„Climate – Smart“ Agriculture

overview

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October 2016

The Challenge

The new challenge for agriculture is emphasised by different organisations:

in 2010 the Committee on World Food Security (CFS) commissioned a study on climate change and food security and food,

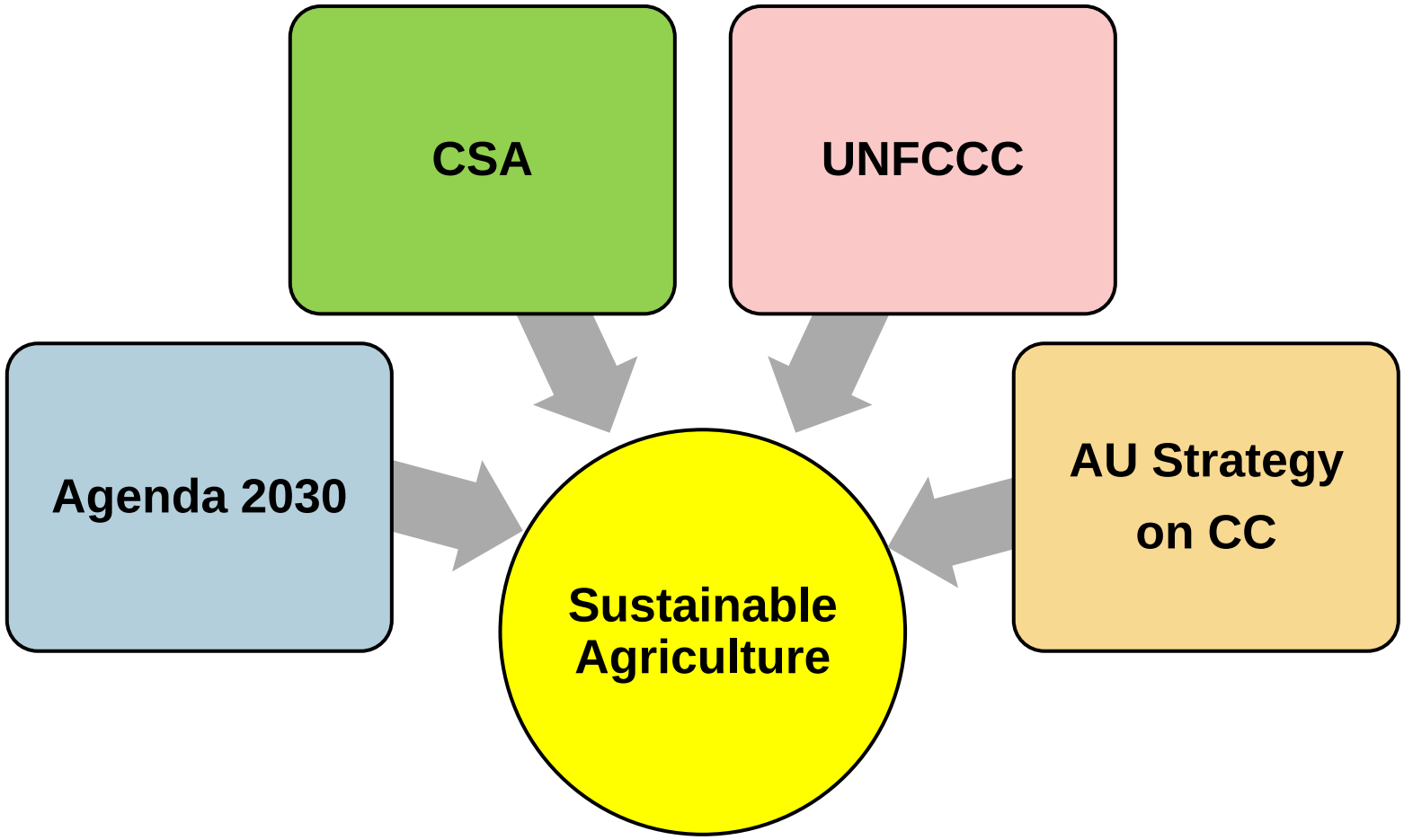
Study on food and agriculture: the future of sustainability – UN Committee on Sustainability Assessment 2012

