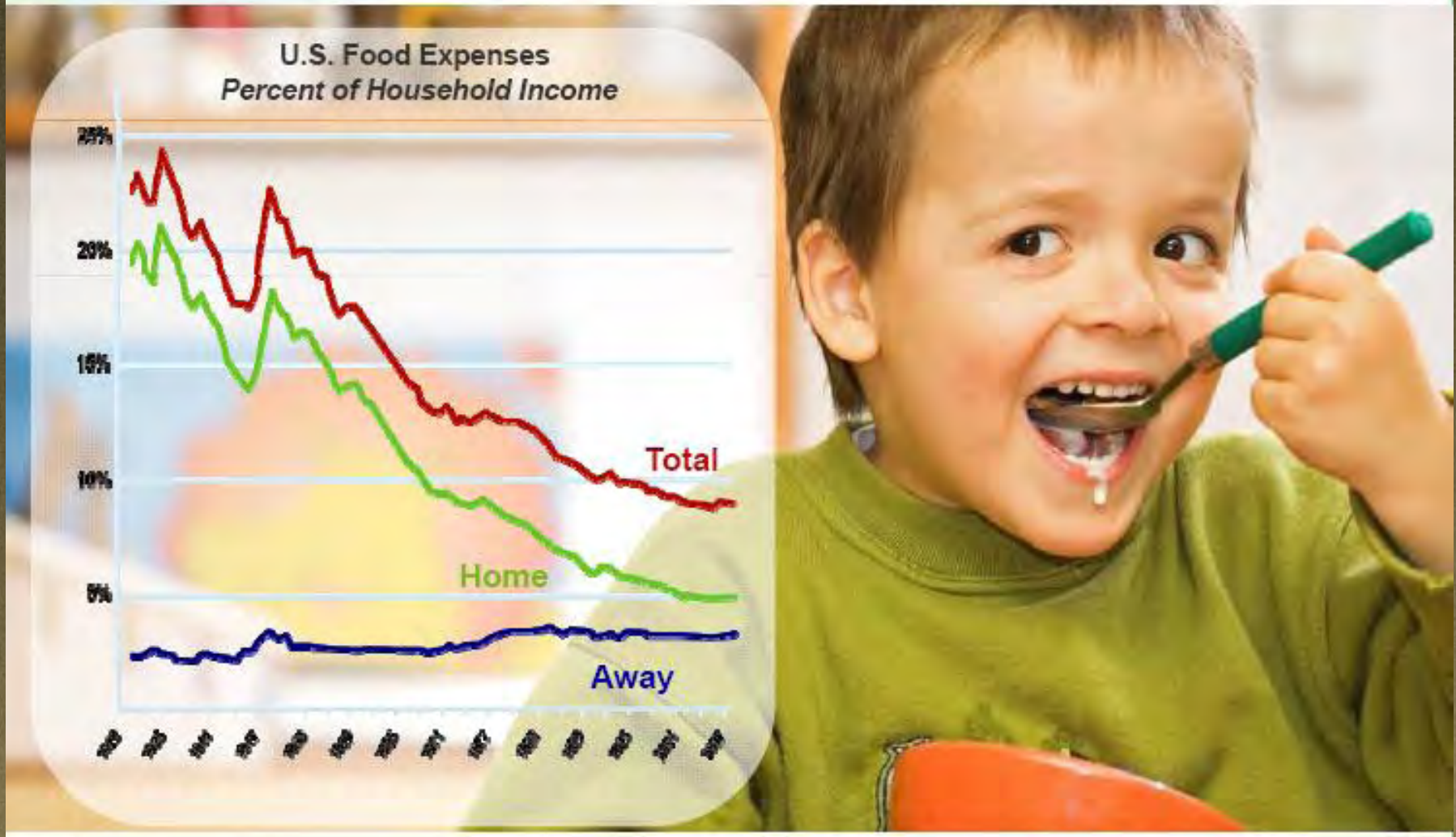


What are the biggest subsidies globally?

Should consumers pay the “cost” of products?

Is Food Too Expensive?

