Agriculture, Food security and Climate change

Structured Expert Dialogue
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A Triple Challenge

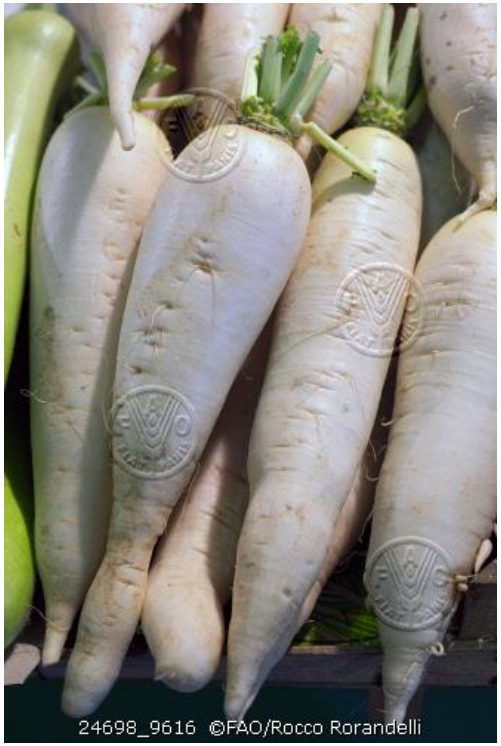
- Food Security and Nutrition: more food, in quantity, quality and diversity, everywhere for everyone
- Adapt to Climate Change
- Contribute to mitigate Climate Change

A growing demand

- World's population will increase by one-third by 2050
- In some countries, population will double, or more.

- FAO estimates that global agricultural production will have to increase by 60% to satisfy increased demand, driven by population growth and diet changes

What effects of climate change on these ?



Pollinators

- 80% of flowering plant species are highly dependent on animal vectors for successful reproduction

Rift Valley Fever (RVF) Impact of climate change

- Floods
  - Hatching of aedes eggs
- High temperatures
  - Increase feeding frequency
  - Increase egg production
  - Decrease the duration of development cycle
- Mosquito density increase

Combining biophysical and socioeconomic futures

- With high population growth and low income growth avrage kilocalorie availability declines in al regions by 2050.
- CC increases the number of malnourished children by about 10% as compared to no CC.
- Trade flow changes.
- Models do not take into account effects of increased variability and extreme events; nor of adaptation.

(HLPE, 2012)

Main effects of climate change on agricultural production

- Decrease of production in certain areas
- Changes in the geography of productions
- Increased variability of production

Impact on Food and Nutrition Security

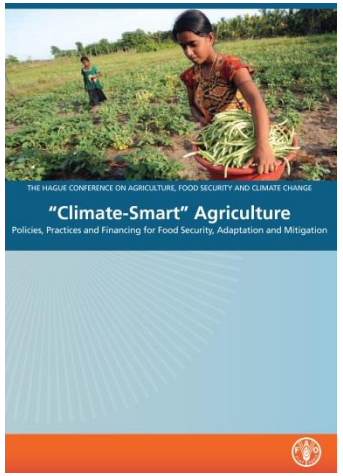
- Impacts on the most vulnerable countries
- Impacts on the most vulnerable people, including small holders
- Impacts on food security and nutrition

Agriculture can contribute to mitigate

- Reduce emissions per kg of output (decorrelate production growth and emissions growth)

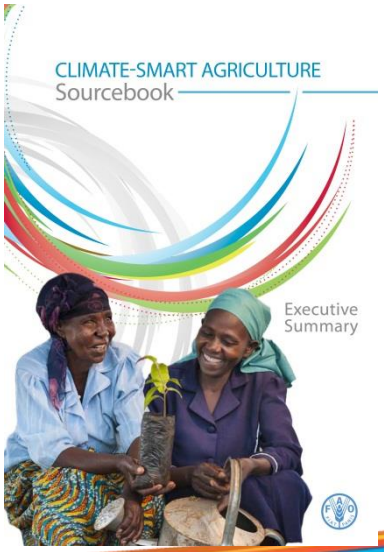
- Enhance agricultural soil carbons sinks

Concept of CSA first presented by FAO in 2010.



