

Tailoring CSA interventions to national and local contexts: The CSA country profiles in South and Southeast Asia



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CIAT in the Consultative Group for International Agriculture Research (CGIAR System Organization)



CIAT Global Research: commodities, systems & futures



Agrobiodiversity

- Bean
- Tropical Forages
- Cassava
- Rice
- Genetic Resources



Soils & Landscapes

- Soils Data/Info
- Landscape Management
- Soil Health



Decision & Policy Analysis

- Climate Change
- Linking Farmers to Markets
- Ecosystem Services

Lead CGIAR Center for **Climate Change, Agriculture & Food Security (CCAFS)**

What is CSA...

...is agriculture that sustainably...



Productivity

...increases the **productivity** and **agricultural incomes**

Adaptation

...enhances resilience
(Climate change **Adaptation**)

Mitigation

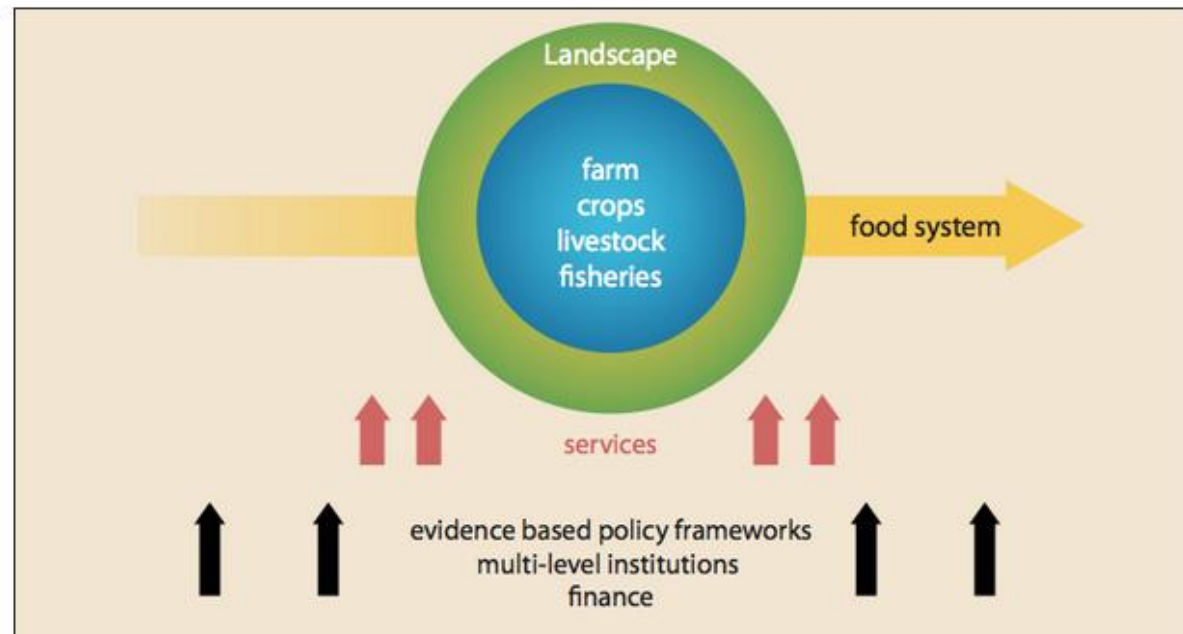
...reduces/removes
GHGs emissions
where possible
(Mitigation)

CSA pillars

Our vision, a sustainable food future

Climate Smart Agriculture: Strategies for implementation

- Successful CSA implementation needs **integrated actions at various levels and scales**:
 - Farm, landscape, county/subnational, national
 - Technologies, policies, institutions, investments



Source: CGIAR CCAFS

Our vision, a sustainable food future

CSA Country Profiles

Objective

Takes stock of CSA activities at national level, identifies promising practices and offers cutting edge information on enabling environments and barriers for mainstreaming CSA.

Users

National and sub-national planners, decision-makers, and implementers are the primary target, along with donors, NGOs, and other investing in mainstreaming CSA

Information and data gathering

Analyses based on existing literature and databases combined with expert interviews and surveys and/or focus group discussions

National stakeholders document review

Outline and contents verified by main climate change and agriculture stakeholders throughout profile development to ensure applicability to key national CSA decisions

Design and dissemination

Profiles are created as short (15-20 pages) easy to read documents with key data highlighted in infographics. Profiles and supplemental information available online.

Climate-Smart Agriculture in Bangladesh

Climate-smart agriculture (CSA) considerations

- P** The agricultural sector in Bangladesh has grown steadily in recent years, driven by an increase in efficiency achieved through innovative technology and mechanization support public policies. This has led to concerns in food security as well as rural poverty that reduction in the past few years or increased farm income.
- M** The lack of accessible and reliable climate information
- P** Agriculture in the country is characterized by production systems largely dominated by marginal farmers, yet a significant commercial farming with high value or animal products has been evident in the past few years. It is expected to contribute to further growth through improvements in health, nutrient outcomes in Bangladesh.
- P** Given its abundant water resources, rice

Climate-Smart Agriculture in Pakistan

Climate-smart agriculture (CSA) considerations

- P** Pakistan is the world's sixth most populous country and its population is growing at a rate of approximately 2% per year. Since most of the arable land is already in use, productivity gains to meet this growing and predominantly urban population will likely be achieved through sustainably increasing cropping intensity on the country, accompanied with increased fertilizer usage.
- M** Agriculture is responsible for approximately 41% of all GHG emissions in the country, mostly through livestock production. CSA technologies and practices that improve efficiency in livestock systems while simultaneously reducing emissions may include: improved animal feed and feeding techniques to reduce methane and nitrous oxide, improved breeding, adapted manure storage and management practices, and improved pastures and management of grazing lands to enhance productivity and create carbon sinks.

Climate-Resilient Agriculture in the Philippines

Climate-resilient agriculture (CRA) considerations

- P** By 2050 climate change and variability is estimated to cost the Philippine economy approx 20 billion yearly.
- M** CRA for landscape enhancement involves
- P** There is evidence of on-field adopt practices by small-scale farmers in systems (e.g., mangrove restoration and based fish stock enhancement), livestock (e.g., biogas and composting and alternate systems), vegetable production (e.g., use crop calendars and organic farming), farming systems (e.g., agroforestry at water conservation), and maize and rice (e.g., use of stress-tolerant varieties and crop management), among others.
- P** However, CRA practices uptake three country is still low and limited by poor access to improved seed, insufficient resources to cover investment costs, and resources of extension services.
- P** Over the last 30 years, Viet Nam rapid growth in agricultural production has transformed the country's socioeconomic status: alleviating national food insecurity, reducing poverty, fostering agricultural exports and providing livelihoods to nearly half of the labor force nationwide. Viet Nam outperforms its neighboring countries in Southeast Asia in its productivity of crops such as rice, maize, coffee, rubber, cashew, tea, and pepper.
- M** But the substantial growth in agricultural production has come at significant environmental cost: intensive use of chemical fertilizers, pesticides and water to boost productivity have made agriculture the second largest source of greenhouse gas (GHG) emissions after energy.
- P** Increasing incidences of extreme weather events such as floods and cold spells in the north and non-rainy season, adverse irrigation in the Mekong River Delta, and droughts in the Central Highlands, have shown that climate change is becoming more apparent in Viet Nam. Changing business as usual (BAU) agricultural production practices to climate-smart and environmentally sustainable practices will overcome the challenges associated with climate change in the agricultural sector.
- P** Given the diversity in topography, soil conditions, and climate characteristics within the country, the impacts of climate change vary by production systems and agro-ecological zones. Under climate change, Viet Nam is expected to become more dependent imports of maize, meat and tropical fruits. Exports of coffee, rice, tea and cassava are likely to decrease while the land area suitable for cultivation of these crops is likely to increase.
- M** To maintain agricultural production under increasing climate risk, various CSA practices have been

The climate-resilient agriculture (CRA) comes an ambition to improve the integration of development and climate responsiveness. It aims to achieve food security and broader development goals under a changing climate and increasing food demands. CSA initiatives sustainably increase productivity, enhance resilience, and reduce net greenhouse gas emissions (GHGs), and require planning to address trade-offs and synergies between the three pillars: productivity, adaptation, and mitigation [24]. The priorities of different countries and stakeholders are likely to vary, and these priorities are reflected to achieve more efficient and equitable food systems that address



Adaptation Mitigation Productivity Institutions Finance

The concept of climate-smart agriculture (CSA) is to improve the integration of agricultural development and climate responsiveness. It aims to achieve food security and broader development goals under a changing climate and increasing food demands. CSA initiatives sustainably increase productivity, enhance resilience, and reduce net greenhouse gas emissions (GHGs), and require planning to address trade-offs and synergies between the three pillars: productivity, adaptation, and mitigation [1]. The priorities of different countries and stakeholders are likely to vary, and these priorities are reflected to achieve more efficient, effective, and equitable food systems that address changes in environmental, social, and economic dimensions across productive landscapes. While the CSA concept is new, and still evolving, many of the practices that make up CSA already exist worldwide and are used by farmers to cope with various production risks [2]. Mainstreaming CSA requires stocktaking of ongoing and promising practices for the future, and of institutional and financial enablers for CSA adoption. This country profile provides a snapshot of a developing baseline needed to initiate discussion, dialogue, and identify key entry points for investing in CSA at scale.