Pacific Ethanol, Inc.



We are eating the planet

Impacts that are acceptable with 7 billion

will not be with 10 billion people.

You manage what you measure.

But, producing anything has impacts.

So, what should we measure?

Externalities, Products and Prices—The Case of Water

	Raw material input	Water to produce input	Farm gate price
1 Cotton T-shirt	4 oz ginned	500 to 2,000 liters of water	US$0.20 (Aust.)
1 liter of soda	6 T sugar	175-250 liters of water	US$0.006 (Brazil)
1 oz. slice of cheese	6 oz milk	40 liters of water	US$0.03 (US)
1 double quarter-pounder	8 oz hamburger	3,000 to 15,000 liters of water	US$0.25 (US)

Those who benefit most from services are most likely to pay for them.

Who benefits most from soil carbon, pollination, predator control and reduced input use or soil erosion?

Farmers

Reclaiming Degraded Land in Brazil by Increasing Soil Carbon from 0.5 to 3%

Methods

- No-till, crop rotation, pasture grasses

Results after 5-6 years

- Reduced input use (up to 50% less pesticides, water, fertilizer; 70% less fungicides)
- Reduced environmental impacts (up to 90% less effluents)
- Increased production and profits

Lessons

- Farmers make more money growing soil than soy—land values increase
- Brazil can increase land in soy >2% per year for 25 years without cutting a single tree or reducing the number of cows

We can’t do everything. We need to focus.

Start with a service that has a market

Governments don’t manage the planet.

Governments don’t create markets.

physical values

weights and measures

quality

color

foreign matter

health and safety

intangible/certified values

organic

non-GMO

carbon

water

poverty alleviation

protected riparian areas

biodiversity

no child labor

Carbon and Commodities

The Goal—Carbon and Commodities

A voluntary program where retailers and brands can buy credible carbon through their existing supply chains.

Carbon and Commodities—Phase 1

Assess the potential carbon from 6-8 crops

- Annual crops—Soy, Cotton
- Perennial—Cocoa, Coffee, Cashews, Palm Oil
- Forests—Paper, Timber
- Animal—Beef, Dairy
- Other—Sugarcane

Identify the existing methodologies

Identify key carbon sources without methodologies

Develop a business model for Carbon & Commodities

Commodities Assessed—Phase 1

	Initial Assessment	Peer Review	Precondition of Certification
Beef	USA	Brazil	Beef Roundtable*
Dairy	USA	New Zealand	Dairy Roundtable*
Cashew	East Africa	East Africa	
Coffee	Global	Global	RA, Utz
Cacao	West Africa	Indonesia	RA, Utz
Cotton	USA	West Africa	BCI
Sugarcane	Australia	Brazil	Bonsucre
Soy	USA	Brazil	RTRS
Timber	USA		FSC
Pulp	USA	Brazil	FSC
Oil Palm	Malaysia	Indonesia	RSPO

* Program in being created at this time, no standards exist.

Types of Credible Carbon from the Assessment

Carbon sequestration in crop production

Carbon sequestration in non-crop production

Reduced emissions in crop production

Avoided carbon emissions in crop production

Avoided carbon emissions downstream from producers

Phase 1 Findings (MT CO2e/MT of output)

	Range (MT)	Average (MT)	Reasons for range
Cocoa			
Crop sequestration	0 to 23.6	11.5	Planting density; ecology
Non-crop sequestration	0 to 19.3	9.5	Use and density of shade trees
Avoided emissions	6.9 to 25.9	20.2	Yields and input use
Coffee			
Crop sequestration	0 to 6.2	1.22	Planting density
Non-crop sequestration	0 to 21	4	Use and density of shade trees
Avoided emissions	0 to 36.6	6.9	Yields: fermentation; husks/hulls
Cashew			
Crop sequestration	1.53 to 27.1	4.2	Lower yields = higher sequestration
Non-crop sequestration	1.53 to 27.1	4.2	Lower yields = higher sequestration

Phase 1 Findings (MT CO2e/MT of output)