An approach to address these 3 interlinked challenges by appropriate:

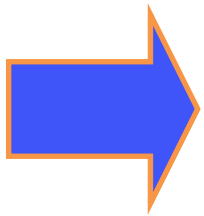
- practices
- policies & institutions
- finances



CSA Food systems

More efficient and more resilient

1. More food, in quantity, quality and diversity
2. Adapt to Climate Change
3. Contribute to mitigate Climate Change



More <u>resource efficient systems</u>: use less land, water, inputs to produce more food sustainably

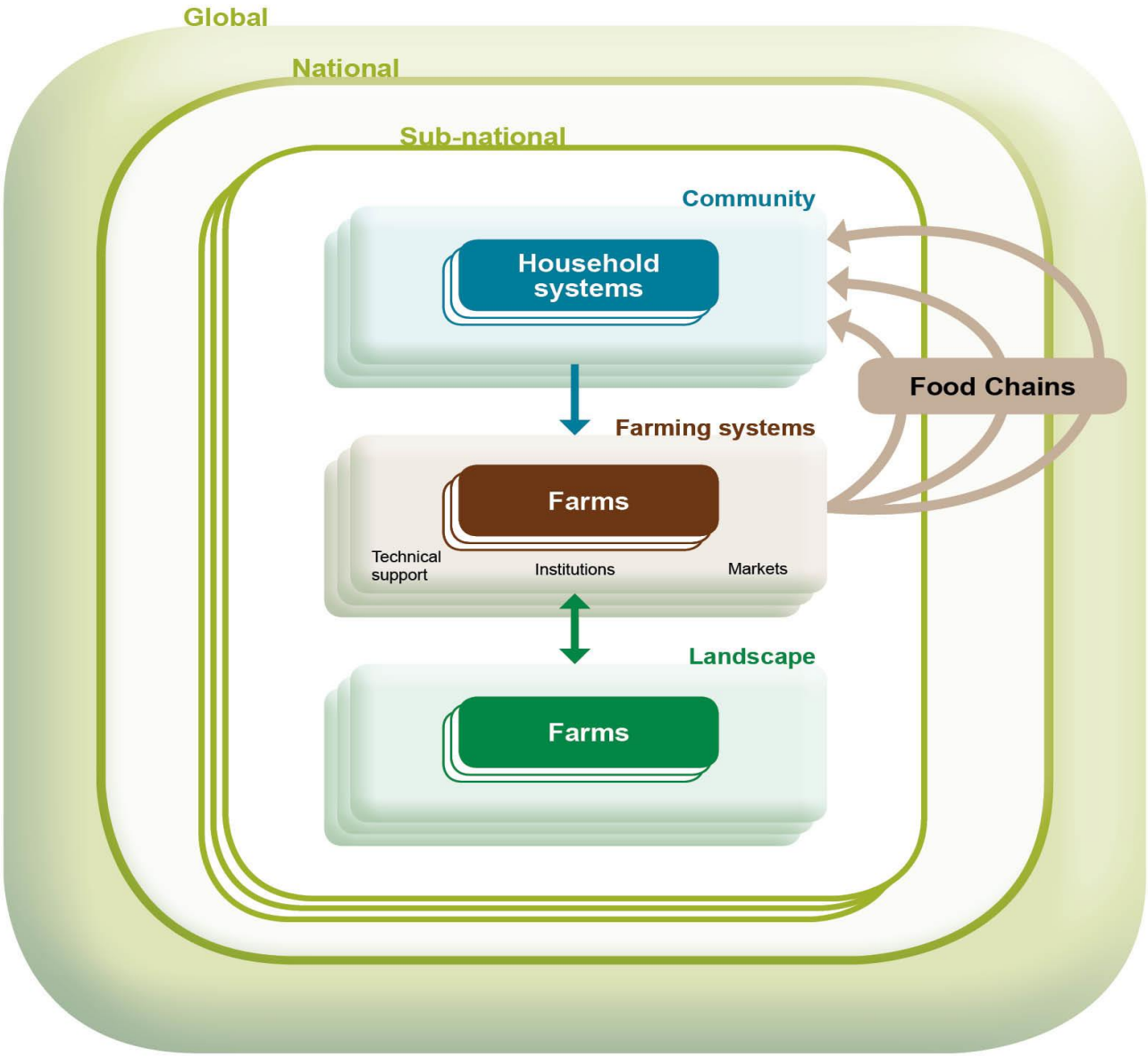
More <u>resilient systems</u> to changes and shocks

Increasing the general resilience of food systems

- Consider adaptation to CC as part of the broader need to build a more resilient food system
- In the perspective of having to produce more food
- Consider the needs and rights of farmers
- Protect vulnerable groups and communities from major price swings
- Lack of sustainability in food production is a key threat to resilience

(HLPE, 2012)

