If you can't measure it – it doesn't exist

Methods and approaches for assessing adaptation, adaptation co-benefits and resilience

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Overview: Assessing Adaptation Co-Benefits in Agriculture

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Overview of Available Adaptation Co-Benefit Metrics

Definition: Environmental, social and economic co-benefits of adaptation in the agriculture sector

Overview of Findings of Review of CSA Indicators (CCAFS, 2016), available as a digital database from ccafs.cigar.org:

Economic Return on Investment

- **Emphasis:** yields, income and livelihood security
- **Gap:** support policy and legal framework to improve food security and food availability and access.

Mitigation

- **Emphasis:** Indicators that related to technologies that have the potential to address mitigation related issues to some degree
- **Gap:** Few mitigation outcome indicators, with some exceptions:
  - IFAD – ASAP: Percentage tons of GHG emissions (CO2e) avoided and/or sequestered
  - WB: Net carbon balance (GHG emission in tons of CO2-equivalent emission/ha/year) of project compared to a without project scenario (determined using FAO Ex-Act tool)
  - Expected lifetime energy savings from energy efficiency or energy conservation, as a result of USG assistance

KJWA could identify and promote appropriate co-benefit metrics & indicators

A Variety of Tools is Available to Support Metrics

Overview of Available Tools to Inform Mitigation Metrics by User Objective (de Kock, 2018; building on FAO, 2012:)

Aim of user		Calculators and geographical zone of application
Raising awareness		Carbon Calculator for New Zealand Agriculture and Horticulture (NZ), Cplan v.0 (UK); Farming Enterprise GHG Calculator (AUS); US cropland GHG calculator (USA); Global Livestock Environmental Assessment Model (GLEAM).
Reporting	Landscape tools	ALU (World); Climagri (FR), FullCam (AUS).
	Farm tools	Diaterre (FR); CALM (UK); CFF Carbon Calculator (UK); IFSC (USA), Confronting Climate Change (ZA).
Project evaluation	Focus on carbon credit schemes	Farmgas (AUS), Carbon Farming tool (NZ); Forest tools: TARAM (world), CO2 fix (world).
	Not focused on carbon credit schemes	EX-ACT (World); US AID FCC (Developing countries), CBP (World), Holos (CAN), CAR livestock tools (USA).
Market and product orientated tools		Cool farm tool (World); Diaterre (FR), Confronting Climate Change (ZA), LCA tools and associated database (SimaPro, ecoinvent, LCA food etc.)

KJWA could commission a review of carbon calculators and issue guidance on their usage

Overview of Adaptation Co-Benefits in Agriculture: Multidimensional Metrics are Required

Operational Approach: Climate-Smart Agriculture (CSA) – for farmers CSA is principally about productivity and income, adaptation and mitigation are the co-benefits (*"Triple Win")*

Schematic Overview of Multiple Returns to Agriculture Investments in Climate Change Context

1 **Metrics for multiple returns can help attract different types of investors:**

- *Farmers*
- *Private sector*
- *Public support*
- *Carbon finance*
- *Compliance etc.*

Economic Return on Investment - Private & Public Returns
Farmer income, investor profit, etc.

+

Adaptation - Private & Public Returns
Natural resource base growth, reduced volatility, etc.

+

Mitigation - Public Returns (& Private via Carbon Finance
Emission reductions, carbon sequestration, etc.

2 **Multi-dimensional metrics frameworks can demonstrate that total benefits / returns are greater than the sum of parts because of synergies between objectives, public and private returns.**

This requires integrated M&E approaches, like the ones proposed in Climate Smart Agriculture Investment Plans (CSAIPs)

KJWA should adopt integrated approaches

1. What methods and approaches do you use and apply when assessing adaptation, adaptation co-benefits and resilience in projects and programmes that you support, as relevant to the Koronivia joint work on agriculture?

