Session 3

Adaptation, Mitigation, and Disaster Risk Reduction Concepts, Methods, and Resources in the Context of Climate Smart Agriculture

Adaptación, mitigación y reducción del riesgo de desastres: Conceptos, métodos y recursos en el contexto del agricultura climáticamente inteligente

Charles Hernick

This presentation was produced for review by the United States Agency for International Development by The Cadmus Group, Inc. through the E3 Global Environmental Management Support II (GEMS II) Contract.

DÍA 1

Session 1. Global Climate Change (GCC): A common framework and impacts on the LAC region and Honduras	Christine Pendzich, USAID/LAC
Session 2. Overview of USAID Feed the Future program and other relevant projects in the region	Moffatt Ngugi, USAID/BFS Victor Bullen, USAID/LAC
Session 3. Adaptation, Mitigation, and Disaster Risk Reduction (DRR) measures in the context of CSA	**Charles Hernick, Cadmus**
Session 4.Participatory discussion on Climate-Smart Agriculture (CSA) - Food Security, Agriculture and GCC	Michael Colby, USAID/BFS Victor Bullen, USAID/LAC Becky Chacko, USAID/E3 Christine Pendzich, USAID/LAC Ivanna Vejarano, Zamorano
Session 5. Value-Chain Linkages in the context of CSA	Moffatt Ngugi, USAID/BFS
Session 6. Outcomes from Best Agricultural Management Practices Workshop in the DR	Scott Solberg, SMTN Pilar Ramirez, REDDOM
Session 7. Overview of Field Visits and Group Exercises for the week	Scott Solberg, SMTN

OVERVIEW

- Definitions
- Climate Smart Agriculture
  - Defining Best Management Practices
  - Knowledge capture in this workshop
- Adaptation and Disaster Risk Reduction
  - Context: Vulnerability, Sensitivity, and Exposure
  - Methods
- Mitigation
  - Context
  - General Methods
  - Example: Coffee
- Tools and Resources

RESUMEN

- Definiciones
- Agricultura Climáticamente Inteligente
  - Definiendo Mejores Prácticas de Manejo
  - Captura del conocimiento en este taller
- Adaptación y Reducción del Riesgo de Desastres
  - Contexto: la vulnerabilidad, sensibilidad y exposición
  - Métodos / Respuestas
- Mitigación
  - Contexto
  - Métodos generales
  - Ejemplo: Café
- Herramientas y Recursos

DEFINITIONS

- **Climate-Smart Agriculture**. Aims to improve productivity, nutrition, and incomes, adapt and build resilience to climate change, and reduce/ remove greenhouse gas emissions, where appropriate

- **Adaptation**. Adjustment to actual or expected climate and its effects
  - Human systems. Moderate harm or exploit beneficial opportunities
  - Natural systems: Human intervention may facilitate adjustment to expected climate and its effects

DEFINICIONES

- **Agricultura Climáticamente Inteligente**. El objetivo es mejorar la productividad, nutrición y los ingresos, adaptar y desarrollar la resiliencia al cambio climático y reducir / eliminar las emisiones de gases de efecto invernadero, en su caso

- **Adaptación**. Ajuste al clima actual o esperada y sus efectos
  - Sistemas humanos. Reducir los daños o explotar oportunidades beneficiosas
  - Sistemas naturales: La intervención humana puede facilitar la adaptación al clima esperado y sus efectos

DEFINITIONS

- **Mitigation**. Human intervention to reduce sources or enhance sinks of GHGs or other substances which may contribute directly or indirectly to climate change
- **Disaster Risk Reduction**. The policy goal and the measures for:
  - Anticipating future disaster risk
  - Reducing existing exposure, hazard, or vulnerability; and
  - Improving resilience
- **Resilience.** The ability of people, households, communities, countries, and systems (social, economic, and ecological) to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth

DEFINICIONES

- **Mitigación**. La intervención humana para reducir las fuentes o mejorar los sumideros de GEI y otras sustancias que pueden contribuir al cambio climático
- **Reducción del Riesgo de Desastres**. El objetivo de la política y las medidas para:
  - Anticipar el riesgo de desastres
  - La reducción de la exposición, peligro o vulnerabilidad existente; y
  - Mejorar la resiliencia
- **Resiliencia**. La capacidad de las personas, los hogares, las comunidades, los países y los sistemas (sociales, económicos y ecológicos) para mitigar, adaptar a, y recuperarse de las crisis y tensiones de una manera que reduce la vulnerabilidad crónica y facilita el crecimiento inclusivo

Photo credit: http://eecampaign.files.wordpress.com/2009/10/1685_elguabo_transport.jpg

AGRICULTURA CLIMÁTICAMENTE INTELIGENTE

- 3 Wins
  - Improve productivity, nutrition, and incomes
  - Adapt and build resilience to climate change
  - Reducing and/or removing greenhouse gas emissions, where appropriate

- 3 Logros
  - Mejorar la productividad, la nutrición y los ingresos
  - Adaptar y aumentar la resiliencia al cambio climático
  - Reducir / eliminar las emisiones de gases de efecto invernadero en su caso

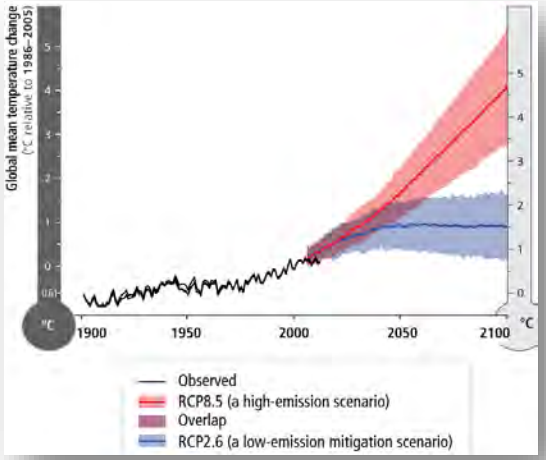
AGRICULTURA CLIMÁTICAMENTE INTELIGENTE

- **It is NOT** a single specific agricultural technology or practice that can be universally applied, or a single endpoint

- **It is** an approach to developing the technical, policy and investment conditions to achieve sustainable agricultural development
  - It is a strategy
  - Site-specific
  - Continuous process

- **No es** una sola tecnología específica agrícola o una práctica que se puede aplicar universalmente, o un solo punto final

- **Es** un enfoque para el desarrollo de las condiciones políticas, técnicas e inversiones para lograr el desarrollo de la agricultura sostenible
  - Es una dirección
  - Sitio específico
  - Proceso continuo que evolucionará con el tiempo y con cambios de clima

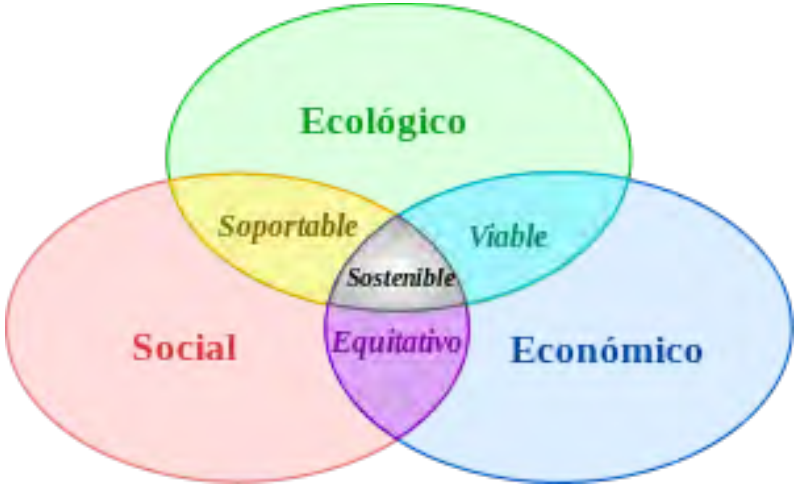


GENERAL APPROACH

ENFOQUE GENERAL

- Recognizes **different country-specific contexts**

- Reconoce **diversas contextos en cada país**



- Identifies **barriers** to adoption

- Identifica las **barreras** a la adopción

- **Aligns policies and financial investments**

- **Alinea las políticas y las inversiones financieras**

GENERAL APPROACH

- Improves **access** to resources
- Addresses **adaptation** and builds resilience to shocks
- Considers opportunities for climate change **mitigation** as a co-benefit

ENFOQUE GENERAL

- Mejora el **acceso** a recursos
  - Servicios y mejores practicas
  - Recursos genéticos (planta y semilla)
  - Productos y mercados financieros
- Se dirige a **adaptación** y construye resistencia a las crisis
- Considera oportunidades para la **mitigación** del cambio climático como un co-beneficio

MEJORES PRÁCTICAS DE MANEJO PARA ACI

- Best practices include:
  - Adaptation measures
    - DRR measures
  - Mitigation measures
  - Policy interventions
  - Strategies for leveraging financing

… we will identify many in this workshop!