World development report 2008 (agriculture for development) and 2010 (development and climate change)

UNDP green economy report (2011)

→ in 2010 the FAO developed the concept of **Climate- Smart Agriculture (CSA)**

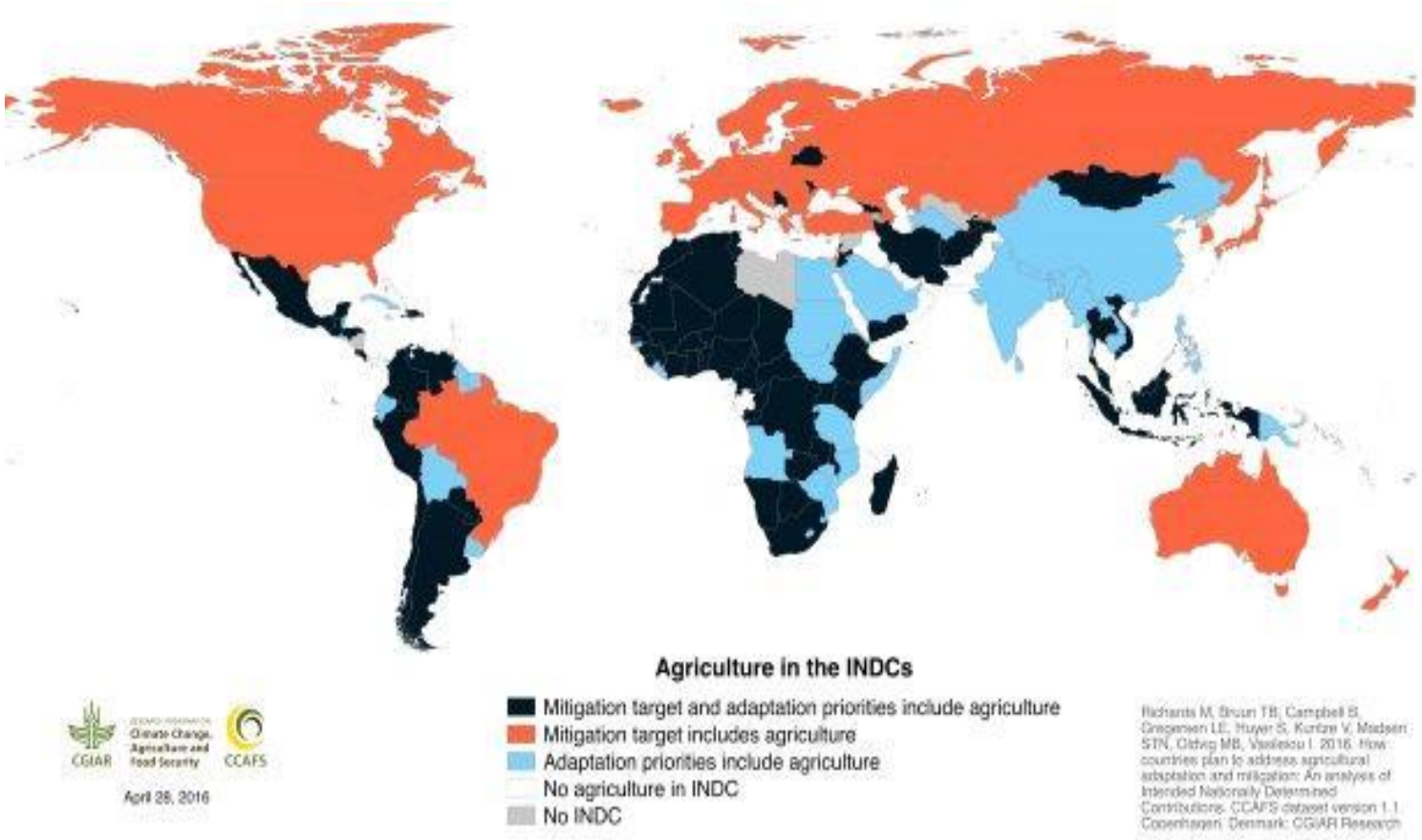
Addressing the Challenge



Agenda 2030 and Paris Agreement

SDG 2: Zero Hunger	SDG 12: Responsible Consumption & Production	SDG 13: Climate Action	SDG 15: Life on Land	Integrated Approach including all SDGs

The global framework: Agriculture & (I)NDCs



Source: CGIAR/CCAFS 2016

Definition of „Climate-Smart“ Agriculture (CSA)

CSA is an approach to help guide the management and transformation of agriculture for food security under the realities of climate change

It is composed of three main pillars:

1. **Sustainably increase** agricultural productivity and **incomes**;
2. **Adapt** and build **resilience** to climate change;
3. **Reduce** and/or remove greenhouse gases emissions, where possible.

FAO, 2013: Climate-Smart Agriculture Sourcebook

Old vine in new bottles? What is new?

- Inclusion of mitigation (sequestration of CO_2 in soils, reduced emissions of greenhouse gases)
- Provision of funds to finance CSA (e.g. through green climate fund – GCF, REDD+); however it is not clear in how far and what extent GCF and REDD+ funds can be used to finance CSA activities.
- Emphasis on climate change projections and forecasts as basis for formulation of National Adaptation Plans (NAP) and measures
- Increasing importance of insurances to cover loss and damage

Critical issues

(mainly raised by NGOs and CSOs and developing countries)