Operational Commitments Underpinning CSA Mainstreaming

We require all projects to complete four Climate Change related processes:

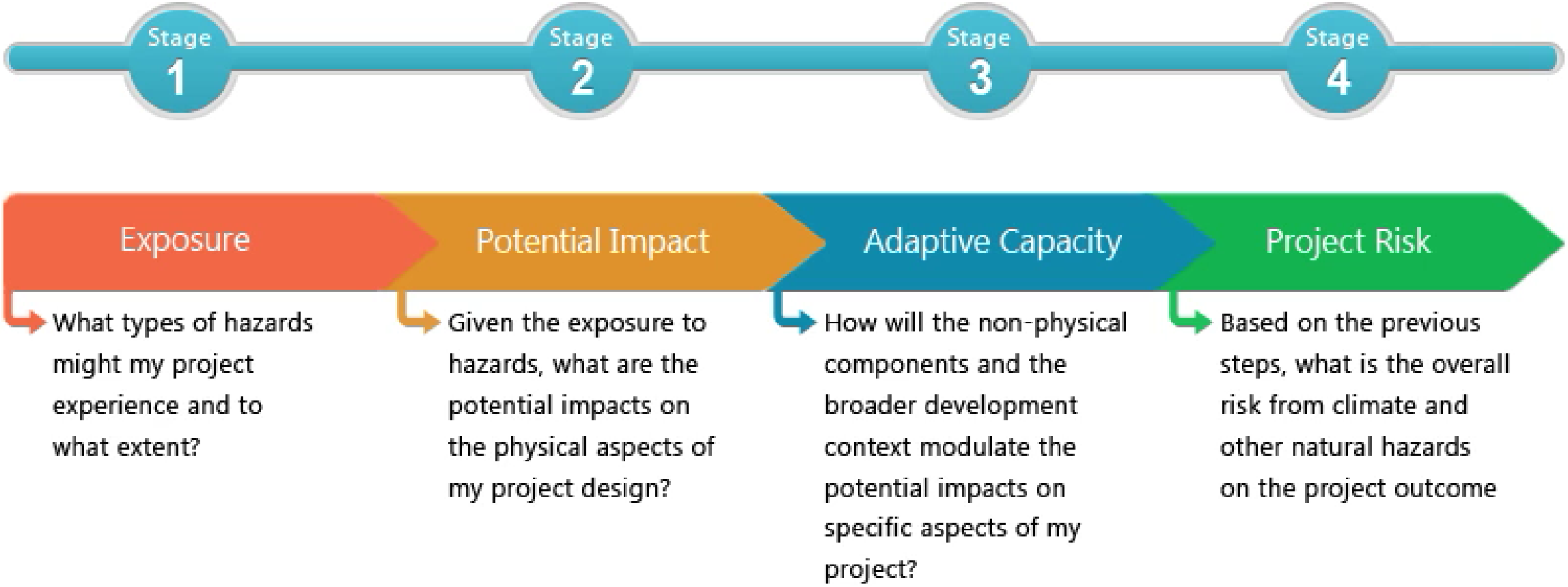
1

Climate & Disaster Risk Screening	GHG Accounting	Shadow Price of Carbon	Climate Finance Tracking (Co-Benefits)
Identify projects' exposure to climate and disaster risks	Ex-Ante determination of gross and net GHG emissions using the Ex-Act tool developed by FAO	Accounting for carbon externalities in economic and financial analysis	Determine projects' share of climate finance by identifying adaptation and mitigation Co-Benefits
RISKS	EMISSIONS	VALUATION	FINANCE

2

World Bank 2025 Climate Change Commitments: Additional tools and approaches being developed