Climate-Smart Agriculture in Nepal

Climate-smart agriculture (CSA) considerations

- P** Agriculture contributes to about one-third of gross legal and provides largely active population. Commercial production, a genetic resources banks (GRB), precise and pest management as a way to sustainably utilize rural land.
- P** Several policies provide an enabling environment for the promotion of CSA actions, yet efforts to coordinate initiatives are sporadic, leading to the duplication of efforts and ineffective resource allocation. Sectors tend to work in isolation, limiting the development of an effective multi-sectoral vision that creates synergies and leverages resources. There is a need for improved governance and policy coordination for delivering planned results in a more integrated way. Capacity building for CSA planning and implementation can be a first step towards that.
- P** Some CSA technologies are costly and financial support is crucial for uptake, especially in resource-poor communities. The potential for national and international CSA finance is high as there are several opportunities to attract new funding. To effectively prioritize and utilize such resources, mechanisms to monitor the targeting and allocation of funds are needed.
- M** Information dissemination through information and communication technology (ICT) and farmer-to-farmer dissemination needs to be scaled-up to make the extension effort more rapid and effective. This will require initial government support, mainly in the form of subsidies.
- P** Highlighting practices that have proven most effective in delivering on CSA goals as 'champions' would aid in the diffusion of CSA investments across scales and regions of the country. This requires further efforts to take stock of the costs and benefits of CSA practices in a more systematic and comprehensive way, complementing the initial findings from this study.
- P** Adaptation Mitigation Productivity Institutions Finance

Climate-Smart Agriculture in Sri Lanka

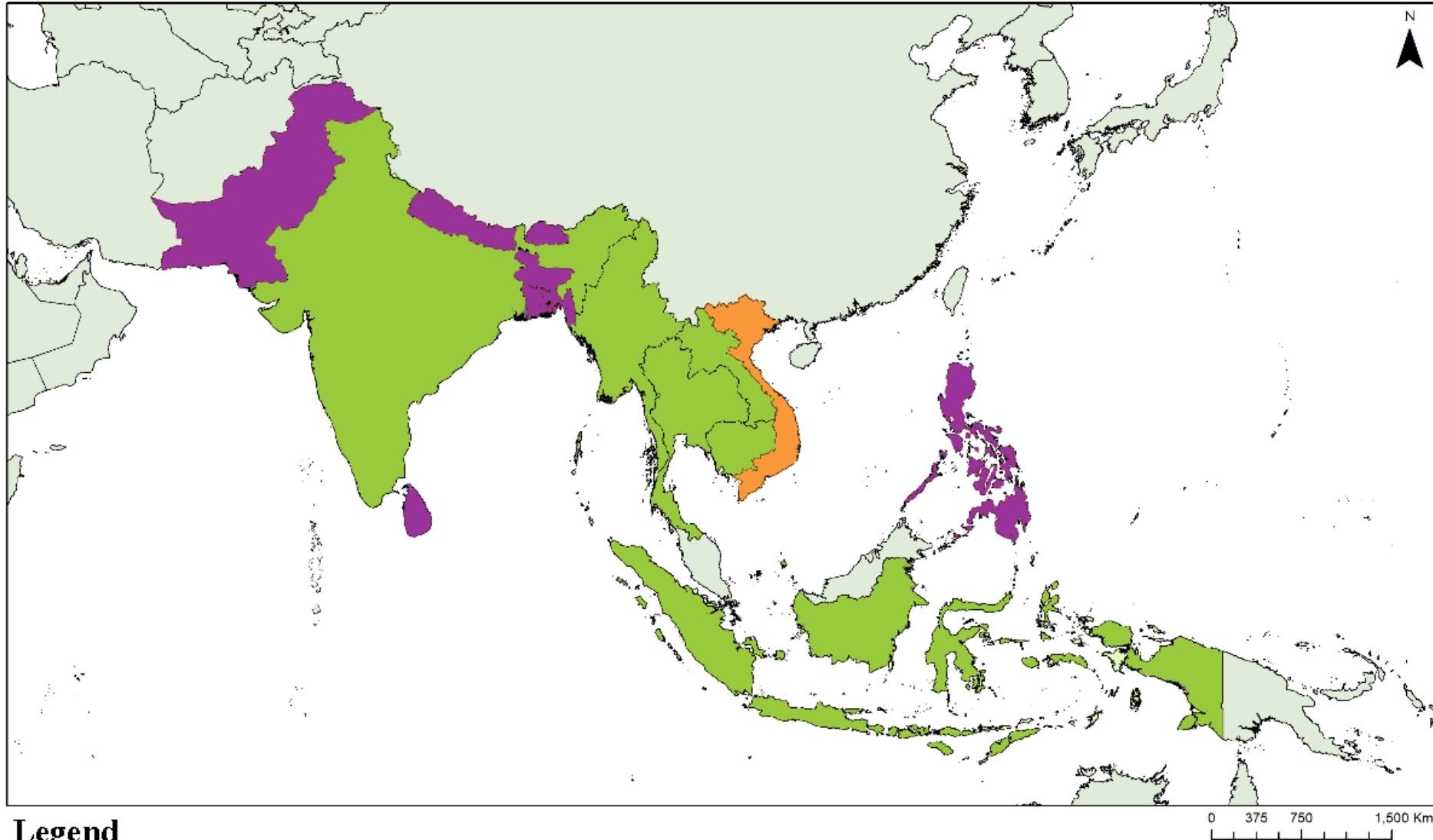
Climate-smart agriculture (CSA) considerations

- P** Agriculture is the mainstay of Sri Lanka's rural economy. Given the adoption of present cropping systems and land-use practices, smaller farmers, who make up the overwhelming majority of the country's 17 million farmers, have long sought ways to boost resilience of the food system under increasing change and variability in climate.
- P** Conservation of genetic diversity of indigenous crop varieties is the foundation for the sustainable development of new varieties that address present and future challenges. Resource-poor farmers have used intelligently genetic diversity over centuries to develop varieties adapted to local environmental stresses. Similarly, the preservation of genetic variability in indigenous livestock has enhanced resilience to changing climate conditions in ruminant dairy systems.
- P** Access to new climate-adapted genetic material is ensured by the Department of Agriculture (DA), which implements crop germplasm collection and systematic crop companion programs that target farmers in different agro-ecological regions.
- P** Farmer harvesting techniques, crop diversification and livestock integration, marketing and trading, and micro-irrigation are key CSA practices adopted in Sri Lankan homesteads. Such activities, predominantly undertaken by women, represent important entry points for advancing adaptation, mitigation, and productivity goals, but also for acknowledging and recognizing women's critical role in knowledge, decision-making and environmental stewardship.
- P** Climate-resilient crop varieties, particularly in rice paddy, have helped improve both household and national food and nutrition security. Rainwater harvesting systems and micro-irrigation technologies have improved water-use efficiency while cover crops and shade management have helped to overcome heat stress and improve productivity in several production systems.
- P** CSA practices that address water utilization and soil degradation and erosion are critical for ensuring the productivity and sustainability of important food and export crops such as potato and tea. Reducing synthetic fertilizer and pesticide use through mulching, bio-fertilizer and agronomy systems, among others, can ensure that water and soil quality are not compromised when aiming for productivity increases.
- P** Land productivity and resilience has been also achieved through the adoption of present cropping systems and short-duration and agro-ecologically adapted plant varieties, while emissions reduction and carbon sequestration have been a consequence of CSA practices such as crop-livestock integration, manure production, and reduced use of chemical inputs. However, adoption levels of these efforts are generally low, especially among small-scale farmers.
- P** There is a need for greater state support for mitigation efforts through policies curbing excessive use of synthetic fertilizers, which has high above-ground agricultural emissions. These should be complemented with efforts to increase public environmental protection awareness through, for instance, farmer-led forums with information on improved fertilizer management practices, nutrient management, and judicious combination of organic and inorganic fertilizers, among others.
- P** Adoption of CSA practices requires institutional support, especially for smaller farmers, in particular, medium- and long-range seasonal climate forecasts, better intra- and inter-institutional coordination, and improved market access by smallholders are prerequisites for increased CSA adoption in Sri Lankan agriculture systems.
- P** Additionally, innovative knowledge management systems should be designed to promote adoption of knowledge-intensive CSA technologies aimed at strengthening farmers' knowledge of CSA practices, facilitating sharing the techniques, and providing support to local and indigenous knowledge systems.
- P** Compliance and voluntary markets are important instruments for enhancing climate resilience, reducing greenhouse emissions, and generating carbon credits, while contributing to the social, economic and environmental development of Sri Lanka.
- P** The development of governance and institutional frameworks supported by legal and regulatory frameworks is critical for maximizing the opportunities for climate finance mobilization and emissions trading in the various sectors of the economy.
- P** Adaptation Mitigation Productivity Institutions Finance