	Range (MT)	Average (MT)	Reasons for range
Soy			
Reduced emissions in crop	.31 to 1.02	.66	Tillage; irrigation; N mgt; pesticides; GM
Avoided carbon in crop	1.14 to 2.72	1.14	Tillage, soil type, climate
Avoided carbon emissions	.023 to .032	.027	Type of N fertilizer used
Cotton			
Crop sequestration			Yield differences
Non-crop sequestration			N use and N20 volatilization
Reduced carbon emissions			Spatial differences
Avoided carbon emissions			Soil profiles; nutrient deficits
Palm Oil			
Reduced emissions in crop		1.4	Improved N use efficiency
Avoided carbon from prod.		5.4	Avoided deforestation
Avoided downstream C		0.8	Methane from processing waste

Phase 1 Findings (MT CO2e/MT of output)

	Range (MT)	Average (MT)	Reasons for range
Beef			
Non-crop sequestration	6.5 to 265	138	Soil, climate, vegetation, conversion
Reduced crop emissions	1.47 to 5.13	4.33	Size, Genetics, lifespan, feed
Avoided crop emissions	52 to 188	120	Range quality & location; Stock density
Timber/Pulp			
Crop sequestration			Growth rates; genetics, fertilizer, competition control; set aside areas
Avoided crop emissions			Harvest age; 300-900 MT CO2/ha
Sugarcane			
Reduced emissions in crop			Climate, irrigation, inter-cropping, burning, productivity/ efficiency, tillage,
Non-crop sequestration			Riparian protection, slope replanting
Avoided downstream C			Bagasse converted to energy

Issues of Concern in Phase 1

- Relationship of Carbon bundling to certification programs
  - C02e measurement in existing programs
  - Certification required by government (e.g. PA, NY)
- Chain of custody issues for bundling carbon
  - Book and claim, segregated, mass balance
- Demand varies, so system should be fungible
- Commodity prices vary so carbon may be onerous for some
- Performance (CO2e/MT of output) vs. practices
- What would a producer get credit for?
  - Reduced CO2e emissions against global norms?
  - Credits based on continuous improvement?
- Biggest CO2e gains come from the bottom

Credible Carbon—Sequencing Issues

Short-Term Carbon--Immediate

- C credits for tree crops, shade trees, or riparian area protection
- Adoption of BMPs (e.g. cover crops, no-till, improved efficiency)
- Reduced net carbon-intensive input use (e.g. fert., pest., water)
- Reduced post harvest losses

Medium-Term Carbon—3-5 Years

- Generation of energy with residue/waste
- Use of trimmings/prunings for fuel
- Avoided habitat loss or deforestation by planting on degraded land or improving productivity or both

Long-Term Carbon—10 Years

- Increased soil carbon

Carbon and Commodities—Phase 2

ID 5-6 commodities with most CO2e potential per MT output

Be strategic—focus on 2-4 sources of emissions or sequestration

ID willing partners to explore C within their supply chains

ID methodology gaps or adaptation issues

Understand baseline and ranges globally per commodity

Evaluate carbon fit with existing certification programs

ID common issues (risks, opportunities, concerns) for the different commodities

Evaluate impacts on biodiversity & water from net GHG reductions

Criteria for Commodity Selection—Phase 2

Meets the C-AGG Principles (20 August 2009)

Production has a high potential for conserving biodiversity

Demand for and funding from the private sector

Methodologies for quantifying credible carbon exist

Potential for carbon is high either globally amongst better producers or regions have comparative advantage

Costs of verification appear acceptable

Selected commodities represent a range of commodities (e.g. annuals, perennials, forest, animal)

There’s no such thing as a free lunch

Addressing externalities will increase the price of food, at least in the short term