- Strong focus on mitigation and carbon markets
- Danger of small-scale farmers to focus too much on carbon certificates rather than improving resilience
- Incorporation of CSA in the carbon market benefits large-scale agriculture enterprises at the cost of small-holder farmers who will receive less money for promotion of sustainable agricultural initiatives.
- Very much focused on climate at the costs of biodiversity
- CSA approach is often used synonymous with sustainable agriculture, although it may be part of it only.

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Increased demand

- Population growth
- Dietary changes

Sustainability

- Availability of land
- Pressure on natural resources & ecosystem services

CSA Pillar 1:
Sustainably increase agricultural productivity and incomes

Source: FAO

Changes in the nature and the geographic distribution of environmental conditions, e.g.:

- Temperature
- Rainfall amounts and distribution
- Extreme weather events (droughts, storms, floods)
- River flows
- Sea levels
- Ocean temperature and acidity

Affecting:

- Growing conditions of crops, livestock, fish, trees
- Ecosystems services
- Livelihood of people, often the poorest

CSA Pillar 2:

Adapt to climate change and build resilience.

Source: FAO

CSA Pillar 3:
Reduce/remove GHG emissions, where possible

- Achieving the Paris Agreement requires action in the agriculture sectors
- Many developing countries have committed to mitigation in the agriculture sectors
- Agriculture sectors potential for adaptation-mitigation synergies recognized

GHG reductions –

Key elements:

Resource Use Efficiency
Improved management

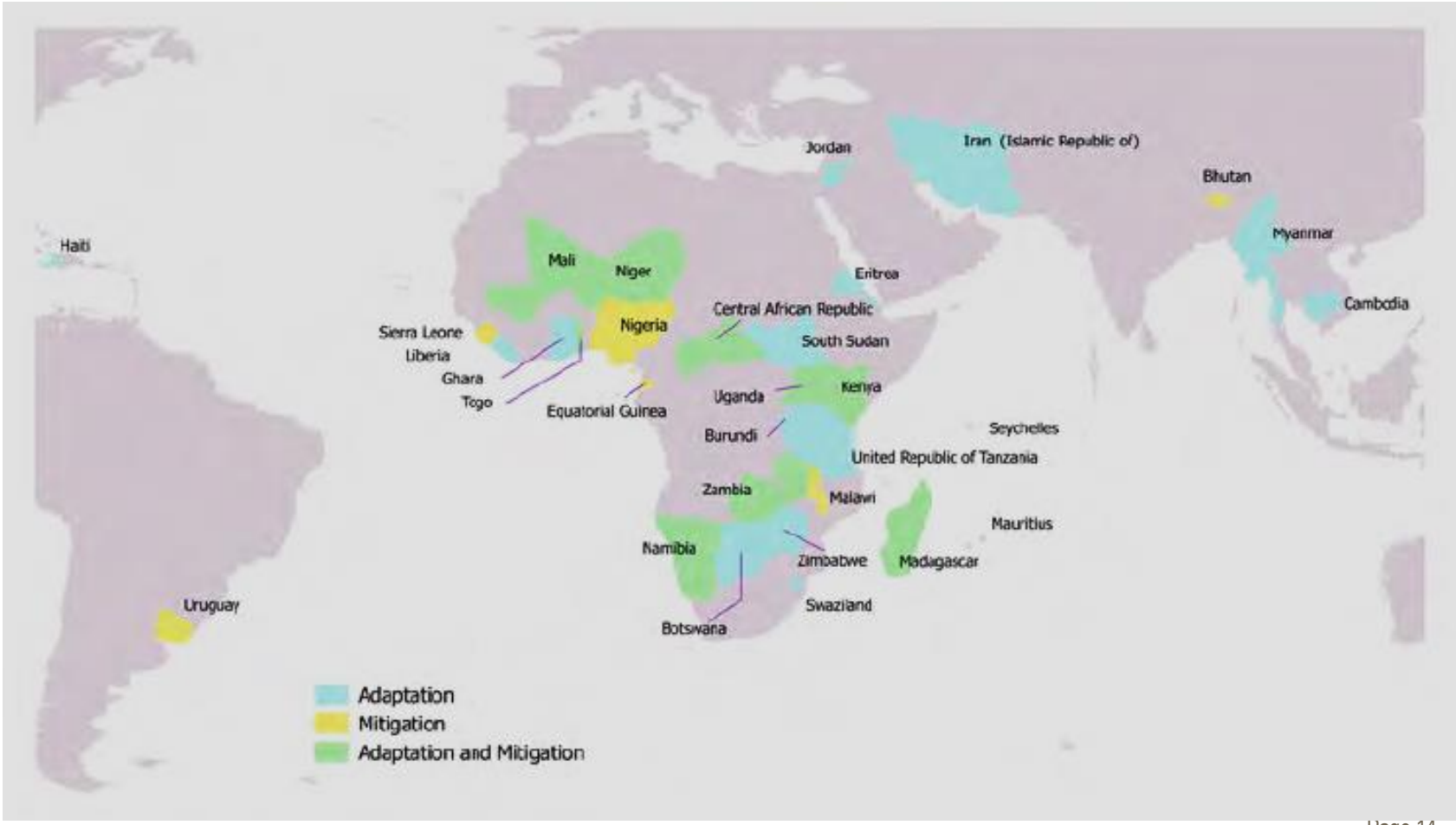
Combining reduction of emission intensity with productivity increase

Source: FAO

Major Stakeholders

- FAO: - MICCA-Project (Mitigation of Climate Change in Agriculture), - FAO-Adapt
- World Bank
- CCAFS (CGIAR Programme on Climate Change, Agriculture and Food Security)
- CSA partnership: including CCAFS, FAO, The Global Mechanism, IFAD, World Bank, WFP und UNEP
- CFS (Committee on World Food Security)
- HLPE (High Level Panel of Experts on Food Security and Nutrition)
- NGOs und Civil Society Organisations (CSOs)
- Private sector (e.g. companies that promote integrated pest management and targeted fertiliser application)

