

The Impact of Climate Change on Global Agriculture

Hom Gartaula, PhD

Theme Lead, Gender and Social Inclusion Research

Integrated Development Program

CIMMYT

27 April 2021



Presented to People2People, Manitoba Canada





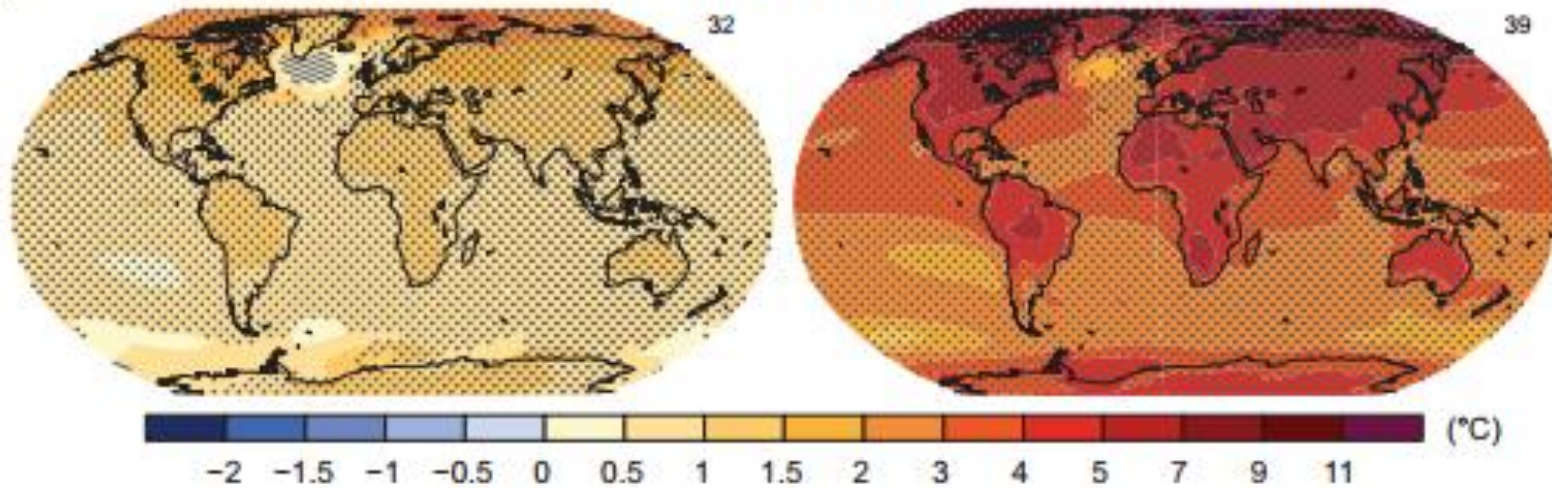
Background

- About 28% (1 billion) people work in agricultural sector globally
- Over 570 million farms are used for agricultural production (most of them are small and family-run)
- About 12% of world's agricultural land is small farms of less than 2 ha
- About 75% of the world's agricultural land are family operated