- Mejores prácticas incluyen:
  - Medidas de adaptación
    - Medidas de RRD
  - Medidas de mitigación
  - Intervenciones de política
  - Estrategias para aprovechar la financiación

... vamos a identificar muchos en este taller!

MEDIDAS DE ADAPTACIÓN Y MITIGACIÓN

Impact to Agricultural Production, Value Chain or Food Security System to be addressed (please note the change in climatic conditions that will cause this impact)	**Best Practice**	**Adaptation Measure?** How does it: • reduce exposure? • reduce sensitivity? • increase adaptive capacity? • promote positive impacts of climate change?	**Mitigation Measure?** How does it: • reduce or prevent emissions? • increase sequestration? • substitute for fossil fuels?	**Applicability**			**Challenges, Barriers or trade-offs** to consider, if applicable	**Solutions** *Identify possible solutions to challenges or barriers*
				Stage in Value Chain / Food Security System or Policy Intervention? Financing?	If landscape or ecosystem specific, specify which ones	If crop-specific, specify crops		
Flooding; waterlogging (caused by increased rainfall)	*e.g., Develop drainage system or spillways*	*Reduces likelihood of flooding in agricultural production areas during extreme rainfall events*	*Can reduce nitrous oxide emissions (GHG) by reducing waterlogging*	*On-farm production*	*Only areas exposed to flooding*	*Crops that are not flood-tolerant*	*Downstream impacts of drainage*	*A specific technical evaluation, including an environmental impact assessment process, should be conducted to design an effective drainage system that avoids adverse downstream impacts*
Flooding; fluvial erosion (caused by increased rainfall)	*e.g. Select road routes and design to avoid exposure and vulnerability to flooding*	*Reduces likelihood that market linkages will be blocked*	*Reduces risk of commodity spoiling due to blacked access to market and storage options*	*Transport*	*Ecosystems with flood risk*	*NA*	*Flood resistant road design may cost more or be more difficult for local management; permanent roads can increase deforestation and other impacts that contribute to climate change*	*A specific technical evaluation, including an environmental impact assessment process, should be conducted to design an effective road network that avoids adverse environmental impacts*
Yield loss post-harvest	*e.g., Reduce spillage, damage and degradation during harvest, processing and transport*	*Reduces exposure to food insecurity*	*Increases productivity per unit area, reducing the need for expanding the agricultural frontier to meet production targets*	*Harvest and post-harvest handling, processing and transport*	*NA*	*Most relevant to crops prone to losses and inefficiencies during harvest*	*May require new technologies or trainings. Could conflict with cultural practices / gender norms*	*Conduct an evaluation of local agricultural system to identify culturally appropriate practices and sustainable technologies*
Agricultural production does not match demand, causing waste	*e.g. Conduct study of market demand*	*Reduces exposure to food insecurity*	*Most efficiently uses land under production (thereby minimizing emissions) by ensuring*	*Governance/Design of Agricultural Development/F*	*NA*	*NA*	*Recommendations may adversely affect cultural and gender norms*	*Study should also consider non-economic forces, such as cultural preferences, gender norms, etc.*

Ejemplos

Impact to Agricultural Production, Value Chain or Food Security System to be addressed (please note the change in climatic conditions that will cause this impact)	Best Practice	Adaptation Measure? How does it: • reduce exposure? • reduce sensitivity? • increase adaptive capacity? • promote positive impacts of climate change?	Mitigation Measure? How does it: • reduce or prevent emissions? • increase sequestration? • substitute for fossil fuels?	Applicability		
				Stage in Value Chain / Food Security System *or* Policy Intervention? Financing?	If landscape or ecosystem specific, specify which ones	If crop-specific, specify crops
				On-farm production		
				Policy		

- Medidas de adaptación o mitigación
- Estrategias políticas? de financiamiento?

ADAPTACIÓN Y REDUCCIÓN DEL RIESGO DE DESASTRES

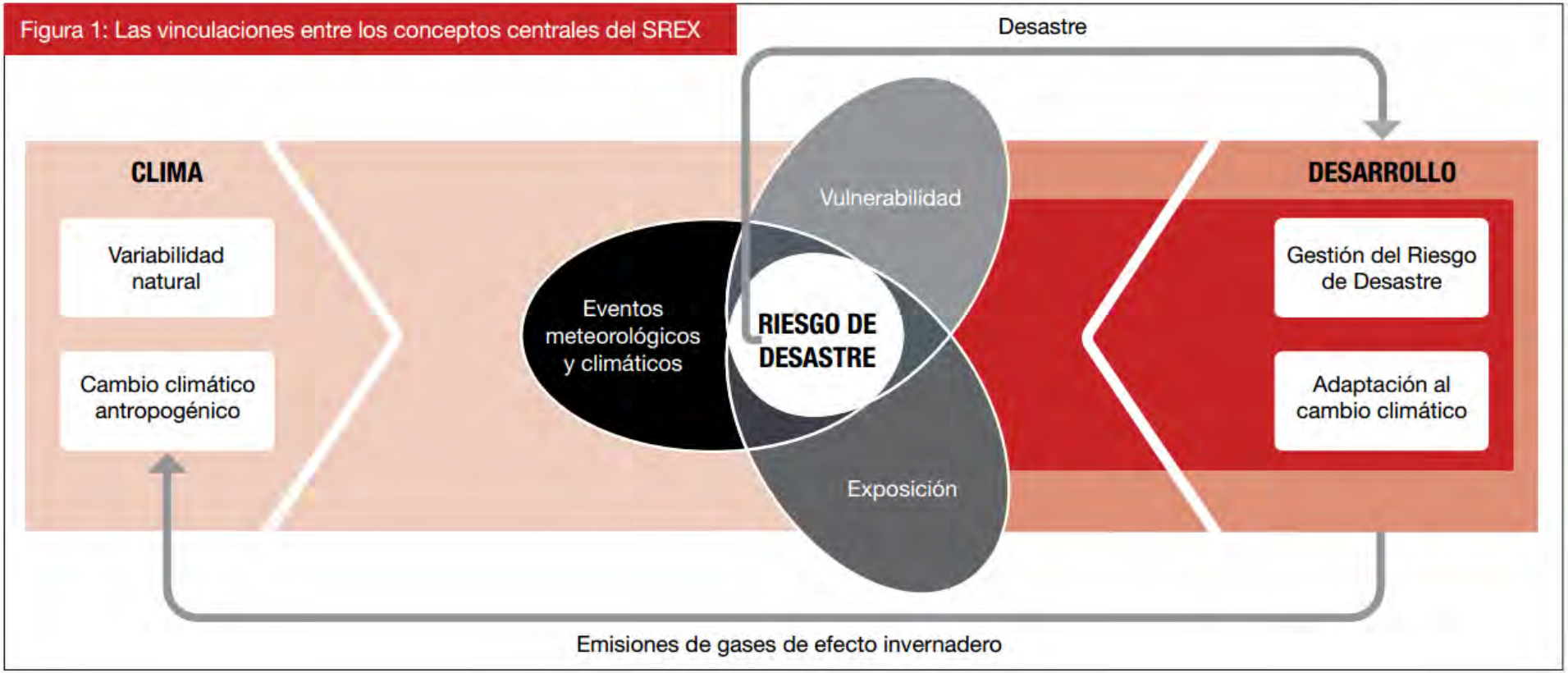
Photo credit: Joe Torres

ADAPTACIÓN Y REDUCCIÓN DEL RIESGO DE DESASTRES

- Climate change **adaptation** focuses on:
  - Impacts already being experienced, especially increased **variability**
  - Long-term changes, both detrimental and beneficial
- **DRR** focuses on responding to acute hazards
  - Especially those exacerbated by climate change
  - Unpredictable climate change impacts (i.e., extreme events)
- Example:
  - Shifting rainy seasons (long-term change)
  - More flash floods (hazard that could lead to a disaster)