Country commitments: More than 30 countries explicitly refer to CSA in their INDCs



CSA in German Development Cooperation

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Food Security

under Climate Change

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Sustainable increase of

Agricultural Productivity

Adaptation

of agriculture to climate change (Resilience)

(if possible) Mitigation

of GHG emissions from agriculture

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Components of CSA

Enhancing the **policy-framework** for CSA

Capacity Development for CSA

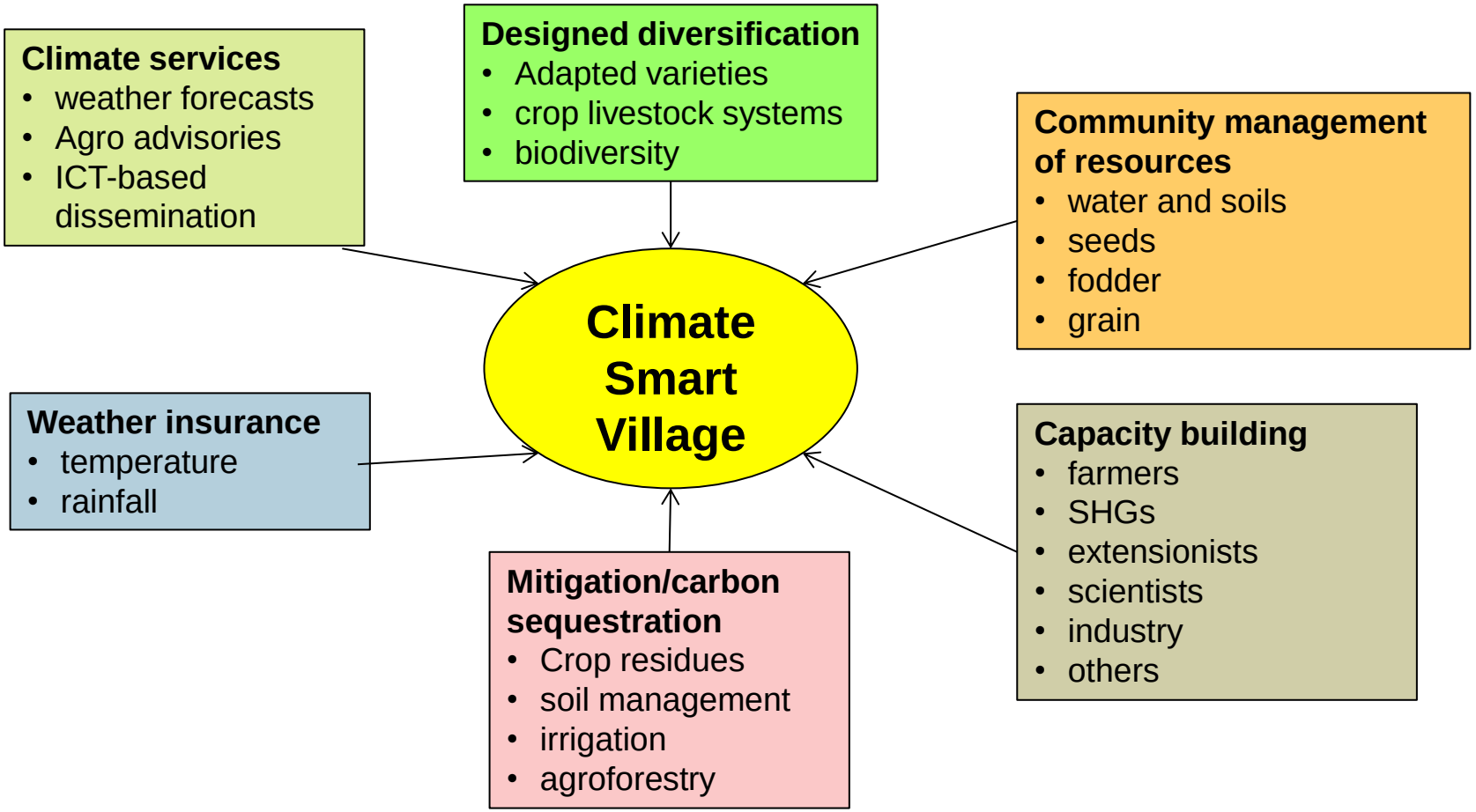
Financing mechanisms for CSA

Improvement of **climate-specific data** in agriculture

Fostering CSA at **local level**

From left to right: © GIZ / Markus Kirchgessner, Joerg Böthling, Shilpi Saxena, Ursula Meissner, Michael Kottmeier

“Climate-smart” villages: engagement of multiple stakeholders necessary for support



Climate-smart practices in smallholder agricultural production

Crop management	Livestock management	Soil and water management	Agroforestry	Integrated food energy systems
▪ Intercropping with legumes ▪ Crop rotations ▪ New crop varieties (e.g. drought resistant) ▪ Improved storage and processing techniques ▪ Greater crop diversity (agrobiodiversity)	▪ Improved feeding strategies ▪ Rotational grazing ▪ Fodder crops ▪ Grassland restoration ▪ Manure treatment ▪ Improved livestock