

## Session Notes

Session Title: **Plenary – *Getting Smart about Change: Climate and Agriculture***

Day and Time: **Wednesday 5/21/14, 2:45 – 3:30 pm**

Prepared by: **Mike Colby, BFS/CSI/Tech**

### **1. Key Learning or Take Home Messages:**

1. We're seeing changes in yields due to climate change - **more declines than previously expected** – short, medium, and long-term. Food prices are on a long-term rise due to rapid, compounded growth in demand, in the face of shrinking supply due to climate change, unless there's a revolution in agricultural technologies, practices, and systems, on a massive scale.
2. **Climate-smart agriculture (CSA)** = **increases in sustainable agricultural production + increased adaptation/resilience + reduced emissions** (decrease GHG emissions intensity + increase carbon sequestration = reduction in net emissions). **In Africa the emissions part is less important than increasing production and adaptation**, but there are opportunities for emissions co-benefits via practices such as precision fertilizer efficiency, agroforestry with legumes, alternate wet and dry rice, livestock feed modifications, potentially carbon farming finance to restore soil fertility and water capture in degraded agro-ecosystems, etc.
3. **Sustainable intensification** (closely related/part of CSA) has three legs: **Genetic intensification + Socio-economic intensification + Ecological intensification.**
4. **Agroforestry and evergreen agriculture** appear to be gold standard practices that achieve the *triple win* objectives of CSA. The **African CSA Alliance's "25by25 Campaign"** could be an enormous boost to the up-scaling of climate-smart Farmer-Managed Natural Regeneration/ agroforestry/conservation agriculture-with-fertilizer/fodder/fuelwood trees and shrubs all-across the continent. The **Global Alliance for Climate Smart Agriculture** can also help promote this approach.

**2. Notes from the session:** *For each speaker and discussion please capture the main points of what you are hearing, with consideration of information that may be useful in future or otherwise noteworthy.*

### **JONATHAN SCHRIER, Dept. of State - Introduction**

There is a recent research article saying that indicates climate change will not only affect agricultural productivity, it is also likely to reduce the nutritional value of some foods.

We have the emerging Global Alliance for Climate Smart Agriculture, and also an emerging African Alliance for Climate Smart Agriculture (not just a regional affiliate of the Global Alliance)

And we have African leadership on the 2014 Year of Agriculture.

2:46

**DENNIS GARRITY, Moderator**

Thanks to Secretary Vilsack for being the teaser to the main act this afternoon!

This panel and discussion will be about three big questions:

1. What do we know about the impacts of CC on future of agriculture in the developing world?
2. What is coming up in practical alliances to promote CSA in coming years?
3. What is being done to enhance the productivity of smallholders?

**MOLLY BROWN, Research Scientist, NASA Goddard Space Flight Center**

I've spent 15 years studying the drivers of agricultural change, and saw it up close while in the Peace Corps in Senegal.

The data shows:

- Increasing demand for food – compounded growth of both population and per capita consumption
- Threats to the food supply: some areas are seeing up to 2.5 degrees change already.
- **Increasing variability around the mean, it's not just an issue of averages. Timing and intensity of rain fall and heat are key as well.**
- Differences in vulnerability – low income countries have the lowest ability to cope with these extremes.
- **Models and data are showing changes in yields due to climate - more declines than previously thought.**
- Rising Food Prices – may persist
- Poverty remains a major driver of impacts on outcome, measured as % of family income spent on food: 63% in Niger, 6% in US, 15% in France.
- Productive crop areas are shrinking: Kenya's traditional bread basket crop areas are shrinking (FEWS NET).
- There's a growing production gap, between the population's need, and investment.
- **We'll need to increase production by about 70% (from 2006), not 50 or 60% to provide enough calories for 9.6M people by 2050.**

2:56

**MARC SADLER, Practice Leader for Agriculture, Environment, and Climate Change (Risk and Markets), World Bank**

Some of my slides are the same as Molly's – just reinforces the message.

Increasing Population times Changing Diets = demand Growth Squared

Climate Change Will Have Significant Impacts on Food Systems: In the Short term, Production shocks and volatility. Medium term: Production declines and Increasing Cost structure; Longer term: potential production collapses, tightening supply.

*Recent years have brought several periods of rapid food and cereal price increases following climate extremes in key producing regions. Several of these climate extremes were made more likely as the result of manmade climate change. – Intergovernmental Panel on Climate Change (IPCC), 2014.*

At the Same Time, Agriculture Also Contributes to the Problem: ~13% of direct total GHG emissions, plus ~11% through land use change.