The climate-smart agriculture (CSA) concept reflects the ambition to improve the integration of agricultural development and climate responsiveness. CSA aims to achieve food security and broader development goals under a changing climate and increasing food demand. CSA initiatives sustainably increase agriculture productivity, enhance resilience of agro-systems, and reduce net greenhouse gas emissions (GHGs) from agriculture production, and require planning to address trade-offs and synergies between these three pillars: productivity, adaptation, and mitigation [1]. While the concept is new, and still evolving, many of the practices that constitute CSA already exist worldwide and are used by farmers to different degrees to cope with various production risks [2]. Mainstreaming CSA requires a critical stocktaking of existing and promising agricultural production practices for the future, and of institutional and financial enablers for CSA adoption. This country profile provides a snapshot of a developing baseline (CSA) from agriculture production, and require planning to address trade-offs and synergies between these three pillars: productivity, adaptation, and mitigation [1]. While the


<https://ccafs.cgiar.org/publications/csa-country-profiles>


CSA Country Profiles in Asia



Legend

 Finalized (Bangladesh, Bhutan, Nepal, Pakistan, Philippines, Sri Lanka)

 In Preparation (Vietnam)

 Planned or partially funded (Cambodia, India, Indonesia, Laos, Maldives, Myanmar, Timor Leste, Thailand)

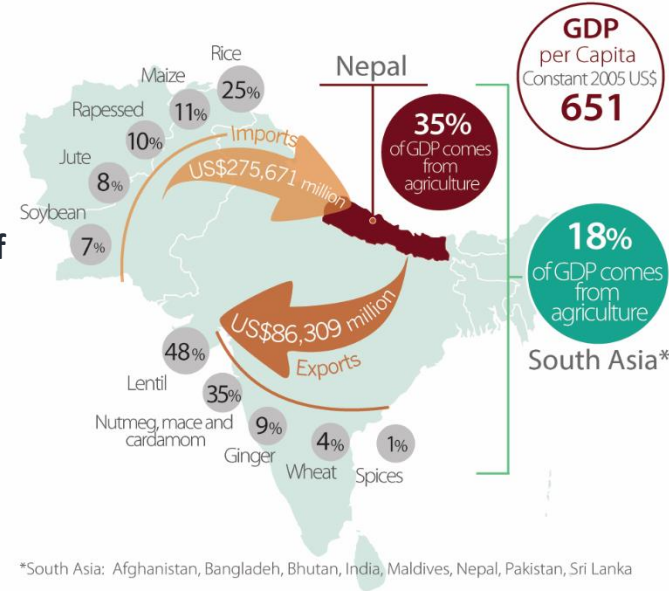
CSA Country Profiles: Key Areas of Focus



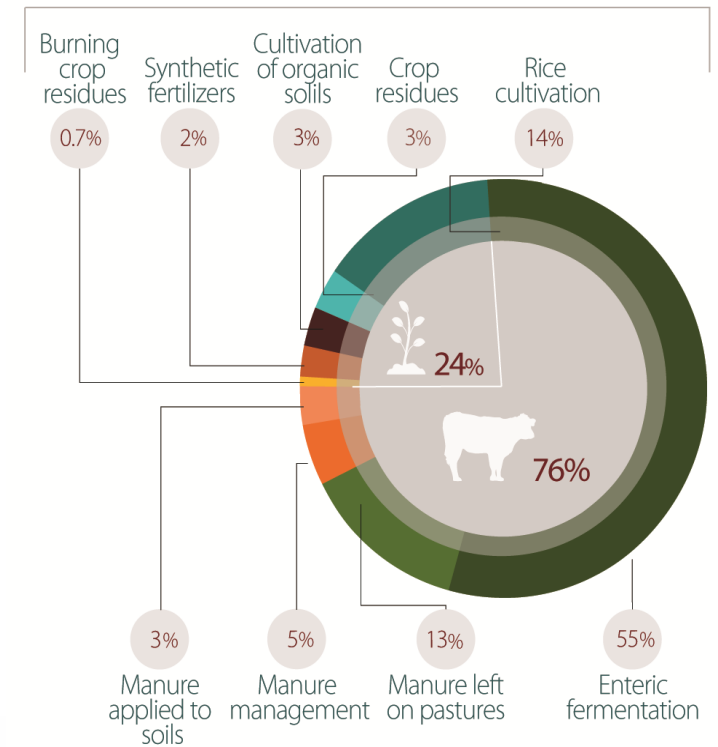
Stocktaking: National Context of Agriculture

Example from Nepal

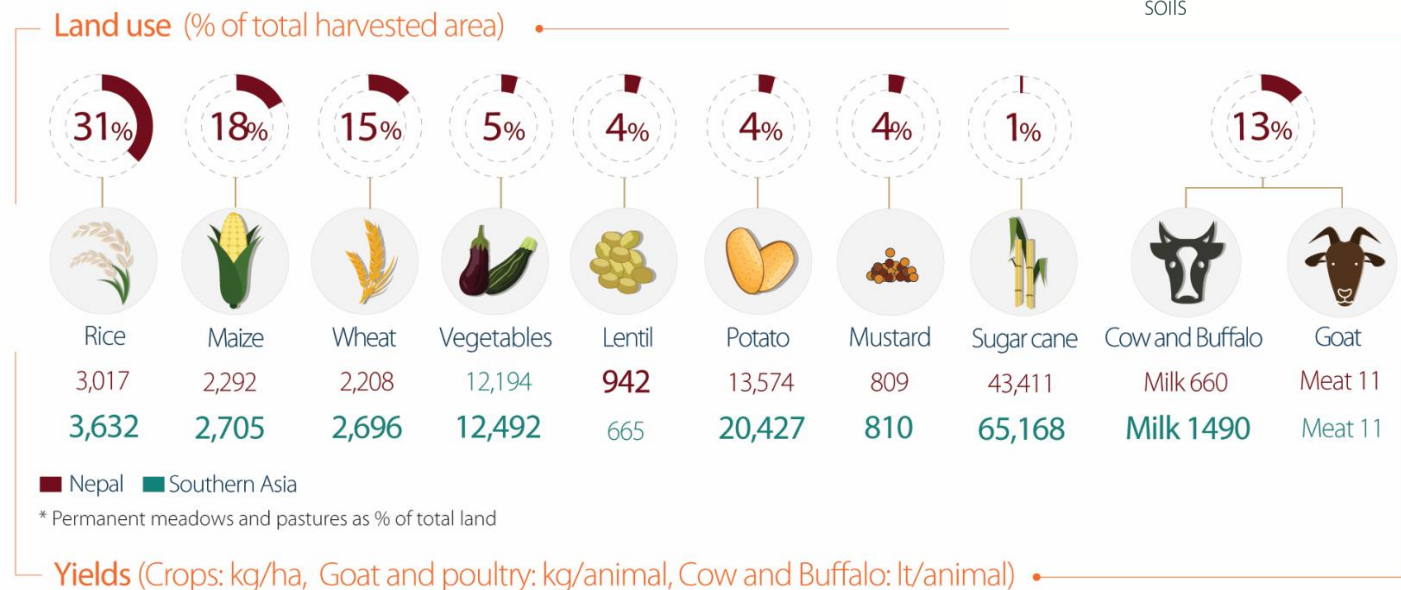
Economic importance of agriculture



Total emissions from agriculture in Nepal



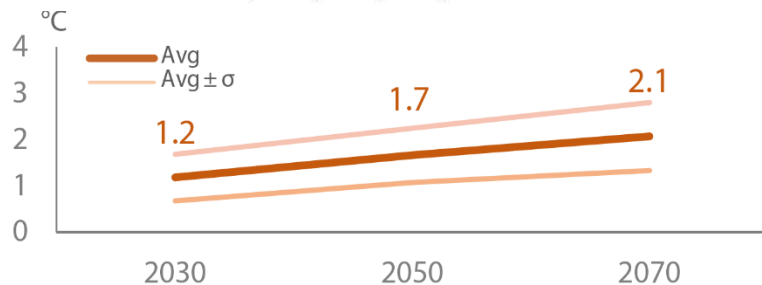
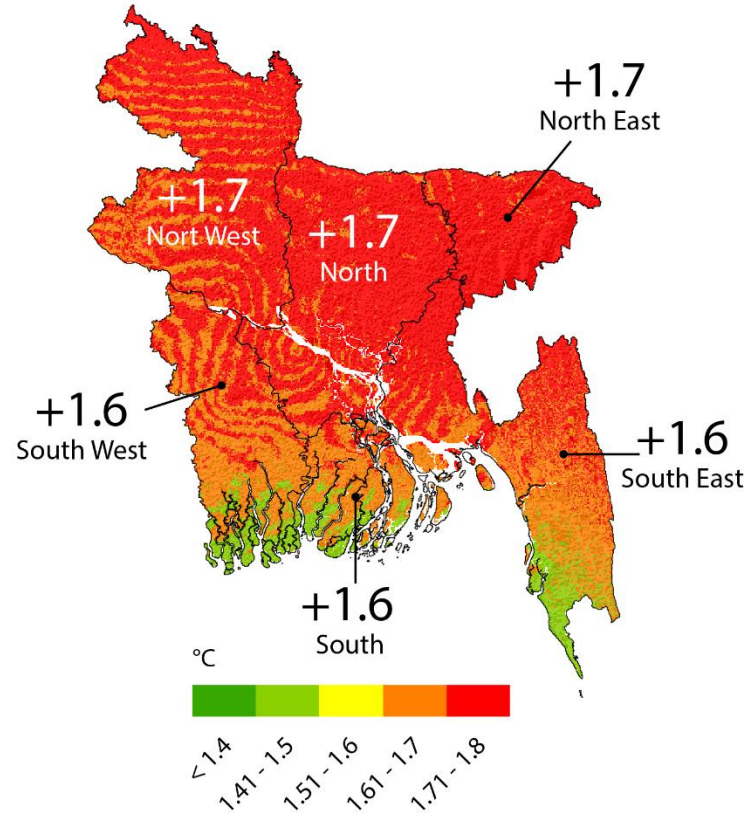
Key production systems in Nepal