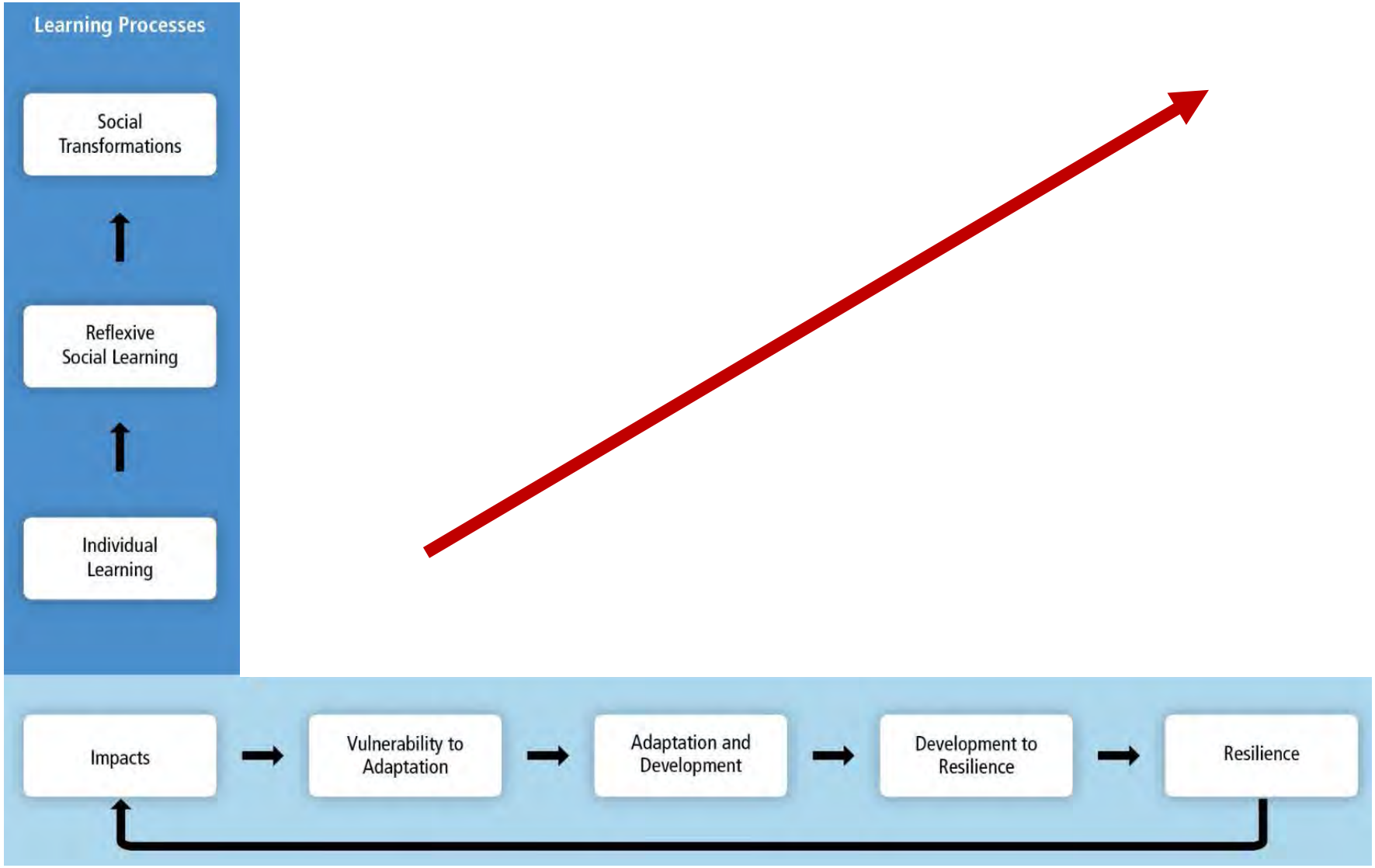
- La **adaptación** al cambio climático se centra en:
  - Los impactos ya se están experimentando, especialmente el aumento de la **variabilidad**
  - Cambios largo plazo, negativo y beneficiosos
- **RRD** se centra en responder a los peligros agudos
  - Especialmente esos exacerbada por el cambio climático
  - Impredecible impactos climático
- Ejemplo:
  - Desplazamiento de estaciones de lluvias (cambiar a largo plazo)
  - Más inundaciones repentinas (peligro que podría llevar a un desastre)

ADAPTACIÓN Y RRD



IPCC, 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation . http://ipcc-wg2.gov/SREX/report/report-graphics/ch5-figures/

ADAPTACIÓN CON EL TIEMPO - CÓMO FUNCIONA



IPCC, 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation . http://ipcc-wg2.gov/SREX/report/report-graphics/ch5-figures/

ADAPTACIÓN CON EL TIEMPO - MÉTODOS Y RESPUESTAS

- Adaptation needs to be informed by an understanding of vulnerability
  - Past experience
  - Predictive modeling

- La adaptación tiene que ser informado por un entendimiento de la vulnerabilidad
  - La experiencia del pasado
  - Modelado predictivo

VULNERABILIDAD Y ADAPTACIÓN

- **Vulnerability** is the degree to which something can be harmed by or cope with stressors such as those caused by climate change

- Function of:
  - Exposure
  - Sensitivity
  - Adaptive capacity

- La **vulnerabilidad** es el grado en que algo puede ser dañado por o afrontar los factores de estrés tales como las causadas por el cambio climático