Systems at different scales



Gitz & Meybeck 2012

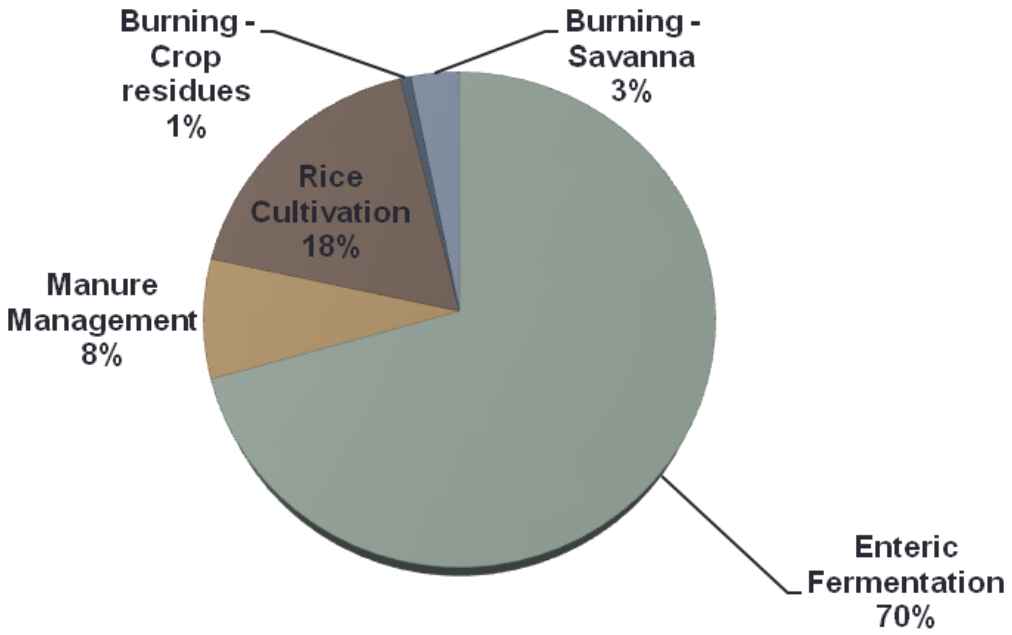
Methane emissions from livestock

How much ?

Agriculture accounts for 50% of global methane emissions

Within agriculture, 78% of methane emissions are from livestock

Estimated Global Anthropogenic Methane Emissions by Source



FAOSTAT, 2014

Methane emissions are energy losses

Total enteric methane emissions at global level

equivalent to 144 Mt oil/year

= final energy consumption of France…

Total manure methane emissions at global level

equivalent to 29 Mt oil/year

→There is a strong link between GHG emission intensity and natural resource use efficiency

A wide range of technical interventions to improve natural resource use efficiency & productivity and reduce emissions

Enteric CH_4

At animal AND herd level

- Improved feeding practices and feed processing
- Supplement feeding
- Improved herd management and animal husbandry (genetics, health, reproduction)

Manure CH_4

- Manure storage and separation
- Manure covers
- Nutrient and energy recovery through anaerobic digestion
- Nutrient balance in the diet

Why focus on livestock methane ?

- **Opportunity for high impact**. 78% of agricultural and 40% of global methane emissions; expected to grow
- **Low cost and wide range of co-benefits** (climate, productivity, profitability, food security, nutritional benefits, human health benefits, adaptation (green energy), etc.)
- **Technologies are available**: Existing, cost-effective reduction opportunities (esp. for low productive systems) using relatively common practices >> number of barriers need to be overcome

Investment proposals for climate smart livestock in Zambia

Improved feeding practices & grazing management

Production +3% to +7%
Emissions -7% to -15%

Improved health & reproduction management

Production +14% to +21%
Emissions -1% to +1%
(reduced mortality)

Energy & nutrient recovery from manure with anaerobic digestion

Cooking energy for 21,000 to 61,000 households
Emissions -7%

Overall potential for livestock production growth : 17 to 28%

Overall reduction of GHG emissions: 32% to 38%, including carbon sequestration in grasslands

Technical packages designed with national livestock sector stakeholders, modelled in GLEAM as contribution to EPIC programme for climate smart agriculture investment proposals in Zambia