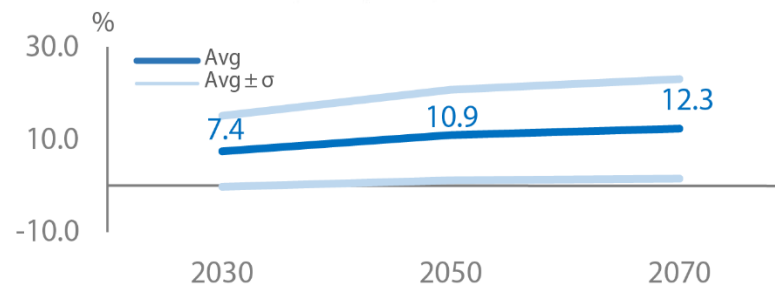
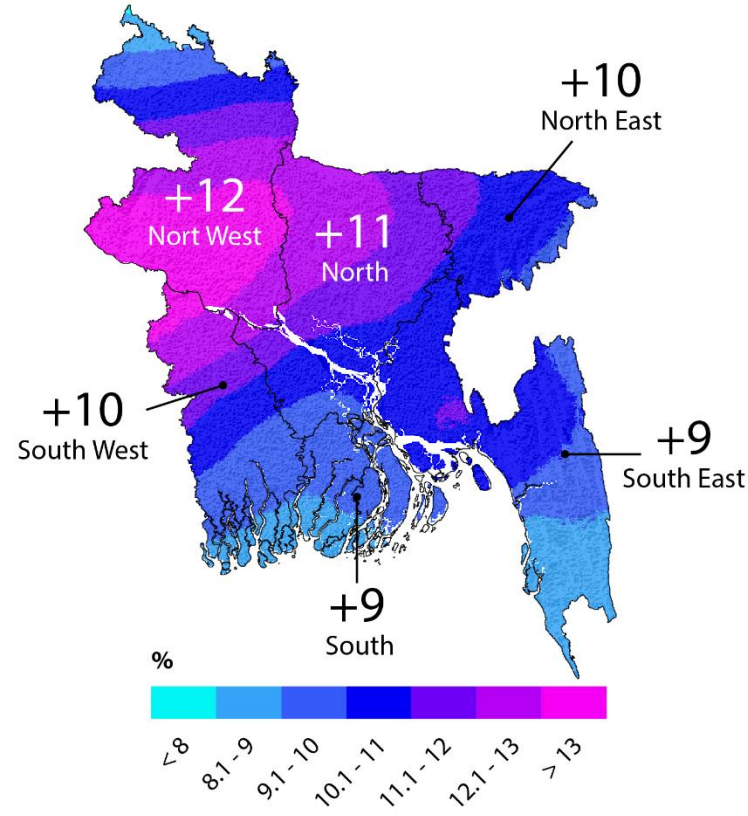
National Context: Exposure to climate change

Projected changes in temperature and precipitation in Bangladesh by 2050

Changes in annual mean temperature (°C)

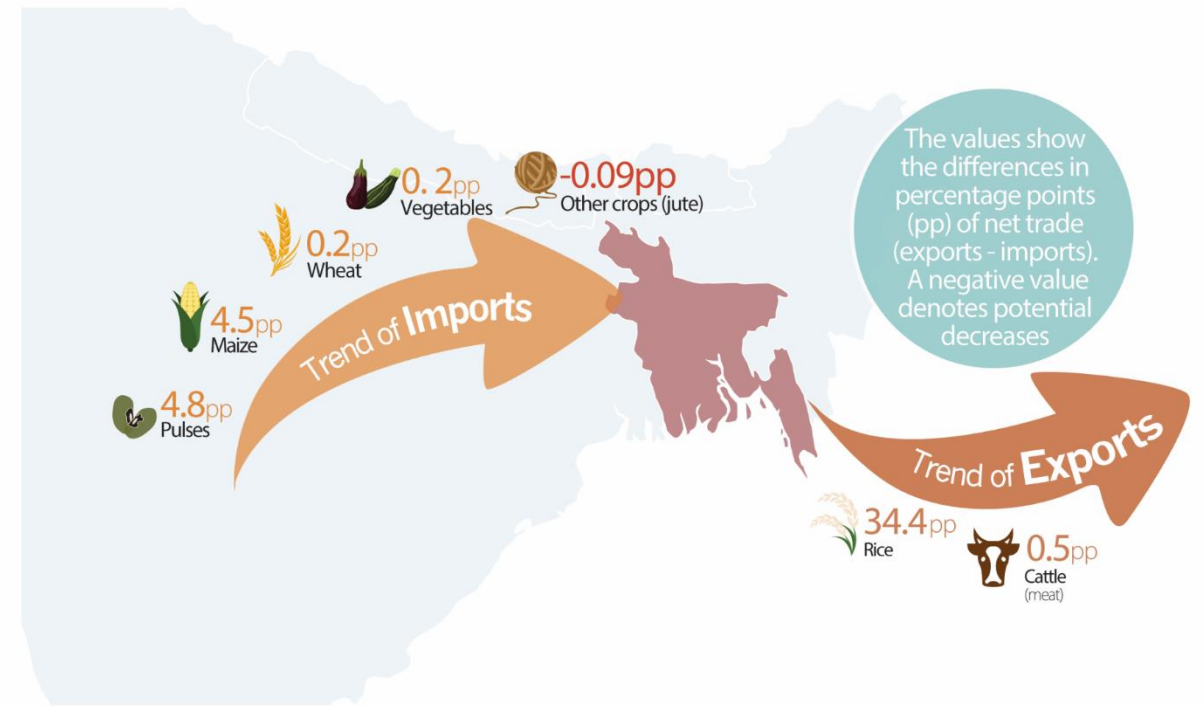
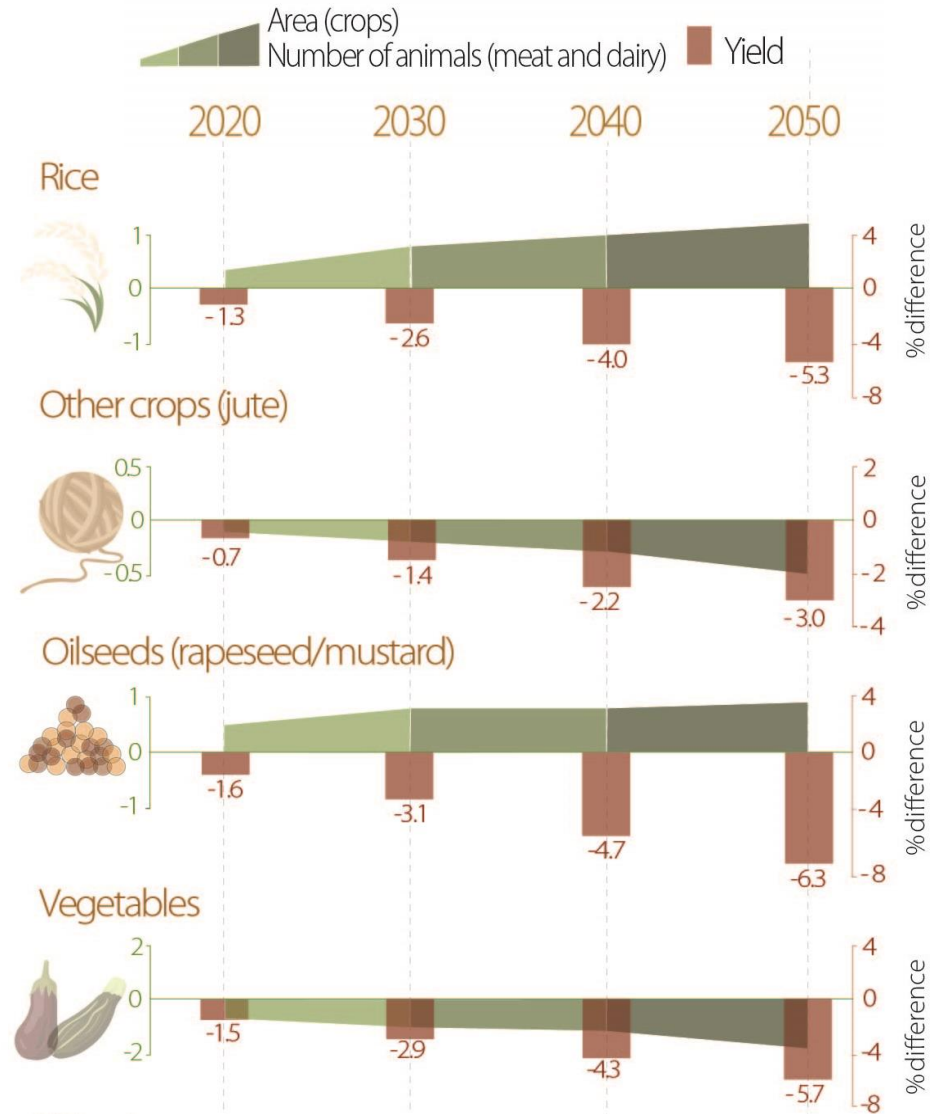