health ▪ Animal husbandry improvements	▪ Conservation agriculture (e.g. minimum tillage) ▪ contour planting ▪ terraces and bunds ▪ planting pits ▪ water storage (e.g. water pans) ▪ alternate wetting and drying (rice) ▪ dams, pits, ridges ▪ improved irrigation (e.g. drip)	▪ Boundary trees and hedgerows ▪ nitrogen fixing trees on farms ▪ multipurpose trees ▪ improved fallow with fertiliser shrubs ▪ woodlots ▪ fruit orchards	▪ Biogas ▪ production of energy plant ▪ improved stoves

Synergies Aquaculture and Fisheries

- Promoting sustainable fish farming (e.g. rice - fish culture)
- Developing countrywide maps that depict areas for shore protection
- Encouraging coastal and watersheds basin management approach linking land-use practices to marine and fisheries resources conservation

ridge to reef approach

- Establish fisheries biodiversity network to identify and monitor species that will be affected by climate change

Synergies at Landscape Management Level

- **Agrobiodiversity** (genetic diversity, plant species richness, conservation of soil fauna and flora)
- **Agroforestry** (increased resilience, nitrogen fixing)
- **Organic Agriculture** (Mitigation potential depends on organic farming system: (0.4 t – 11 t Carbon/ha/year)
- **Ecosystem and Sustainable Approaches** (sustainable agriculture, sustainable forest and landscape management, conservation agriculture, precision farming, climate smart agriculture),