- Función de:
  - Exposición
  - Sensibilidad
  - Capacidad de adaptación

EVALUACIONES DE VULNERABILIDAD DEBEN CUBRIR

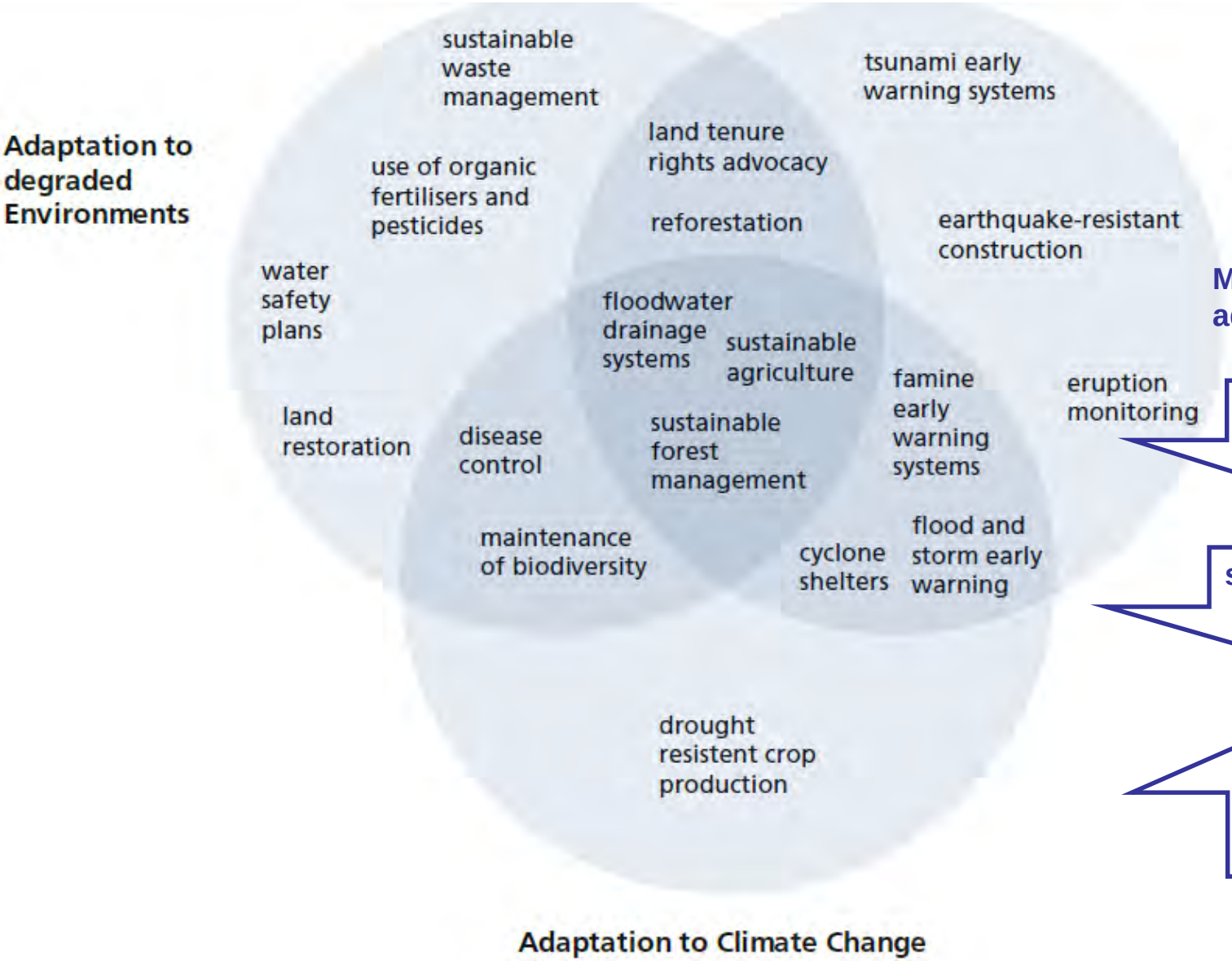
- **Exposure**: the extent to which something is subject to a stressor
- **Sensitivity**: extent to which something will change if it is exposed to a stressor
- **Adaptive capacity:** the combination of:
  - strengths
  - attributes
  - resources

  That are available to reduce adverse impacts, moderate harm, or exploit beneficial opportunities

- La **exposición**: la medida en que algo está sujeta a un factor de estrés
- La **sensibilidad**: la medida en que algo va a cambiar si se expone a un factor estresante
- La **capacidad de adaptación:** la combinación de:
  - fortalezas,
  - atributos
  - recursos

  Que son disponibles para reducir los impactos adversos, daño moderado, o explotar oportunidades beneficiosas

EJEMPLOS DE MEDIDAS DE ADAPTACIÓN Y DE LA RRD



Medidas de adaptación:

exposición

sensibilidad

Capacidad de adaptación

CEDRIG, 2012. http://www.sdc-drr.net/system/files/CEDRIG_Part_I_Aim_Concept_and_Support_Material_EN_Web.pdf

ADAPTACIÓN Y RRD: MUCHOS RECURSOS

A.3.1
A typology or major agricultural systems at risk and response options

Major agricultural systems	Sub-system and location	Vulnerability			Typical response options
		Main climate change exposure	Sensitivity	Adaptive capacity	
Highlands	Densely populated highlands in poor areas: Himalayas, Andes, Central American highlands, Rift Valley, Ethiopian plateau, Southern Africa	Rainfall variability, droughts, floods	High: mostly rainfed agriculture, marginal lands, poor soil moisture capacity	Low: high prevalence of poverty, limited options, knowledge, social safety nets and resources	Watershed management and on-farm water storage for water conservation; integrated water resources management in river basins; investment in social infrastructures
Semi-arid tropics	Smallholder farming in Western, Eastern and Southern Africa savannah region and in Southern India; agro-pastoral systems in the Sahel, Horn of Africa and Western India	High temperatures, rainfall variability, droughts	High: crop and animal sensitivity to high temperature and droughts, high population density on marginal lands	Low: high prevalence of poverty, limited options, knowledge, social safety nets and resources, limited capacity for water storage	On-farm water storage; crop insurance; increased productivity through better crop-livestock integration; integrated water resources management
Sub-tropics	Densely populated and intensively cultivated areas, concentrated mainly around the Mediterranean basin	Reduction in annual rainfall, increased rainfall variability, reduction in runoff and aquifer recharge, high temperatures, higher occurrance of droughts and floods	Variable, depending on the region and level on reliance on agricultural activities. Agricultural systems highly sensitive to changes in temperature and water availability.	Low adaptive capacity for agric scarc	Water conservation where possible:
Temperate areas	Highly intensive agriculture in Western Europe. Intensive farming in United States, Eastern China, Turkey, New Zealand, parts of India, Southern Africa, Brazil	Increased rainfall variability, reduced water availability in places.	Medium to low. Some high yielding varieties more sensitive to temperature and water stress	Possi comp stras supp irriga regio in wa	
Rice-based systems (irrigated)	Southeast and Eastern Asia, Sub-Saharan Africa, Madagascar, Western Africa, Eastern Africa	Increased rainfall variability, increased rainfall, increased occurrence of droughts and floods	Medium, depending on the capacity to cope with floods and droughts	Medi on the invest against and floods	

Best Practice (increases productivity/ income)	For adaptation measure, how does it: -reduce exposure? -reduce sensitivity? -increase adaptive capacity? (in terms of the impacts from previous matrices)	For mitigation measure, how does it: -reduce or prevent emissions? -increase sequestration? -substitute for fossil fuels? (in terms of the impacts from previous matrices)	Applicability		Barriers or trade-off to consider, if applicable
			If landscape or ecosystem specific, specify which ones	If crop-specific, specify crops	
e.g., Planted wind breaks	Reduces tree exposure to strong winds	N/A - limited	....	Banana, Coffee, etc.	...
e.g., No till	Increased water availability. Reduces sensitivity to nutrient depletion and for second and alternate wet-dry rice	Terrestrial/soil sequestration		Annual plants only	