Changes in total precipitation (%)



IMPACT Modelling: Climate change impact on net trade, yield and area

Example from Bangladesh



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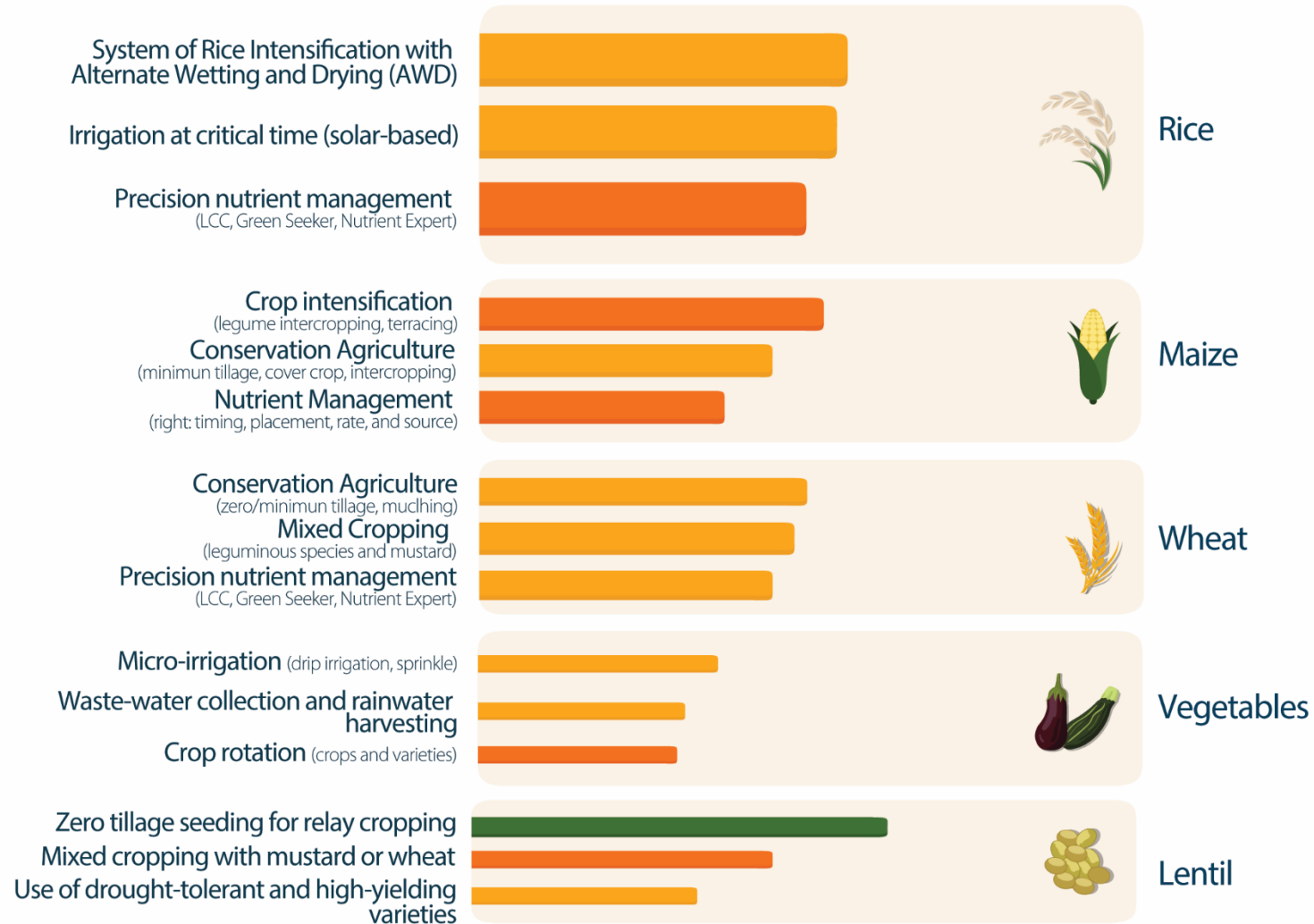


Selection of CSA practices

Example from Nepal

Degree of Adoption ■ High ■ Medium ■ Low * Width of the bars is based on production system area

Smartness level 0 1 2 3 4 5 6 7 10




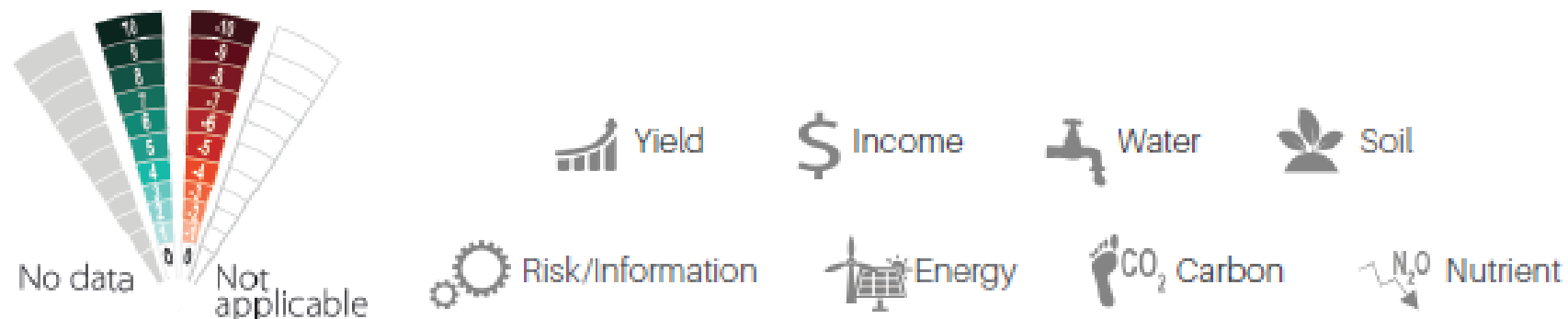
Climate Smart Agriculture: technologies

What makes a technology climate-smart?

Example: Conservation Agriculture

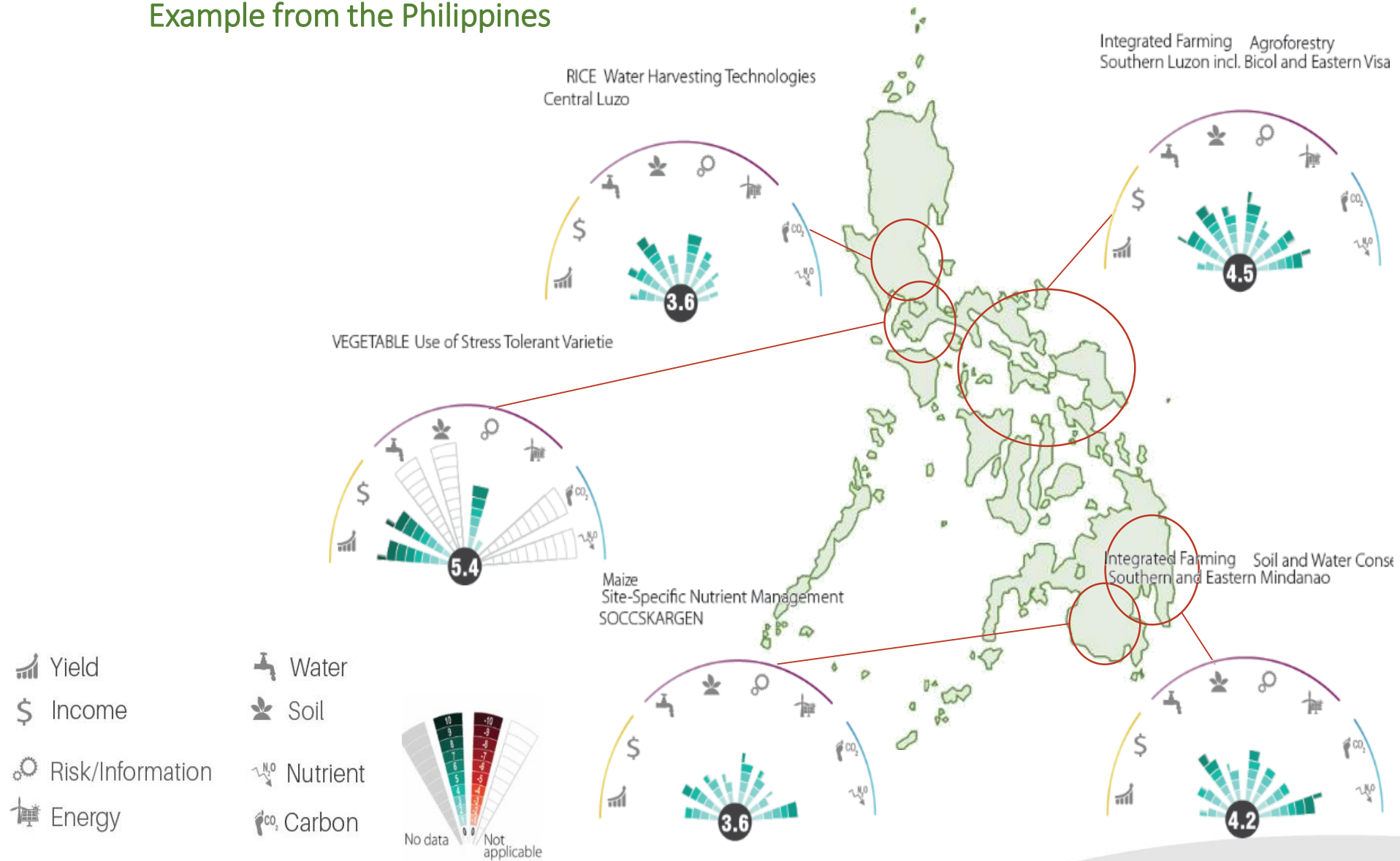
- Principles: Minimal soil disturbance (i.e. no-tillage), permanent soil cover (mulching), crop rotation