Four Screening Stages



2 Climate Finance Tracking: Co-Benefit Methodology

Objective overall: Climate Finance reporting by MDBs

The assessment of **adaptation co-benefits** is *based on contextual analysis:*

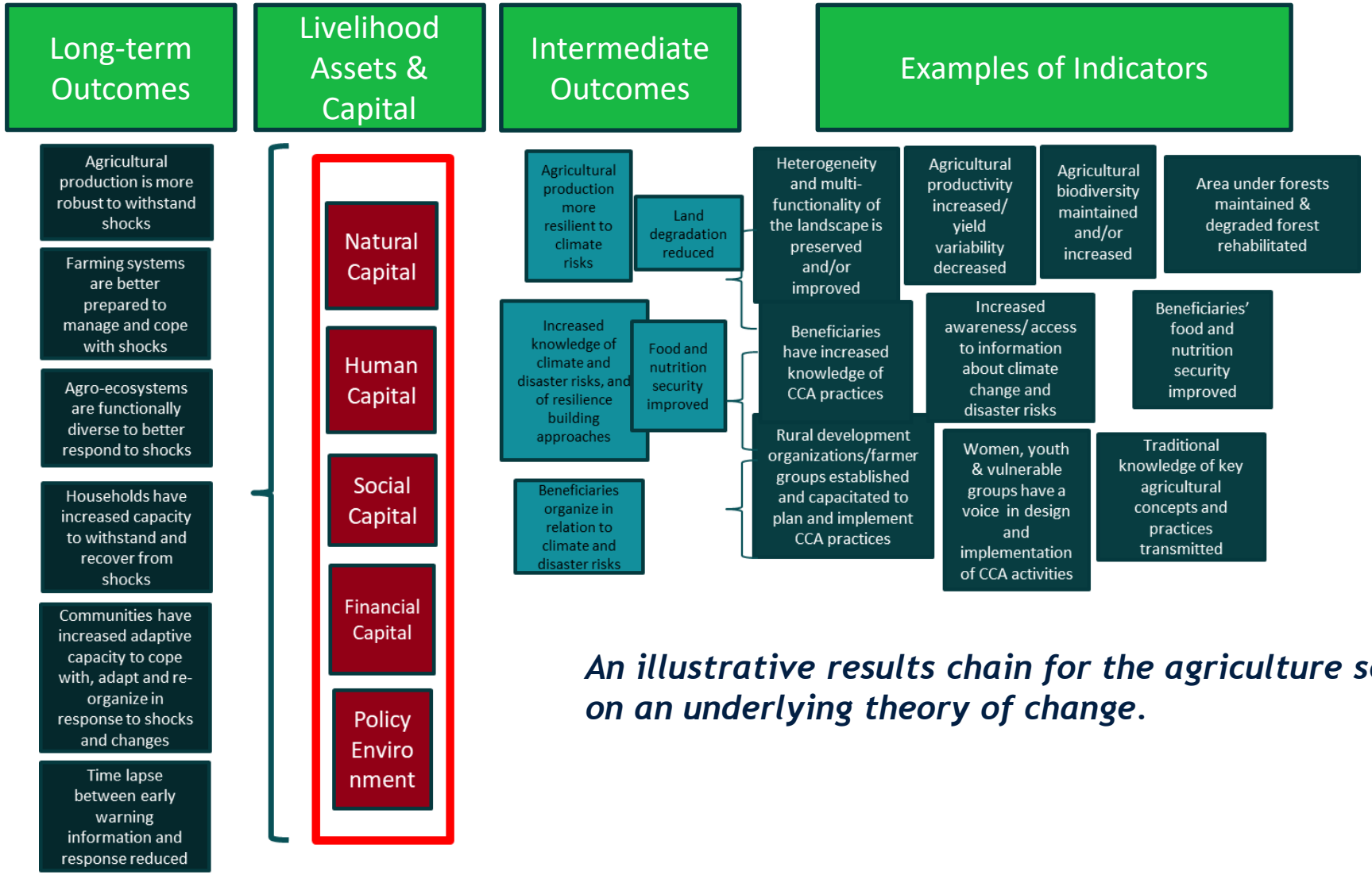
1. Describe CC context & vulnerabilities
2. Demonstrate the intent to address vulnerabilities via project
3. Link between vulnerabilities and project (at component/ sub-component level)

Mitigation co-benefits are based on *positive list of qualifying activities*

Resulting metrics: %- share of project finance dedicated to climate change adaptation and mitigatoin

Determined by
Joint MDB Approach

The Theory of Change Is an Organizing Tool to Identify Context Specific Resilience Indicators



A menu of indicators that describe how to measure resilience outputs and outcomes along the results chain in the AG sector.

An illustrative results chain for the agriculture sector based on an underlying theory of change.

Moving backwards from desired outcomes to identify appropriate resilience metrics

M&E for Resilience Example: Resilience Index in Kenya CSA Project

Integrated M&E Framework in Kenya Climate Smart Agriculture Project

Resilience M&E design reflects multiple good practices

- Engaging stakeholders in project component design and creation of a web-based M&E platform to facilitate tracking and increase transparency
- Development of county level CSA Profiles to identify the vulnerability context
- Securing resources to deploy demand-driven data collection and analysis.