RECURSOS DE USAID PARA ADAPTACIÓN

USAID
FROM THE AMERICAN PEOPLE

PERU
CLIMATE VULNERABILITY PROFILE

INTRODUCTION

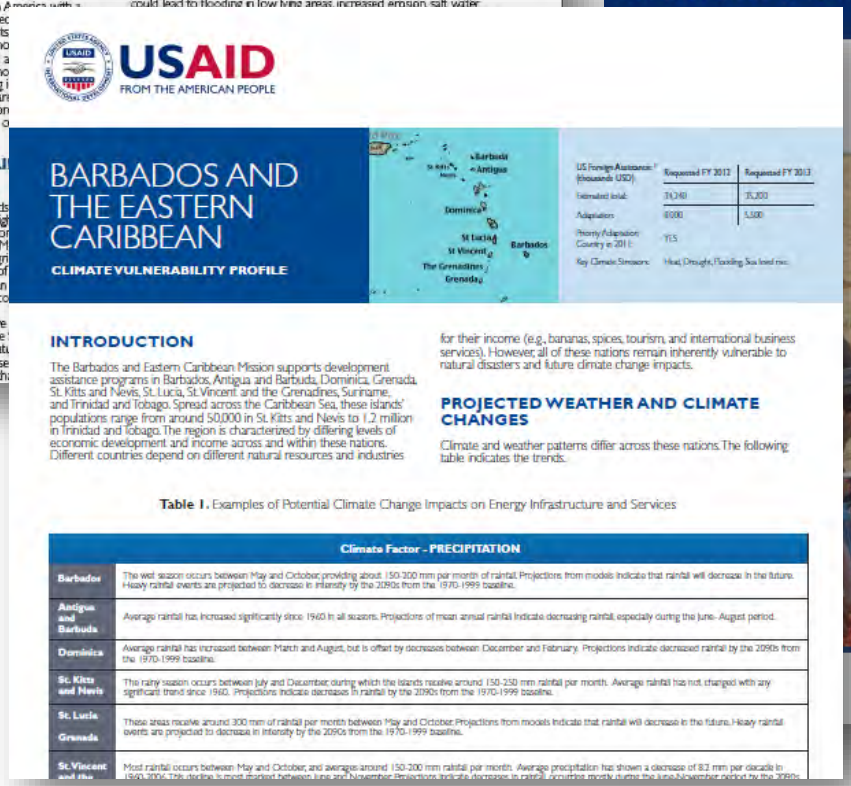
Peru is a large country on the western coast of South A
population of over 29 million people. Despite recent ec
Peru faces challenges to reduce poverty and protect its
resources. Peru also has significant income disparity: mo
of the population lives on less than US$2 per day and a
on less than US$1 per day. Poverty is even more prono
with approximately 60 percent of rural residents living i
mining, coca production, deforestation, and poaching an
that development projects seek to minimize. USAID pr
largely focused on providing economic alternatives to c

PROJECTED WEATHER AND CLI
CHANGES

Peru has three distinct climates: desert coastal lowlands
Ocean, the Andes Mountain range, and the Andean hig
coastal lowlands are the location of the country's major
of the mechanized agriculture. To the east, the Andes M
north-south through Peru. In the Andean highlands, agr
and dependent on precipitation cycles. Sixty percent of
east of the Andes and falls within the Amazon Basin, an
where illegal logging, poaching, and deforestation are co

TEMPERATURE: Observed temperatures in Peru have
increasing over the past few decades. According to the
Communication, since 1960, on average, high temperat
0.2°C per decade. This was accompanied by a decrease
nights with freezing temperatures. The SNC projects th

SEA LEVEL RISE: Precise sea level rise projections for the Peruvian coast
are not available. However, the CCKP states that sea level rise by 2050
could lead to flooding in low lying areas, increased erosion, salt water



USAID
FROM THE AMERICAN PEOPLE

BARBADOS AND THE EASTERN CARIBBEAN
CLIMATE VULNERABILITY PROFILE

US Foreign Assistance (thousands USD)	Requested FY 2012	Requested FY 2013
Estimated total	39,240	35,800
Adaptation	6000	5,500
Priority Adaptation Country in 2011	YES	
Key Climate Stressors	Heat, Drought, Flooding, Sea level rise	

INTRODUCTION

The Barbados and Eastern Caribbean Mission supports development assistance programs in Barbados, Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago. Spread across the Caribbean Sea, these islands' populations range from around 50,000 in St. Kitts and Nevis to 1.2 million in Trinidad and Tobago. The region is characterized by differing levels of economic development and income across and within these nations. Different countries depend on different natural resources and industries for their income (e.g., bananas, spices, tourism, and international business services). However, all of these nations remain inherently vulnerable to natural disasters and future climate change impacts.

PROJECTED WEATHER AND CLIMATE CHANGES

Climate and weather patterns differ across these nations. The following table indicates the trends.

Table 1. Examples of Potential Climate Change Impacts on Energy Infrastructure and Services

	Climate Factor - PRECIPITATION
Barbados	The wet season occurs between May and October, providing about 150-300 mm per month of rainfall. Projections from models indicate that rainfall will decrease in the future. Heavy rainfall events are projected to decrease in intensity by the 2090s from the 1970-1999 baseline.
Antigua and Barbuda	Average rainfall has increased significantly since 1960 in all seasons. Projections of mean annual rainfall indicate decreasing rainfall, especially during the June- August period.
Dominica	Average rainfall has increased between March and August, but is offset by decreases between December and February. Projections indicate decreased rainfall by the 2090s from the 1970-1999 baseline.
St. Kitts and Nevis	The rainy season occurs between July and December, during which the islands receive around 150-250 mm rainfall per month. Average rainfall has not changed with any significant trend since 1960. Projections indicate decreases in rainfall by the 2090s from the 1970-1999 baseline.
St. Lucia Grenada	These areas receive around 300 mm of rainfall per month between May and October. Projections from models indicate that rainfall will decrease in the future. Heavy rainfall events are projected to decrease in intensity by the 2090s from the 1970-1999 baseline.
St. Vincent and the	Most rainfall occurs between May and October, and averages around 150-200 mm rainfall per month. Average precipitation has shown a decrease of 8.3 mm per decade in 1960-2006. This decline is most marked between June and November. Projections indicate decrease in rainfall, particularly mostly during the June-November period by the 2090s