Climate-smartness	Productivity	Adaptation	Mitigation
<p>Example: Maize</p> 	<p>Potential increases in profits due to increased crop yield and reduced production costs.</p>	<p>Increases moisture retention due to mulching and cover crops, reduced soil erosion caused by heavy rains, and soil tillage.</p>	<p>Reduces fossil fuel requirements for tillage. Mulching and cover crops increase soil carbon capture and soil organic matter content.</p>



Smartness assessment of CSA practices

Example from the Philippines



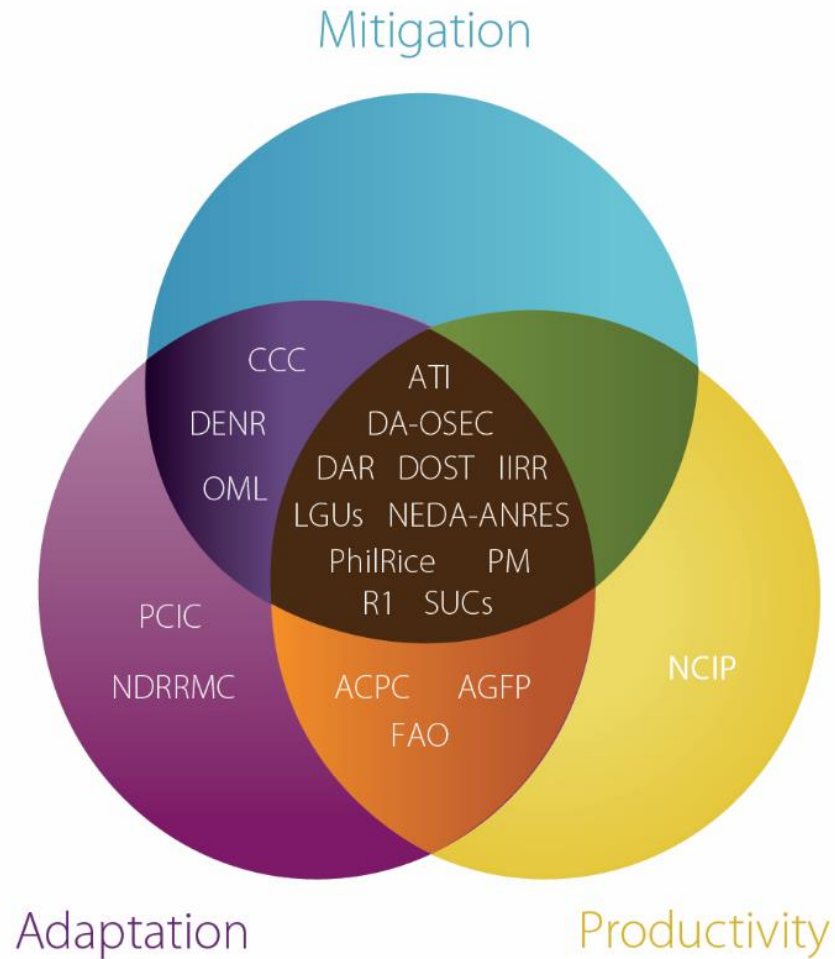
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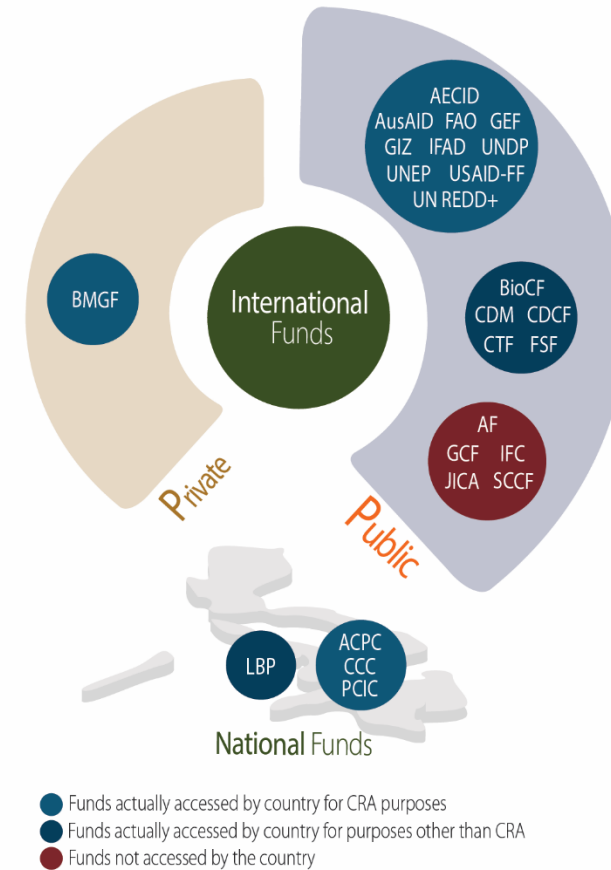
Policy, institutional and financial environment for CSA/CRA

Example from the Philippines

Institutions for CSA/CRA

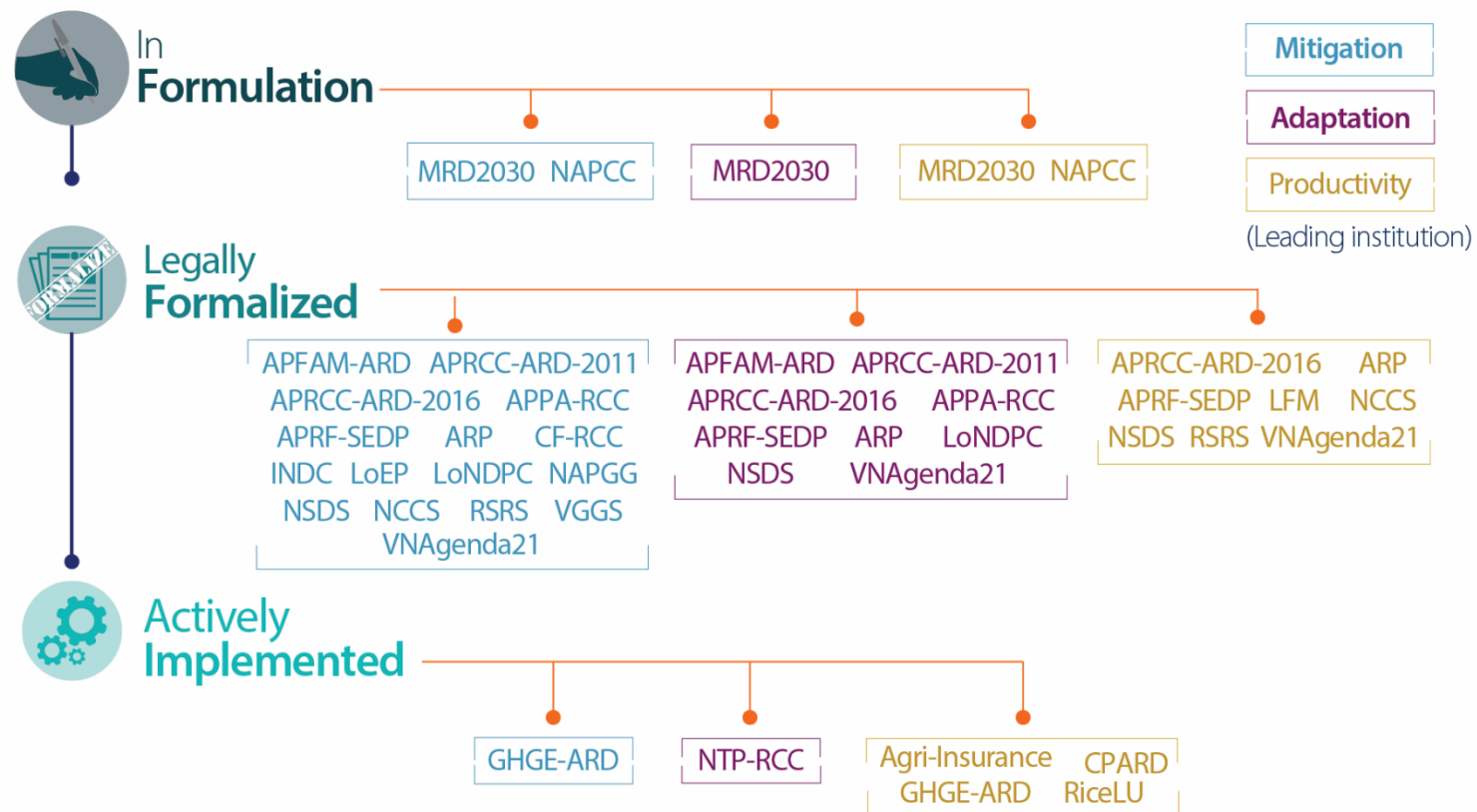


Financing opportunities for CSA/CRA



Policy, institutional and financial environment for CSA

Example from Vietnam



CSA Country Profiles as an Entry Point for CSA

1. Stock-taking and understanding the context

2. Prioritizing interventions

3. Piloting: Implementation & Monitoring

4. Scaling: Inform Policy Design, Implementation & Monitoring

CSA Country Profile

Analysis on Policy Implementation Barriers

Sub-National Climate Risks Profiles

Climate Impact Maps

Cost-Benefit Analysis (CBA)