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Lack of investment in past decades has brought us to Armageddon – Century of food and water (and soils and rainfall). Challenge of many lifetimes. Business as usual won't get us across the line.

Even industry gets that sustainable agriculture isn't about niche markets – it's about sustainability of the entire agri-business sector.

This is a global target, no company or organization can do it on own.

We're also the most affected/vulnerable sector, least able to adapt. And we're about 20 years behind other sectors who started adapting already.

Even in a 2 degree world, Tim Searchinger's work at WRI indicates that because other sectors are already reducing their emissions, if agriculture were to continue growing with business as usual (BAU) emissions, agriculture would account for 70% of global emissions by 2050, instead of ~24% now.

Malawi used to grow pigeon peas to export to India, then dahl (processed pigeon peas) – that's increasing the value kept in Malawi, and reducing its emissions intensity – good.

Huge protein gap. Developing countries want, need to consume more protein. Cambodia and Vietnam now produce more rice than they need, use to buy feed for livestock.

When Dr. Kim (World Bank President) saw our 4 Degrees report, he said "That's terrifying, but what are you going to do about it?"

**CSA = Sustainable agriculture + resilience – emissions.**

All sectors at bank are now using a climate lens – though still defining what it is.

Metrics and targets still under development, but could include:

- *By mid-2015 100% of agricultural projects will be subjected to the climate lens*
- *From 2016 all agricultural projects will create baselines for CSA at appraisal*
- *By 2030 x% of agricultural projects are fully climate-smart*

I guess having doctors running the show (at World Bank and USAID) helps focus on metrics and results

The Bank lends \$8-10B/yr in a \$5 trillion industry.

What will it take?

The **Alliance for Climate Smart Agriculture** is a global movement, bringing a diverse set of stakeholders together for action, with an array of tools for action, to increase food and nutritional security, enhance resilience, and reduce emissions intensity.

3:05

**JERRY GLOVER, Senior Sustainable Agricultural Systems Advisor, USAID**

I try to be a Systems Thinker. Where does that take you?

**Malawi – the Rhoda story.**

CSA is not just a practice or tool – it's a process. Rhoda got 3 bags of maize from her degraded hectare 20 years ago. Before the concept of climate change really hit the ground. Now she gets as much as 45 bags.

As I see it, **Sustainable intensification has three legs:**

1. **Genetic intensification** (of crops and livestock – improved varieties and breeds) – for drought- and heat- (+flood- + salt-) tolerance, pest & disease resistance, nutrient use efficiency,

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photosynthetic efficiency – carbon assimilation (C4 rice), perennializing major grain crops – this may only be months to fruition.

2. **Socio-economic intensification** – education, extension, enterprise diversification, market linkages, farmer organizations and field schools, innovation platforms. Rhoda focused as much on education as on food for her children – where real resilience will come from.
3. **Ecological intensification** – farming systems that include crops, livestock, shrubs and trees; nutrient cycling, fertilizer management, intercropping & rotations, more effective at capturing sunlight, rainwater; whole farm including cropped and non-cropped areas; above- and below-ground.

We are embedding these ideas into our research and development programs, gaining a better understanding of what's going on underground.

Soil profile – tree roots – leguminous (*Faidherbia*), bringing water and nutrients up from deeper in the soil than crops can do – it's an above- & below-ground system. Long process, inter-generational.

How did Rhoda do this? She is recipient of a USAID project by ICRAF and local extension services.

3:13

**DENNIS GARRITY**, United Nations Drylands Ambassador & former Executive Director of the World Agroforestry Centre)

**NEPAD meeting a few weeks ago** – CADDP, FARA/SROs, CCAFS, ICRAF, donors, 20 country representatives, “big 5” development INGOs (CARE, CRS, etc)

Looked at the urgency – Climate Change is already being felt in Africa.

What is CSA in African context, how to move forward?

**Global perspective: 3 equivalent objectives, triple win.**

**African perspective: mitigation is less important** – weight the three circles – so mitigation is smaller, often a co-benefit to the major concerns of production and resilience.

Provoked a challenge to the continent – 25by25: to reach 25M farmers [adopting at least one CSA practice by 2025.

Campaign being developed – CADDP mobilizing – presenting to African Heads of State Conference on Agriculture in June for approval. Measurable. 25M is about a quarter of the farmers in Africa.

Agroforestry and evergreen agriculture showed up as gold standard practices that achieve the *triple win* indicators for CSA. The “25by25 Campaign” could thus be an enormous boost to the up-scaling of agroforestry all-across the continent.