USAID
FROM THE AMERICAN PEOPLE

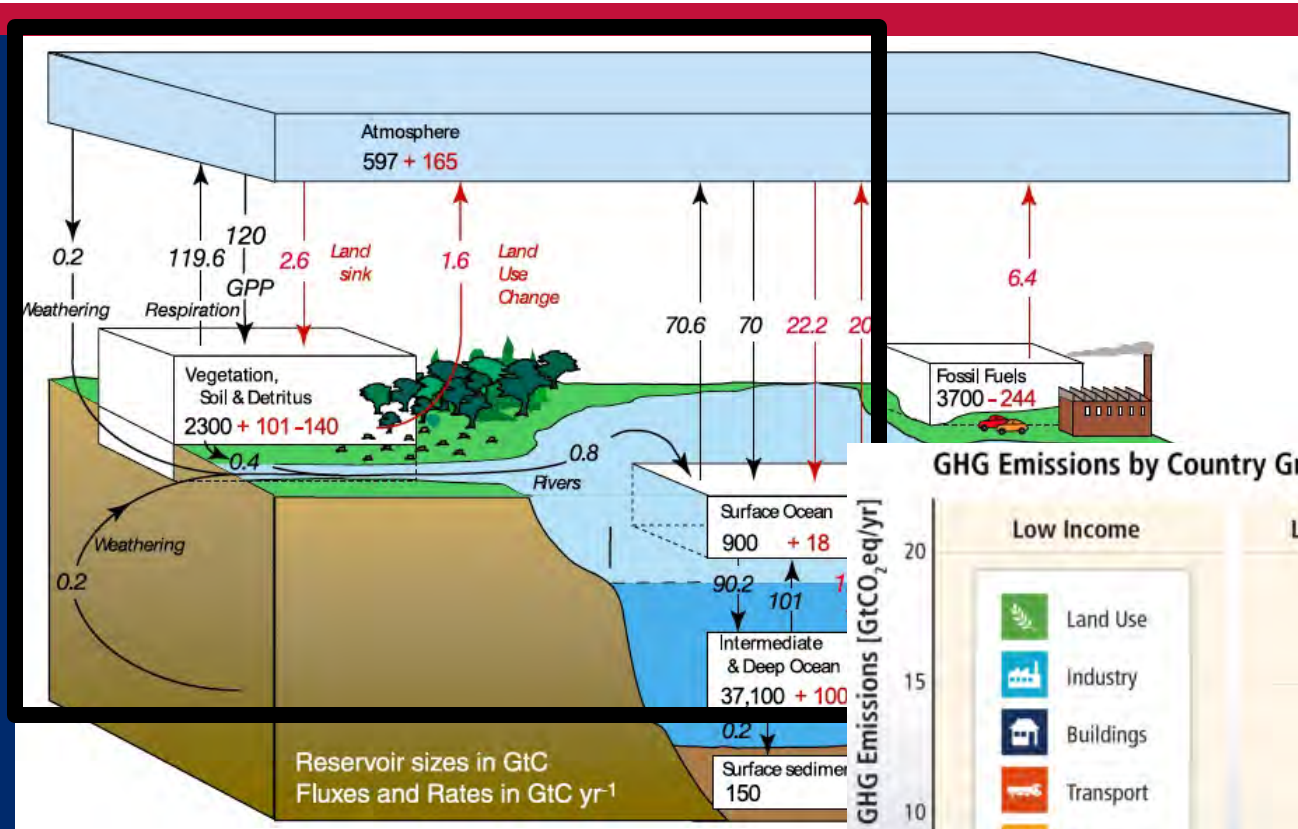
CLIMATE-RESILIENT DEVELOPMENT

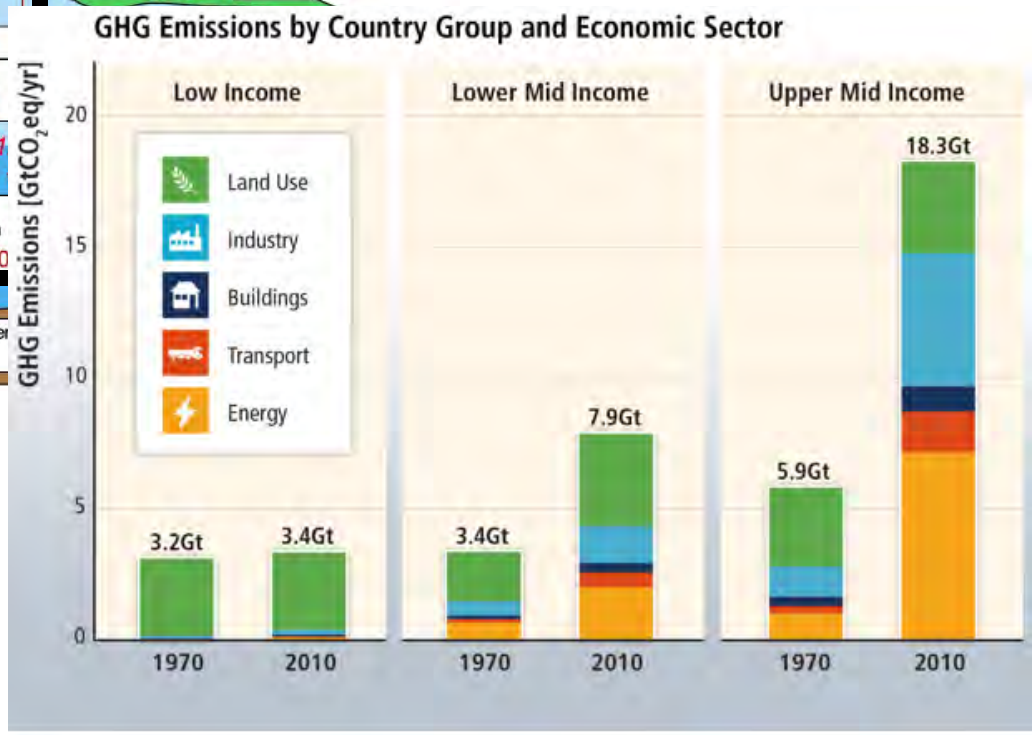
A FRAMEWORK FOR UNDERSTANDING AND ADDRESSING CLIMATE CHANGE

MITIGACIÓN

Photo credit: Joe Torres

EMISIONES Y CAPTURA DE CARBONO TERRESTRE



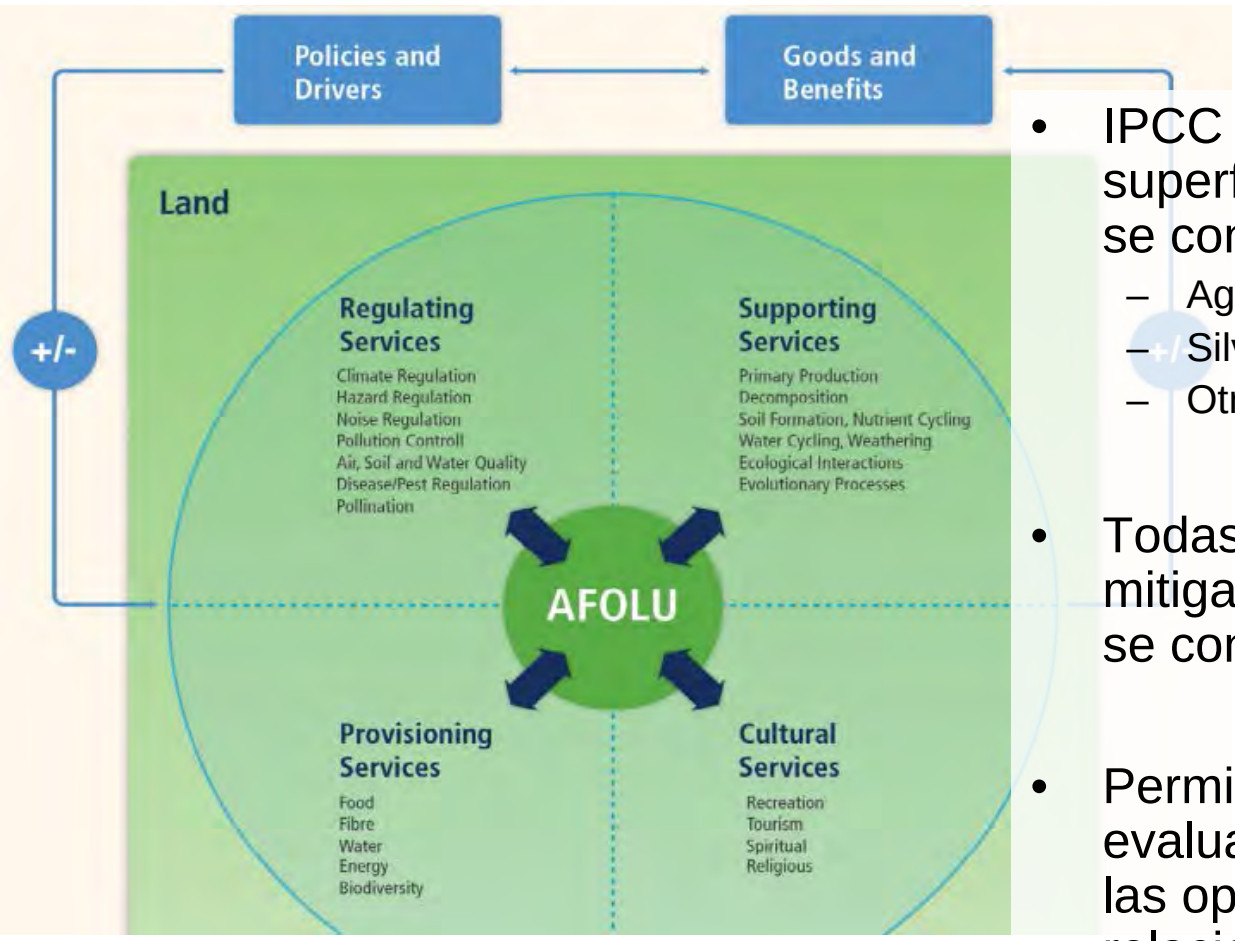


La expansión agrícola es una de las principales causas de la deforestación
(emisiones de cambio de uso de la tierra)

IPCC Fourth Assessment Report: Climate Change 2007.
http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html