Vulnerability Assessment

Foresight Analysis and Modelling: Climate Smart Investment Plan

Piloting and designing business models for CSA upscaling

Supporting the implementation of Climate Smart Villages




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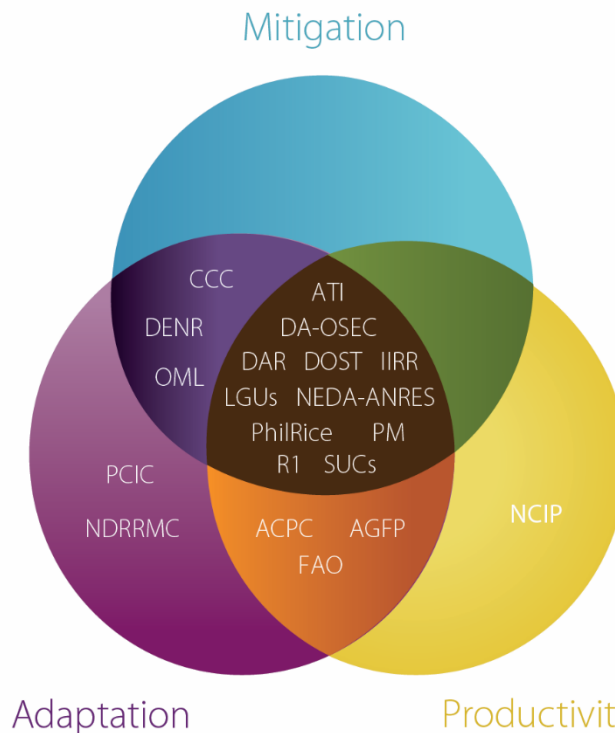
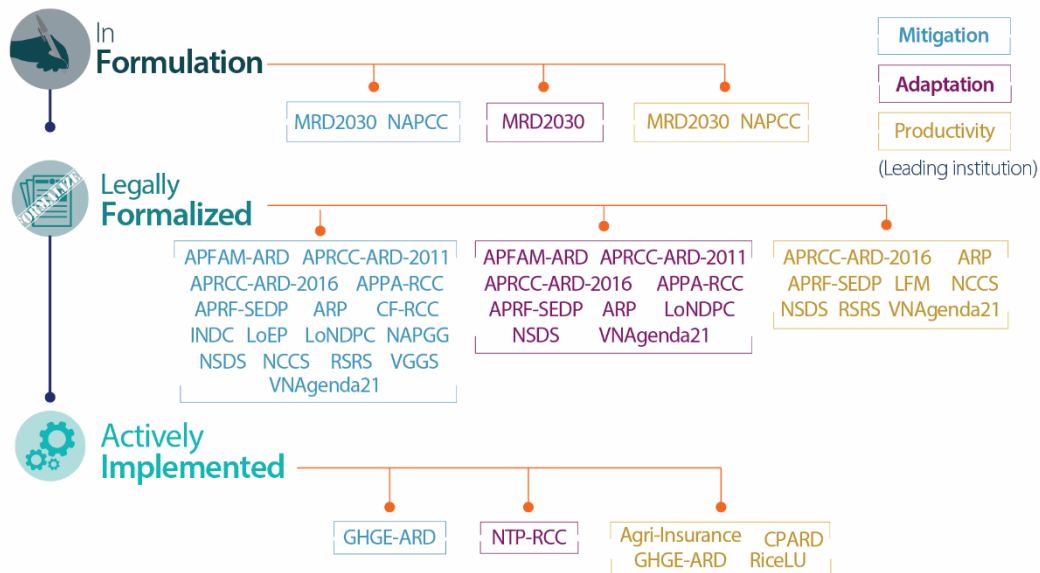


A CGIAR Research Center

What actions are needed to implement climate-smart agriculture?

CSA approaches include four major types of actions:

- **Expanding the evidence base** and assessment tools to identify agricultural growth strategies for food security that integrate necessary adaptation and potential mitigation
- **Building policy frameworks** and consensus to support implementation at scale
- **Strengthening national and local institutions** to enable farmer management of climate risks and adoption of context-suitable agricultural practices, technologies and systems
- **Enhancing financing options** to support implementation, linking climate and agricultural finance



Agri-Insurance The pilot provision of agriculture during 2011-2013 (2011) (GOV) **APFAM-ARD** Action Plan Framework for Adaptation and Mitigation in the Agriculture and Rural Development sector for the period 2008-2020 (2008) (MARD) **APPA-RCC** Action Plan to Implement Paris Agreement in Response to Climate Change (2016) (GOV) **APRCC-ARD-2011** Action Plan on Response to CC in Agriculture and Rural Development period 2011-2015 and vision to 2050 (2011) (MARD) **APRCC-ARD-2016** Action Plan to Response to CC in Agriculture and Rural Development, period 2016-2020, vision 2050 (2016) (MARD) **APRF-SEDP** Adaptation prioritization Framework for Socio-Economic Development Planning (2013) (MPI) **ARP** Agricultural Restructuring Plan towards raising added values and sustainable development (2013) (GOV) **CF-RCC** Protection and Management of Coastal Forest in response to climate change for the period from 2015-2020 (2015) (GOV) **CPARD** Credit Policies for Agricultural and Rural Development (2010) (GOV) **GHGE-ARD** Reduction of GHG Emissions in Agriculture and Rural Areas by 2020 (2011) (MARD) **INDC** Intended Nationally Determined Contribution of Viet Nam (2015) (National Assembly) **LFM** Encouraging cooperation, development of Large-scale Fields Models and linkages between production and consumption of agricultural products (2013) (GOV) **LoEP** Law of Environment Protection (2014) (National Assembly) **LoNDPC** Law of Natural Disaster Prevention and Control (2013) (National Assembly) **MRD2030** Planning on Agriculture and Rural Areas in the Mekong River Delta to 2020, vision to 2030 in the context of climate change (2014) (MARD) **NAPCC** National Action Plan on Climate Change period 2012-2020 (2012) (GOV) **NAPGG** National Action Plan on Green Growth in Vietnam for the period 2014-2020 (2014) (GOV) **NCCS** National Climate Change Strategy (2011) (GOV) **NSDS** Vietnam Sustainable Development Strategy for 2011-2020 (2012) (GOV) **NTP-RCC** National Target Programme on Response to CC (2008) (GOV) **RiceLU** Management and Use of Rice-farming Land (2012) (GOV) **VGGG** Vietnam Green Growth Strategy (2012) (GOV) **RSRS** Restructuring Strategy for Vietnam's Rice Sector up to 2020 and vision to 2030 (2016) (MARD) **VNAGenda21** Promulgating the oriented strategy for sustainable development in Vietnam (2004) (GOV)

ACPC Agricultural Credit Policy Council **AGFP** Agricultural Guarantee Fund Pool **ATI** Agricultural Training Institute **CCC** Climate Change Commission **DA-OSEC** Department of Agriculture - Office of the Secretary **DAR** Department of Agrarian Reform **DENR** Department of Environment and Natural Resources **DOST** Department of Science and Technology **FAO** Food and Agriculture Organization of the United Nations **IIRR** International Institute for Rural Reconstruction **LGUs** Local Government Units **NCIP** National Commission on Indigenous Peoples **NDRRMC** National Disaster Risk Reduction and Management Council **NEDA-ANRES** Agriculture, Natural Resources and Environment Staff - National Economic and Development Authority **OML** Oscar M. Lopez Center for Climate Change Adaptation and Disaster Risk Management Foundation **PCIC** Philippine Crop Insurance Corporation **PhilRice** Philippine Rice Research Institute **PM** Philip Morris Foundation **R1** Rice Watch and Action Network **SUCs** State Universities and Colleges