Use of a resilience index

- Underpinned by Theory of Change informed by vulnerability context
- Uses a set of variables that are aggregated to cover multiple resilience dimensions
- Relative changes can be monitored over time

2. Based on your experiences, what challenges, opportunities and lessons learned does your body/organization see are relevant in relation to advancing work on methods and approaches for assessing adaptation, adaptation co-benefits and resilience in the context of the Koronivia joint work on agriculture?

Inconvenient Truths about Resilience & Opportunities through Technology

Don’t let the perfect be the enemy of the good

As a community, we should accept that resilience is more complex to measure than other climate outcomes – and adjust approach and expectations accordingly

- Different metrics for different actors, purposes, time horizons, dimensions - are unavoidable.
- Given the delta between the project time horizons (often 4-7 years) and the ability to identify statistically significant changes in resilience given climate variability (decades), resilience metrics will have to rely on proxies for outcomes.

Harness technology

A variety of measurement related technologies are rapidly developing and already being implemented in agriculture contexts. Often, they provide near real-time information to decision makers across resilience, mitigation and productivity.

Opportunities: Sensor Technology – The Case of Water level-Sensors in Rice Production

Small size sensors can be deployed to tackle a key barrier into alternate wetting and drying (AWD) in rice production: the risk of fields drying out

- Sensors (ultrasonic, infrared, pressure based connected with cell phones) enable the remote water monitoring of water levels in paddy fields
- Information provided to farmers' smart phones enable more accurate decisions on when to irrigate paddy fields or enable automation irrigation scheduling by pumps

These and other similar sensors systems can measure a host of outcomes:

- Water & energy savings
- Reductions in GHG emissions including to underpin carbon credit verification mechanisms
- Time savings and reduced labor requirements

Monitoring, reporting and verification will benefit significantly from falling prices for sensors of all kinds – often by 3 magnitudes over the past decade.

Opportunities: Geospatial Data for Soil Health Monitoring

Monitoring, Reporting and Verification (MRV) bottlenecks represent a significant barrier to investment into soil health because of the high cost of measuring soil organic matter

- Strong positive correlations between soil carbon and multiple desirable soil properties enable the use of soil carbon as a strong proxy indicator for soil health
- Measurement of soil organic matter would enable farmers to realize the climate change mitigation outcomes they generate, for instance, in the form of carbon assets.
- Current promising solutions combine pragmatic and user-friendly tools with site-specific modelling
- Innovation is needed to develop geospatial data fueled remote sensing approaches that are robust, reliable and economical
- Cost-effective at scale soil health measurements would unlock soils as an anchor variable for public support to Agriculture

Case example: Haiti Resilient and Productive Landscapes Project

- The project promotes the adoption of resilient agriculture technologies based on the position of a farm in the watershed
- To monitor project progress including changes in soil organic matter, it deploys a geospatial approach based on a geo-tagging of farmer fields and measures such as NDVI
- The work is conducted in collaboration with the national geospatial data agency of Haiti, CNIGS.

CSA Science Conference: Workshop on Technological Innovation in MRV for Soil Health & Carbon

Bali, Indonesia; Oct 7, 2019

Opportunities: Collecting multi-purpose data - Uruguay National Agricultural Information System (SNIA)

The Initiative:

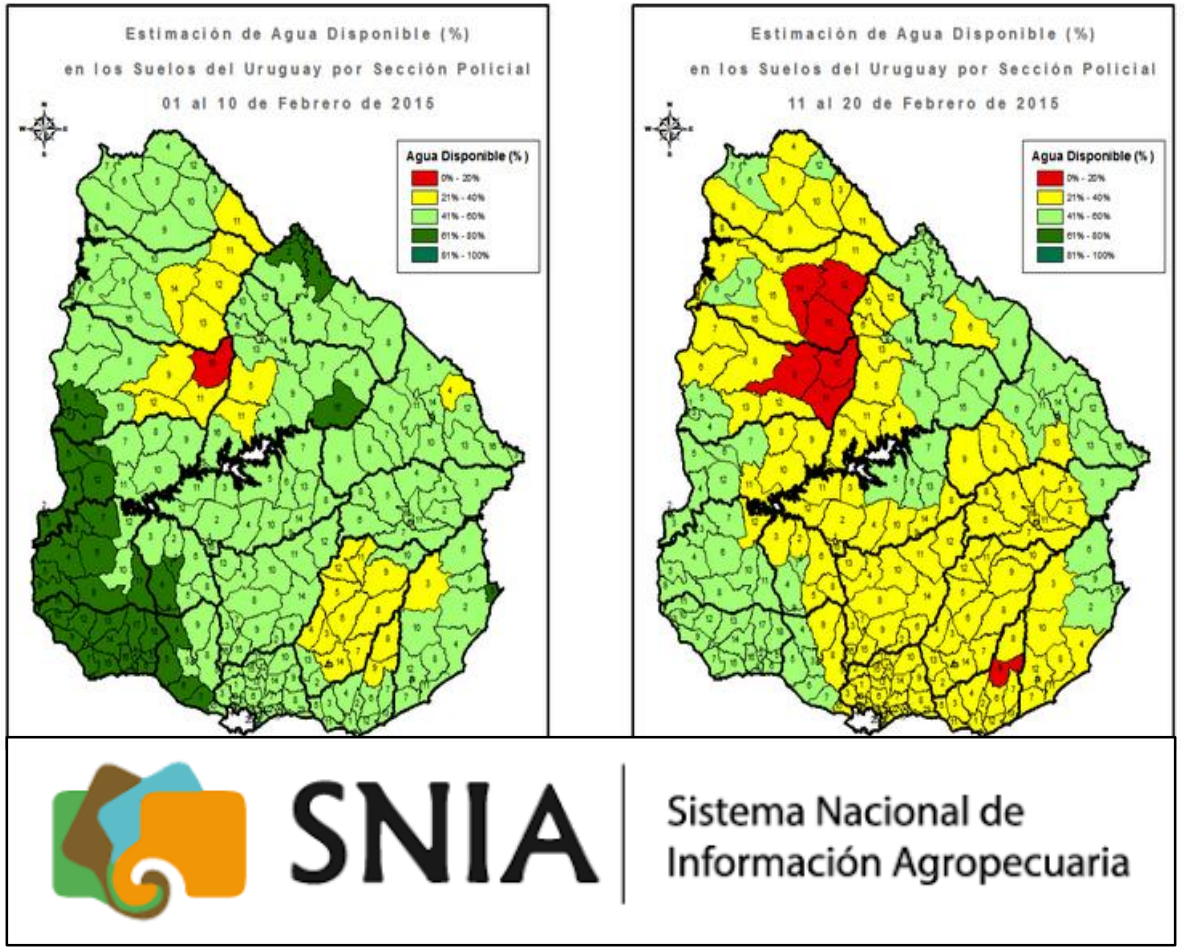
SNIA facilitates the integration of dispersed agriculture, natural resource management and new climate-related information from 32 national agencies, in an online state-of-the-art platform tailored to the needs of different users.

Farmers' can access early-warning system for livestock management, an agrochemical control system, rural risk assessments, and soil and land use plans

Results:

- Quadrupled its agricultural production within a decade,
- While increasing the resilience of their productive systems to climate change, and
- Significantly reducing GHG emission associated with food production.

Example of SNIA in Action: Figures for soil water content



Casting the Net Wider: Towards a Resilience Rating System

We are currently developing an ex-ante resilience rating system applicable to WB and non-WB projects to:

1. Better measure and report on what the WBG is doing on adaptation and resilience;
2. Create incentives to do more and better in achieving climate resilient growth objectives and
3. Create a global standard used in financial markets (e.g. resilience bonds) and public procurement (e.g. infrastructure projects

Guiding question: *Is the project likely to underperform compared to what is expected from the project?*

1. Are disaster and climate risks taken into account in the expected outcomes of the project?
2. If applicable, does the economic and financial analysis reflect these risks?
3. For outcomes that are not captured by the economic or financial analysis, are the vulnerability of these outcomes to disaster and climate risks analyzed and disclosed in project documents?

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Thank You

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