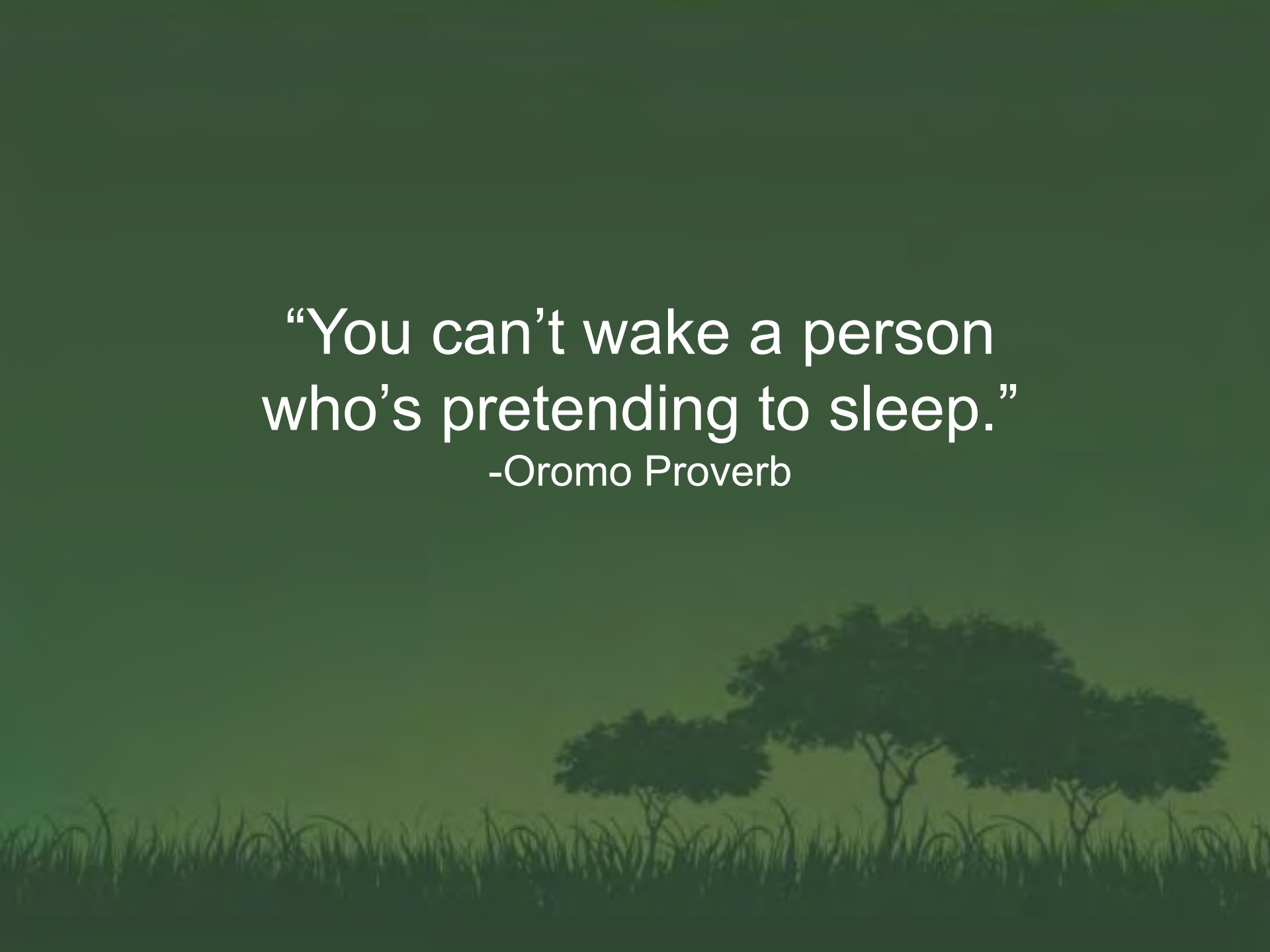
But, it might also make food production more efficient as well

The Private Sector and Agricultural Carbon

- Finite planet—not about price, but availability
- Shift in purchase strategies
  - Long-term contracts vs. spot markets
  - Partnerships vs. transactional relationships
- Carbon is a loss leader
- Aligns buyers and brands with producers
- The concern is from the traders
  - Cargill announcement on palm oil example
  - US market for palm oil—a precompetitive approach

“You can’t wake a person who’s pretending to sleep.”

-Oromo Proverb

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