Working Group III contribution to the IPCC Fifth Assessment Report

SERVICIOS AMBIENTALES Y LA AGRICULTURA



- IPCC Quinto Informe: La superficie terrestre de la tierra se considera en conjunto
  - Agricultura
  - Silvicultura
  - Otro uso de la tierra
- Todas las opciones de mitigación realizadas en tierra se consideran en conjunto
- Permite la consideración de evaluaciones sistémicas entre las opciones de mitigación relacionadas con el uso del suelo agrícola

IPCC WGIII AR5. Chapter 11: Agriculture, Forestry and Other Land Use (AFOLU). http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter11.pdf

MITIGACIÓN: MÉTODOS

- **Reducing/preventing emissions**
- **Sequestering carbon** in terrestrial reservoirs
  - Above ground
  - Below ground (improves soil fertility)

- La **reducción y prevención de las emisiones**
- El **secuestro de carbono** en los reservorios terrestres
  - En la tierra
  - Debajo del suelo (mejora la fertilidad del suelo)

MITIGACIÓN

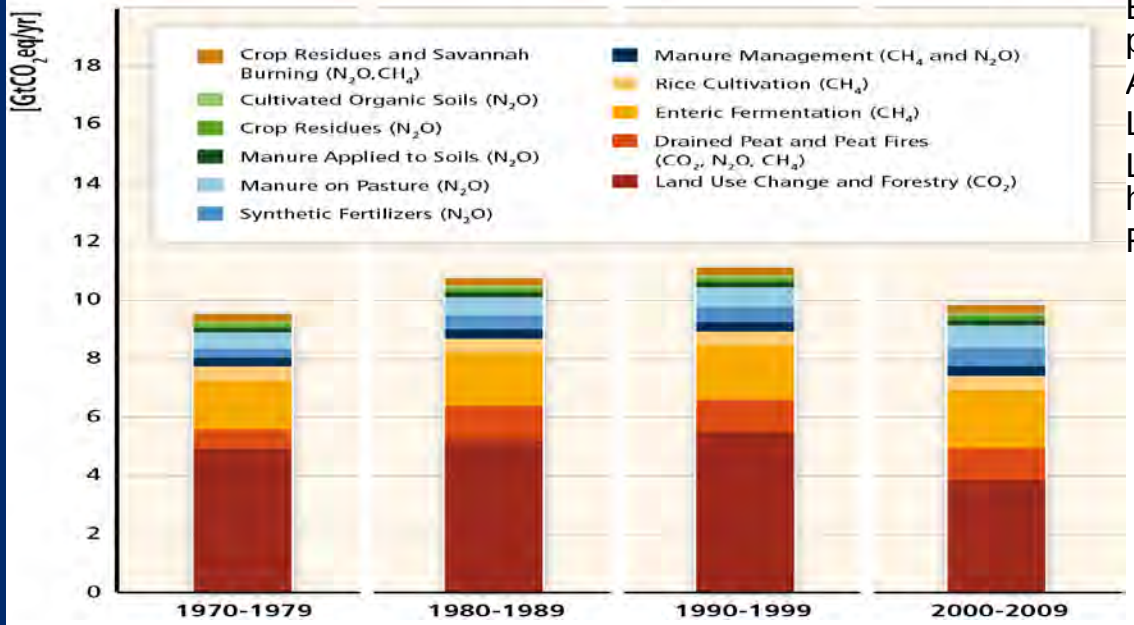
- Reporting on mitigation involves:
  - Baseline conditions
  - Implementing mitigation measures
  - Monitoring emissions/ sequestration
  - Reporting change compared to the baseline
- Carbon markets
  - Offset credits can finance mitigation
  - Requires reporting and capacity

- Presentación de informes sobre la mitigación implica:
  - Una línea base de las condiciones
  - La implementación de medidas de mitigación
  - Las emisiones de Monitoreo / secuestro
  - Informes cambio en comparación con la línea de base
- Los mercados de carbono
  - Créditos de compensación pueden financiar la mitigación
  - Requieren la presentación de informes y capacidad

ESTIMACIÓN DE LA LÍNEA DE BASE … ES BUENA PRACTICA

- Estimating emissions or sequestration builds capacity
  - May be critical to leveraging mitigation-oriented finance
  - Precision is important if seeking credits in carbon markets (e.g., voluntary, EU ETS, California)
- Significant mitigation opportunities in agriculture

- La estimación de las emisiones o el secuestro construye capacidad
  - Puede ser fundamental para el aprovechamiento de la financiación orientada a la mitigación
  - La precisión es importante si la búsqueda de créditos en los mercados de carbono (por ejemplo, voluntaria, ETS de la UE, California)
- Grandes oportunidades de mitigación en la agricultura
  - La eficiencia del agua y fertilizantes
  - Eficiencia, ganadería y manejo del pastoreo
  - Agro-silvicultura y legumbres
  - La agricultura de conservación
  - La gestión integrada de las cuencas hidrográficas
  - Rango y restauración de los bosques

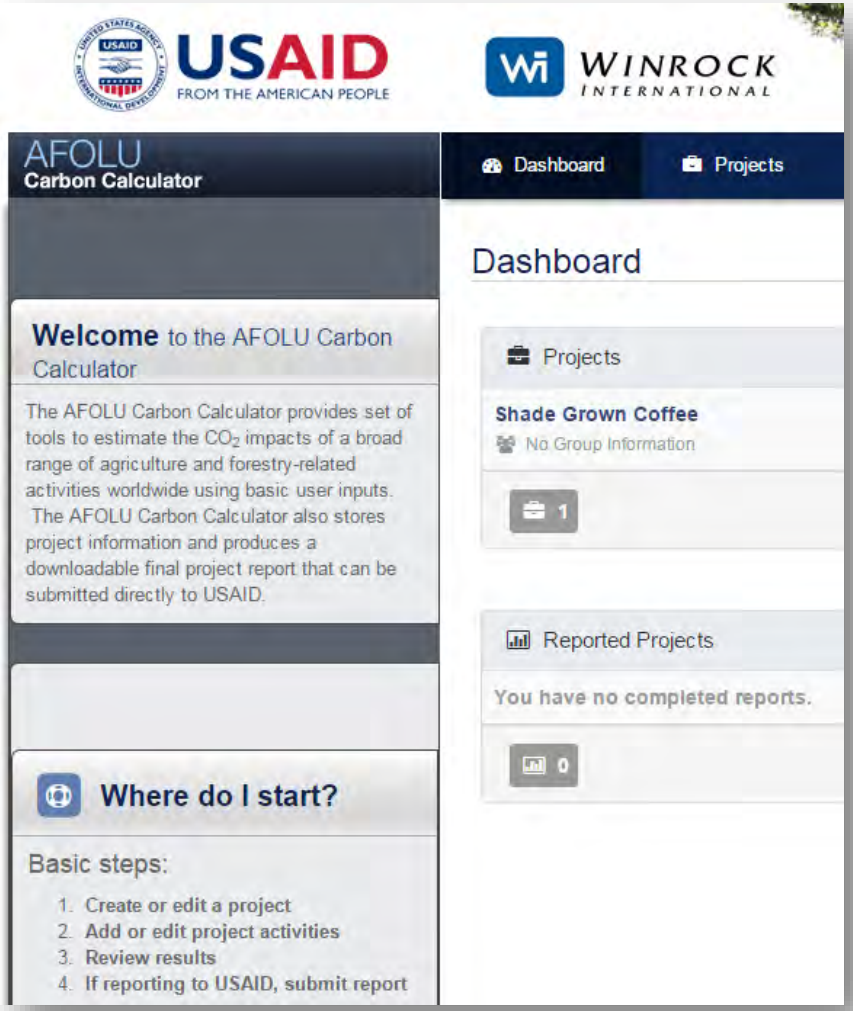


IPCC: http://mitigation2014.org/report/figures/chapter-11-figures

RECURSOS PARA MITIGACIÓN

- USAID projects with mitigation co-benefits can estimate and report using the AFOLU tool for:
  - Cropland Management
  - Grassland Management
  - Agroforestry