Choosing the appropriate actions

Farming systems of Africa: map of 16 agro-ecosystems

CG triple win statistics

Maize-mixed farming system chart as an example, rating different practices on production, resilience, and mitigation (methodology to rank/ prioritize practices)

Zambia picture – **Conservation Agriculture with *Faidherbia albida* (fertilizer-fodder-fuelwood trees)** in Zambia – putting trees in the cropping system is a major opportunity for triple win – building on what farmers already doing. 200,000 farmers.

Tanzania picture. *Faidherbia albida* has reverse phenology, so it is not competing with crops for light.

Also *Gliricidia* (fast-growing, nitrogen-fixing, fodder shrub from South America) – Africans leading the way in adoption.

**Farmer Managed Natural Regeneration** (of *Faidherbia* trees, not by planting) by 1.2 Million farmers, over 5M hectares in sorghum-millet fields in Niger, yielding crop gains plus livestock increases.

World Bank and USAID are now embedding FMNR into Sahel-wide- FMNR approach to the Great Green Wall rather than a narrow band of tree planting.

African Agriculture Ministers issued CSA Call to Action 2 years ago –  
Now 17 countries are scaling up Evergreen Agriculture in Africa (4 forms: FMNR, Conservation Agriculture With Trees, Trees interplanted in conventional tilled cropland, FMNR+ Trees interplanted in conventional tilled cropland)

**Accelerate the ongoing national scaling-up programs** in Malawi, Zambia, Burkina Faso and Niger  
**National Agroforestry Food Security Programs are being developed** for India, Senegal, Ethiopia, Rwanda, and Kenya

**Preparatory work for new programs** under way in Tanzania, Mali, and 12 other countries

**National policy commitments** in Kenya – targeting >10% tree cover on agricultural land;

Ethiopia – National *Faidherbia albida* program targeting 100 million *Faidherbia* trees on agricultural lands.

#### **Evergreen Agriculture Partnership:**

International and regional development organizations (Worldvision is one of our most important partners, we are also speaking to the Catholic Relief Service among others), Donors, Governments and Policy, International and Regional Research organisations, Farmers and agricultural groups, Private Sector, Education, Youth, Civil Society. More support needed.

Millions of smallholders are adopting land regeneration methods.

The African CSA Alliance is a great platform for reaching 25 million farmers with EverGreen Agriculture in the coming decade.

#### **Discussion:**

##### 1) Haitian (couldn't hear name)

– How to deal with problem (solution) of **intercropping** in monocrop agriculture?

>Jerry Glover responds: many farmers have limited land (<1 ha), so they can't afford to do rotations – need to grow maize every year. So they started intercropping with pigeon peas and groundnuts to restore soil, then add *Faidherbia* – get 15 (and up to 45) bags of maize from plot.

##### 2) Todd Crosby, Senegal Yaajende project Chief of Party

-How can we reconcile an emphasis on technologies and private sector/industry with a **new type of agriculture that is process-, long-term oriented** (and not big profit approach for the private sector)?

>Dennis Garrity: need an accommodation for trees, and to adapt mechanized harvest systems. This is an important research issue.

>Marc Sadler: managing volatility in near term, but cost-structures in medium term – emerging equity markets are looking for areas of investment, to maintain yields while managing new risks.

##### 3) PV Sundareshwar, USAID/AFR

– What about **post-harvest losses**?

>Molly Brown: USDA report – this is very important both on- and after-farm in US – reducing losses can help us meet demand.

### **3. Additional notes, resources cited, or important issues raised.**

*Evergreen Agriculture* website [www.evergreenagriculture.net](http://www.evergreenagriculture.net)

The CGIAR Research Program on *Climate Change, Agriculture, and Food Security* (CAAFS) is playing a major role in both the Global and the African Alliances for Climate-Smart Agriculture: <http://ccafs.cgiar.org>

*World Agroforestry Centre* [www.worldagroforestry.org](http://www.worldagroforestry.org)

*USG Interagency Working Group on Climate Smart Agriculture in International Development:* <http://rmportal.net/groups/csa>

**FMNR in Niger video:** <http://rmportal.net/news/news-usaid-nrmd-video-spotlight/a-good-news-story-for-a-deforested-and-degraded-world-farmer-managed-natural-regeneration>

**FMNR in Burkina Faso video:** <http://rmportal.net/news/news-usaid-nrmd-video-spotlight/burkina-faso-farmers-food-security-climate-change-resilience>

**Yajeende project video**– conservation agriculture and bioreclamation of degraded lands in Senegal and Niger <http://rmportal.net/news/news-usaid-nrmd-video-spotlight/yajeende-conservation-agriculture>