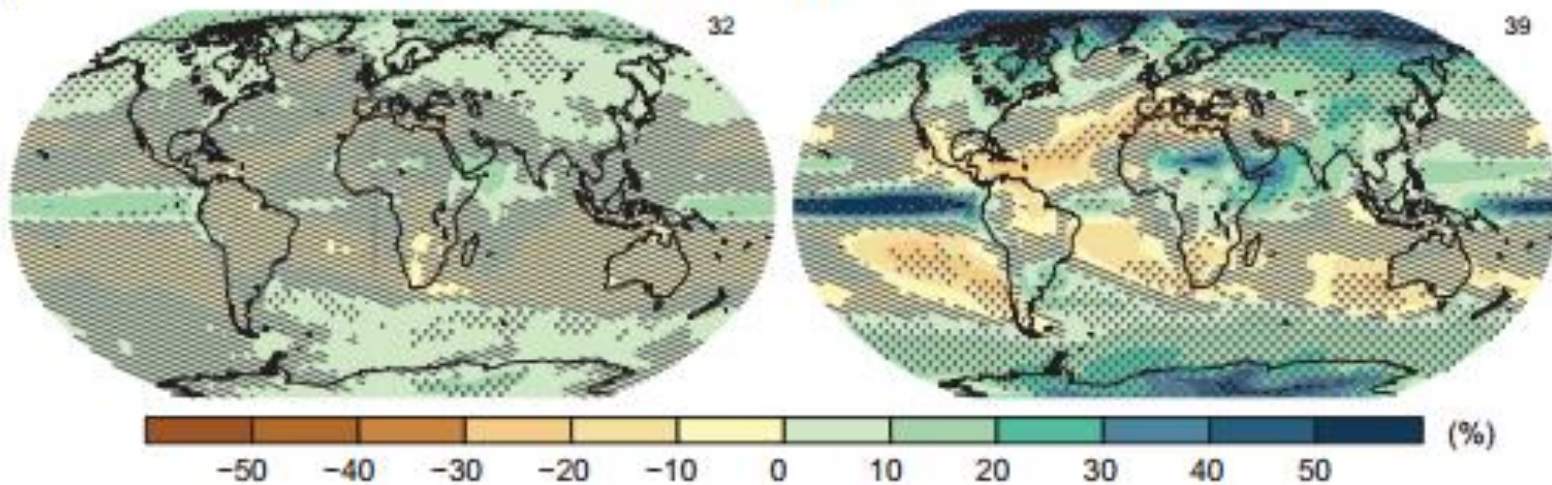
RCP 2.6

RCP 8.5

(a) Change in average surface temperature (1986–2005 to 2081–2100)