CLIMATE-SMART AGRICULTURE on the GROUND

Preserving the Agro-forestry system on Mount Kilimanjaro

Kihamba landscape, Tanzania

In the slopes of Kilimanjaro, **Tanzania**

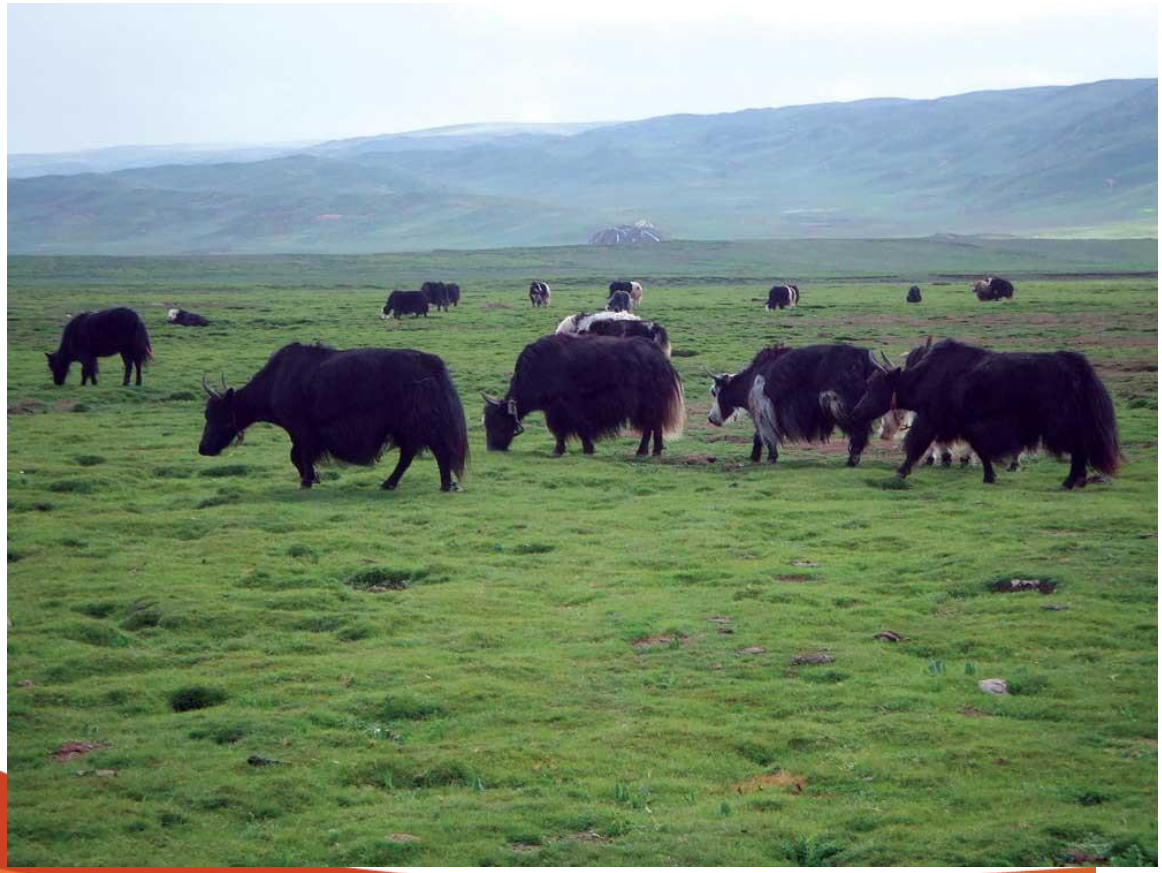
120 000ha of **agroforestry**

Include coffee crops that will **INCREASE** income by **25%**

In **3** years

www.fao.org/climat

Sustainable grazing for better livelihoods in China



Yak grazing in Qinghai, China

the average annual mitigation potential is

CO_2
63 000
tonnes

Climate-smart agriculture for smallholder farmers in Kenya and Tanzania

Woman harvesting in Kenya

Some **2500** farmers in **Tanzania** & **Kenya**

46% women

trained in climate-smart agriculture resulting in

33 500 tree seedlings planted

44 tree nurseries

235 terraces established to conserve soil and water

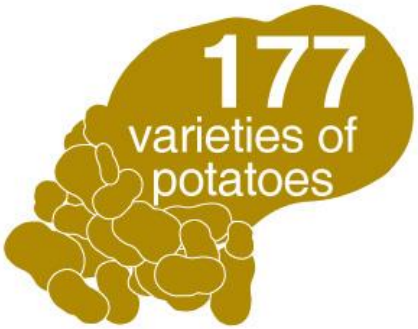
2 biogas digesters to produce renewable energy from cow manure

300 energy-efficient cooking stoves to reduce deforestation

www.fao.org

Andean agriculture: the importance of genetic diversity

Varieties of potato for sale at the local market, Peru



A landscape approach for policy making, planning, and monitoring in the Kagera river basin

A panoramic view of Lake Burera, Rwanda

Promoting the development of urea deep placement in Nigeria through South/South cooperation

Rice farmer examines his crop in Kiroka, Tanzania

BANGLADESH
rice systems

increased yields by **25%**

decreased nitrogen losses by **40%**

decreased urea use by **25%**

Thank you!