An ideal climate-smart landscape of the future

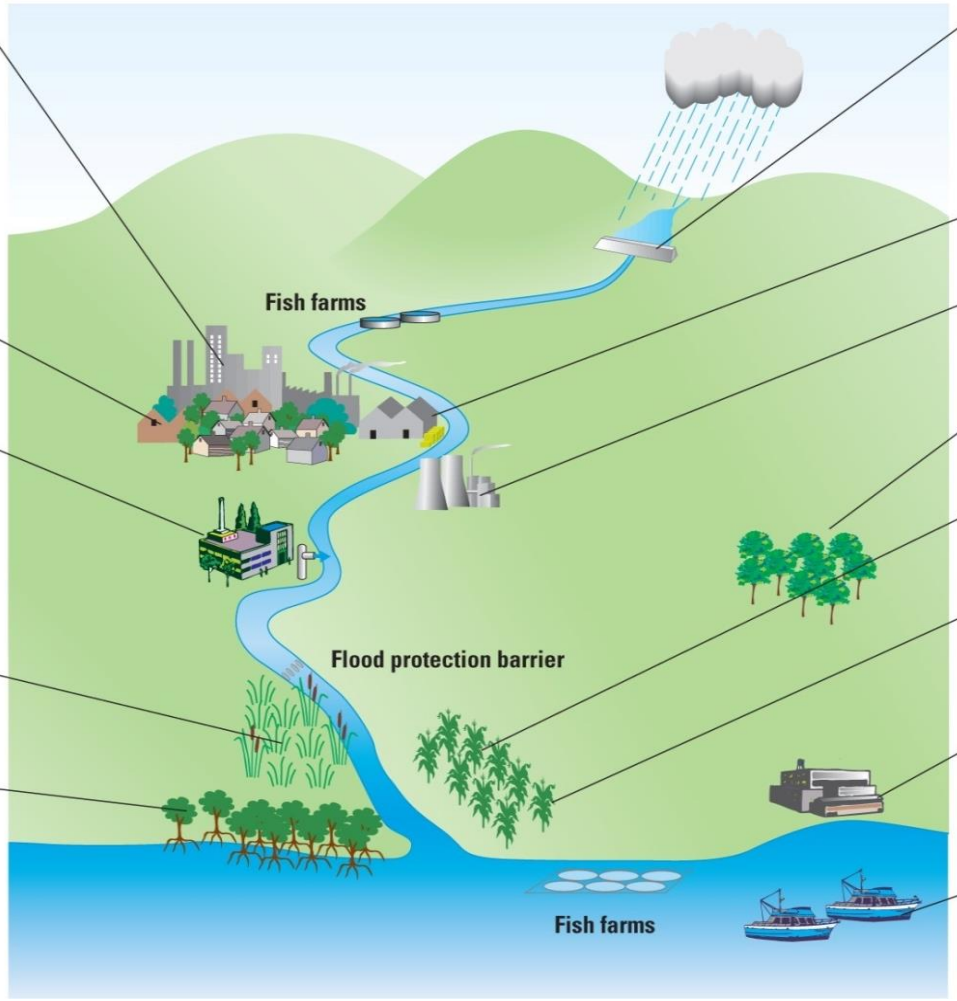
City
built away from the flood plain
- distributed energy system including renewables
- planned for low-carbon transport
- buildings use low environmental-impact materials
- road materials and drainage designed for increased temperatures and severe storms

Bonded warehouse
for grain stocks to buffer price shocks in international grain market

Wastewater treatment plant
treated water
- injected into aquifer to protect against saline intrusion
- piped to coastal wetlands to counteract excess abstraction
- used for irrigation upstream

Wetlands
preserved to sequester carbon, provide habitat, and purify water

Mangroves protected:
- in response to incentives from carbon credits
- to provide ecosystem services, including fish nursery and storm protection



Dam
- provides energy, irrigation, and drought and flood protection
- re-engineered to cope with extreme rainfall and minimize environmental damage

Upgraded port and customs facility
to facilitate international trade

Power station
carbon captured and stored underground

B **Indigenous trees**
sequester carbon in former wasteland

Modern crop varieties
adapted to climate change stress

Coastal agriculture
with irrigation from coastal aquifers protected from saline intrusion

Desalination plant
- uses renewable energy
- provides water to city and coastal agriculture

Regulated fishery
ensures catch is at sustainable levels

Source: World Development report , 2010

Steps in planning CSA measures

1. Vulnerability assessment (target groups)
2. Identification of adaptation measures
3. Identification of measures for reduction of emissions
4. Identification of potential for carbon storage
5. Elaboration of an action plan (integrated planning: including agriculture, forestry, fisheries and water) at different levels – local, watershed, regional
6. Explore possibilities for "carbon finance" (NEPAD, GCF…)
7. If possible link to climate risk insurances
8. Provision and dissemination of timely climate information to farmers

Thank you and hope to see you again!