- Proyectos USAID con los co-beneficios de mitigación pueden estimar y hacer un informe utilizando la herramienta de AFOLU para:
  - Gestión de tierras agrícolas
  - Gestión de pastizales
  - Agroforestería



MEDIDAS DE MITIGACIÓN: MUCHOS RECURSOS

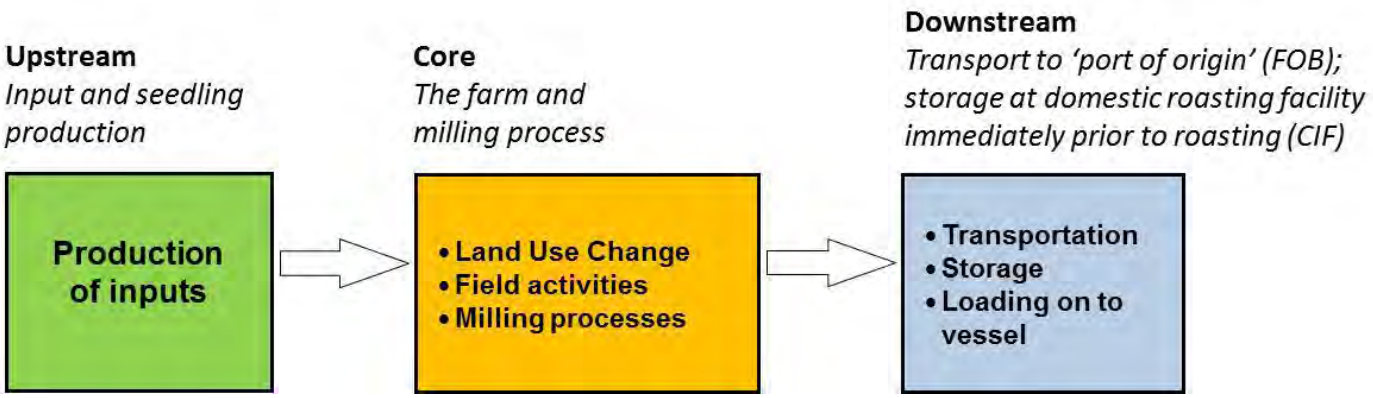
Land-based agriculture						
Cropland management						
Croplands – plant management	**C**: High input carbon practices, e.g., improved crop varieties, crop rotation, use of cover crops, perennial cropping systems, agricultural biotechnology.					15, 16, 17
	N_2O: Improved N use efficiency.					18
Croplands – nutrient management	**C**: Fertilizer input to increase yields and residue inputs (especially important in low-yielding agriculture).					
	N_2O: Changing N fertilizer application rate, fertilizer type, timing, precision application, inhibitors.					
Croplands – tillage/residues management	**C**: Reduced tillage intensity; residue retention.					
	N_2O:					
	CH_4:					
Croplands – water management	**C**: Improved water availability in cropland including water harvesting and application.					
	CH_4: Decomposition of plant residues.					
	N_2O: Drainage management to red leaching.					
Croplands – rice management	**C**: Straw retention.					
	CH_4: Water management, mid-seas					
	N_2O: Water management, N fertiliz timing, precision application.					
Rewet peatlands drained for agriculture	**C**: Ongoing CO_2 emissions from red may increase).					
Croplands – set-aside and LUC	**C**: Replanting to native grasses and					
	N_2O: N inputs decreased resulting in reduced N_2O.					
Biochar application	**C**: Soil amendment to increase biomass productivity, and sequester C (biochar was not covered in AR4 so is described in box 11.3).					39, 40, 41
	N_2O: Reduced N inputs will reduce emissions.					39, 42

Best Practice (increases productivity/ income)	For adaptation measure, how does it: -reduce exposure? -reduce sensitivity? -increase adaptive capacity? (in terms of the impacts from previous matrices)	For mitigation measure, how does it: -reduce or prevent emissions? -increase sequestration? -substitute for fossil fuels? (in terms of the impacts from previous matrices)	If la ec sp s wh		
e.g.: Planted wind breaks	Reduces tree exposure to strong winds	N/A - limited	...	Banana, Coffee, etc	...
e.g.: No till	Reduces sensitivity to nutrient depletion	Terrestrial soil sequestration		Annual plants only	

CAFÉ VERDE Y AGRICULTURA CLIMÁTICAMENTE INTELIGENTE

- Carbon Footprint Product Category Rule (CFP-PCR)- calculate GHG emissions from eco-coffee production, specifically
  - System boundaries (see below)
  - Calculating and reporting

- Proporciona orientación sobre
  - Límites del sistema
  - Cálculo y presentación de informes



UN CFP-PCR: Green Coffee. 2013. http://environdec.com/en/PCR/Detail/?Pcr=8539#.VEbBuU10zcs

REGLA DE CAFÉ VERDE

- Need to cover at least 95% of climate change potential
- Uses emission factors
- Soil sequestration CANNOT be counted (to offset emissions)
- Land use change in the last ***20 years*** must be included in the baseline calculation

- Se incluida por lo menos 95% del potencial cambio climático
- Usar factores de emisión
- El secuestro del suelo NO SE PUEDE contar (para compensar las emisiones)
- Línea de base de **20 años**

RESUMEN

- Climate smart agriculture is a continuous process
- Both adaptation (long-term) and resilience/DRR (short-term) are vital to vulnerable agricultural systems, and along with sequestration (for its productive benefits) are the main foci of CSA for smallholders
- Tools are available

- Agricultura Climáticamente Inteligente es un proceso continuo
- Tanto la adaptación (a largo plazo) y la capacidad de recuperación / RRD (a corto plazo) son vitales para los sistemas agrícolas vulnerables, y junto con el secuestro (por sus beneficios productivos) son los principales focos de ACI para los pequeños agricultores
- Las herramientas están disponibles para aydiar

- Questions?
- Discussion

- Preguntas?
- Discusión

Charles Hernick, The Cadmus Group, Inc.
charles.hernick@cadmusgroup.com
(703) 247-6193

@charleshernick
@CadmusGroup

RESOURCES

- From the Interagency Working Group on Climate-Smart Agriculture in International Development. http://rmportal.net/groups/csa/about-csa. First defined and presented by FAO at the Hague Conference on Agriculture, Food Security and Climate Change in 2010.
- IPCC WGIII AR5. Annex I: Glossary. http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_annex-i.pdf.
- IPCC. 2012. Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). p. 556. http://ipcc-wg2.gov/SREX/report.
- FAO. 2013. Climate Smart Agriculture Sourcebook. P. ix-x. http://rmportal.net/library/content/csa-sourcebook.
- Hansen, J. W., Baethgen, W. E., Osgood, D. E., Ceccato, P. N., & Ngugi, R. K. (2007). Innovations in climate risk management: protecting and building rural livelihoods in a variable and changing climate.
- Howden, S. M., Soussana, J. F., Tubiello, F. N., Chhetri, N., Dunlop, M., & Meinke, H. (2007). Adapting agriculture to climate change. *Proceedings of the National Academy of Sciences*, *104*(50), 19691-19696.
- CEDRIG. Part I Aim, Concept and Support Material of CEDRIG. 2012. p. 7. http://www.sdc-drr.net/system/files/CEDRIG_Part_I_Aim_Concept_and_Support_Material_EN_Web.pdf.
- IPCC. 2012. SREX Chapter 5. Managing the Risks from Climate Extremes at the Local Level. http://ipcc-wg2.gov/SREX/images/uploads/SREX-Chap5_FINAL.pdf.
- IPCC WGIII AR5. Chapter 11: Agriculture, Forestry and Other Land Use (AFOLU). http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter11.pdf.
- UN CFP-PCR: Green Coffee. 2013. p. 5, 23. http://environdec.com/en/PCR/Detail/?Pcr=8539#.VEbBuU10zcs.