THINK: Updating existing methodologies and developing new research agendas

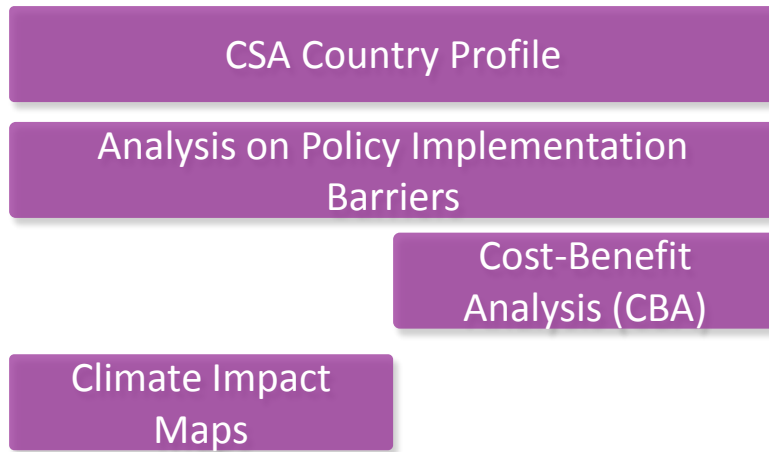
1. Stock-taking and understanding the context

2. Prioritizing interventions

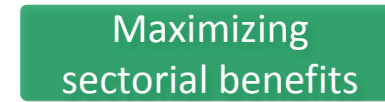
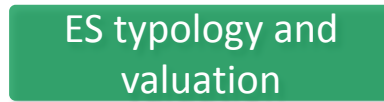
3. Piloting: Implementation & Monitoring

4. Scaling: Inform Policy Design, Implementation & Monitoring

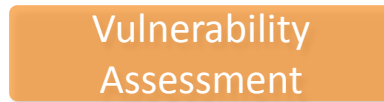
Climate Policy Hub
Economic and Policy Analysis



Ecosystem Services



Big Data

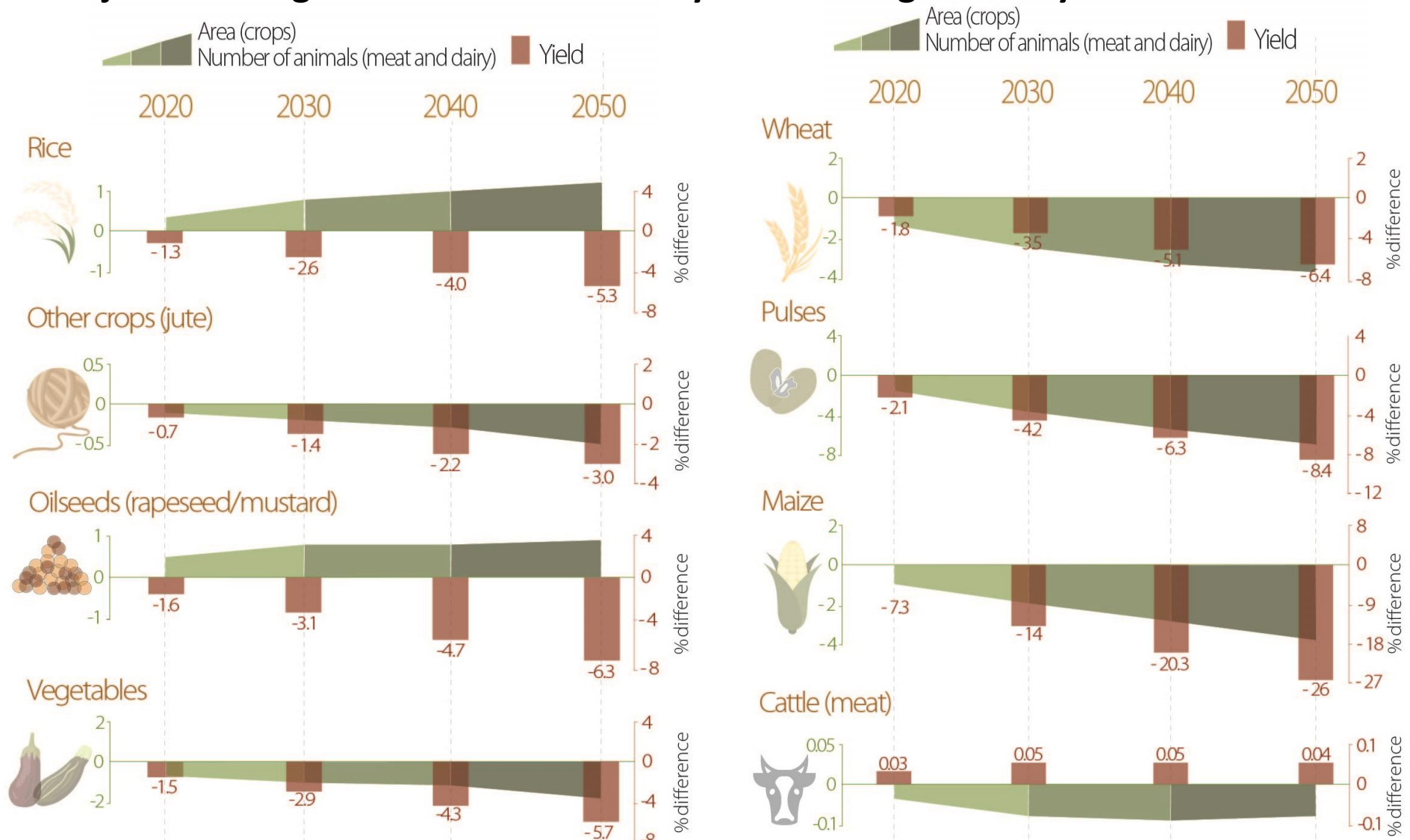


Our vision, a sustainable food future



National Context: Vulnerable to climate change

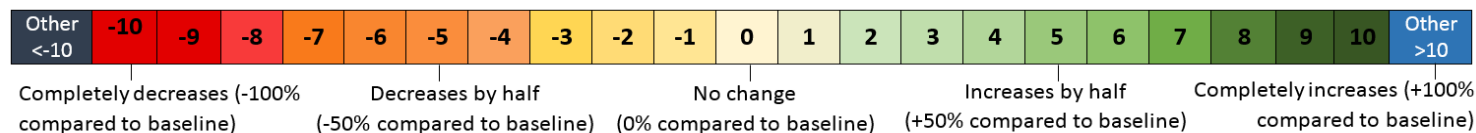
Projected changes in suitable area and yields in Bangladesh by 2050*



*A negative value denotes potential decreases in area and yield expressed as percentage change in a climate change scenario vs. non climate change

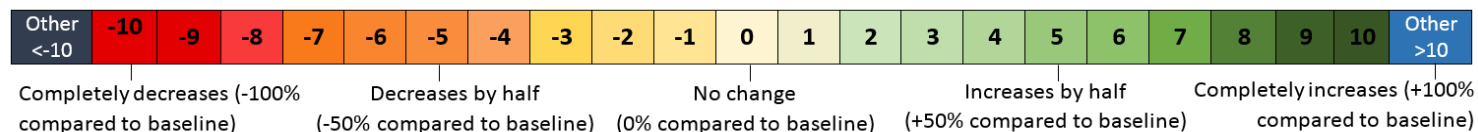
Assessing the smartness levels using CRA indicators

By IMPLEMENTING the practice what are the expected changes in the following indicators?			
	Indicator (Average)	REGION A (-10 to 10 scale)	REGION B (-10 to 10 scale)
1.29	Yield (crop/livestock)	FOOD/YIELD SMART	
1.30	Post-harvest loss		
1.31	Income generated from crop/livestock production	INCOME SMART	
1.32	Quantity of water available for crop/livestock production		
1.33	Quantity of water used per unit of product (water use efficiency)		
1.34	Quality of water used for crop/livestock production	WATER SMART	
1.35	Equilibrium in the water cycle (balance between water inflow and outflow) in the ecosystem		
1.36	Soil's capacity to retain water in areas under crop/livestock production		
1.37	Level of soil disturbance (ploughing)	SOIL SMART	
1.38	Ability of farmers to manage climate risks	RISK/INFO SMART	
1.39	Ability of farmers to limit the system's exposure to climate risks		



Assessing the smartness levels using CRA indicators

By IMPLEMENTING the practice what are the expected changes in the following indicators?			
	Indicator (Average)	REGION A (-10 to 10 scale)	REGION B (-10 to 10 scale)
1.40	Diversification of income sources on the farm	RISK/INFO SMART	
1.41	Use of local and traditional knowledge to manage crop/livestock		
1.42	Quantity of energy used from fossil fuels for crop/livestock	ENERGY SMART	
1.43	Quantity of energy used from renewable sources for crop/livestock		
1.44	Quantity of above-ground biomass (ABG) available for crop/livestock	CARBON SMART	
1.45	Quantity of below-ground biomass (BGB) available for crop/livestock		
1.46	Content of soil organic matter (SOM) in soils accumulated in crop/livestock cultivated areas		
1.47	Quality of animal diet (including diet diversification, forage quality) <i>(for livestock systems only)</i>		
1.48	Quantity of manure produced that is left on pastures/ fields <i>(for livestock systems only)</i>		
1.49	Quantity of organic AND/OR inorganic fertilizer used per unit of product? (mention type of fertilizer assessed: organic, inorganic or both)		



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