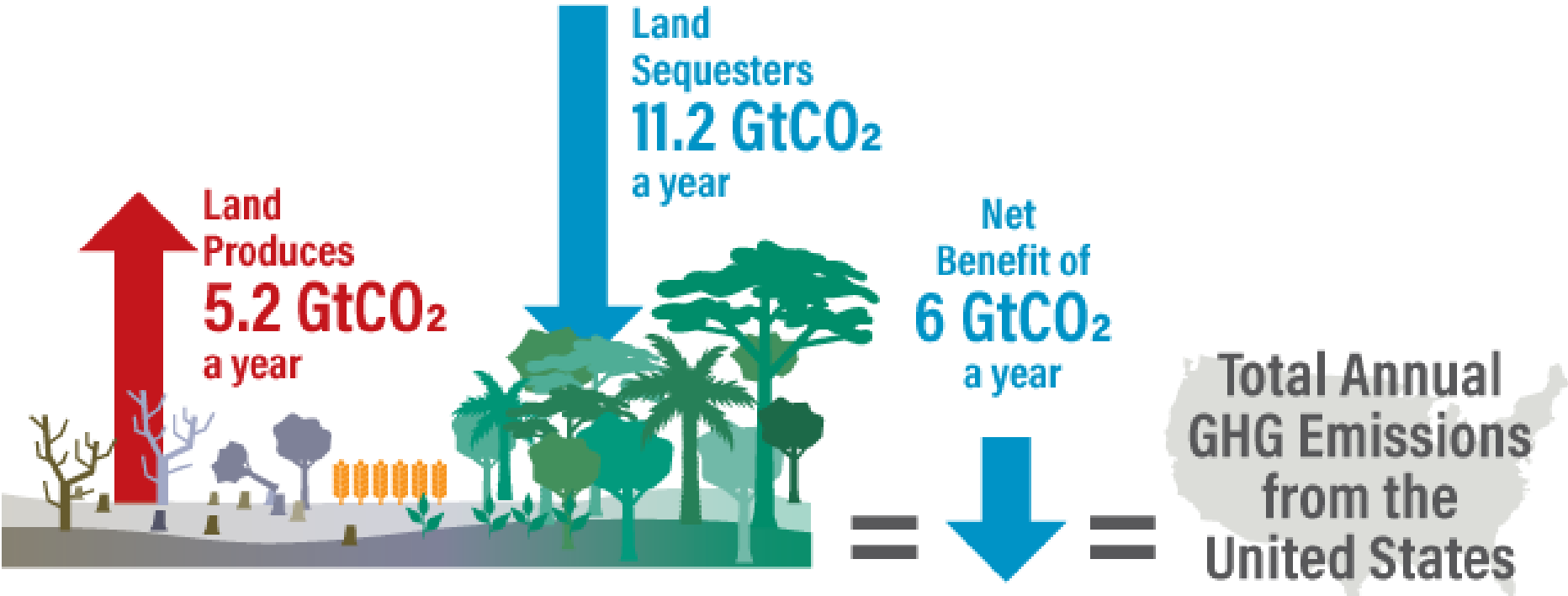


(b) Change in average precipitation (1986–2005 to 2081–2100)





Land is Both a Powerful Sink and Emitter of Carbon Dioxide Emissions



Note: Values are an average over 2007-2016
Source: IPCC Special Report on Climate Change and Land

 WORLD RESOURCES INSTITUTE

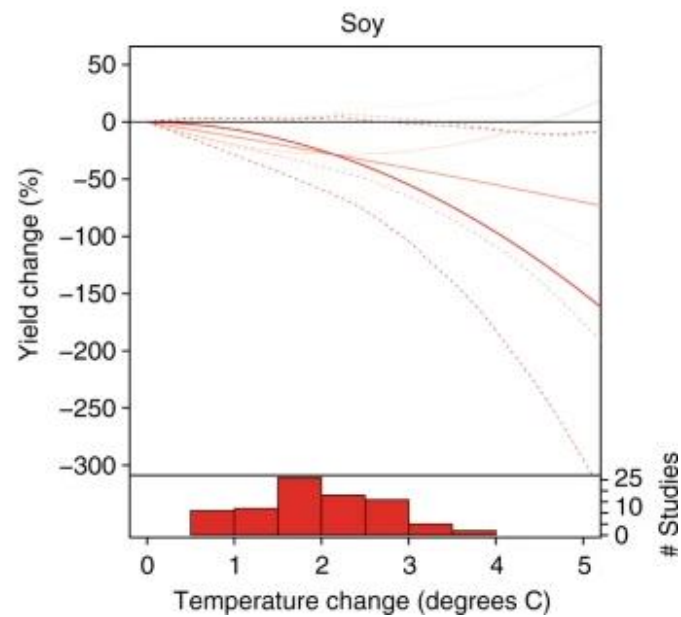
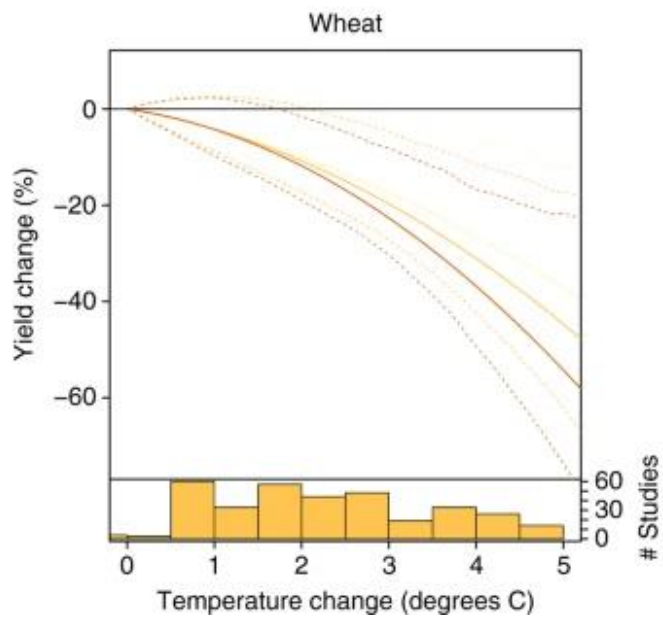
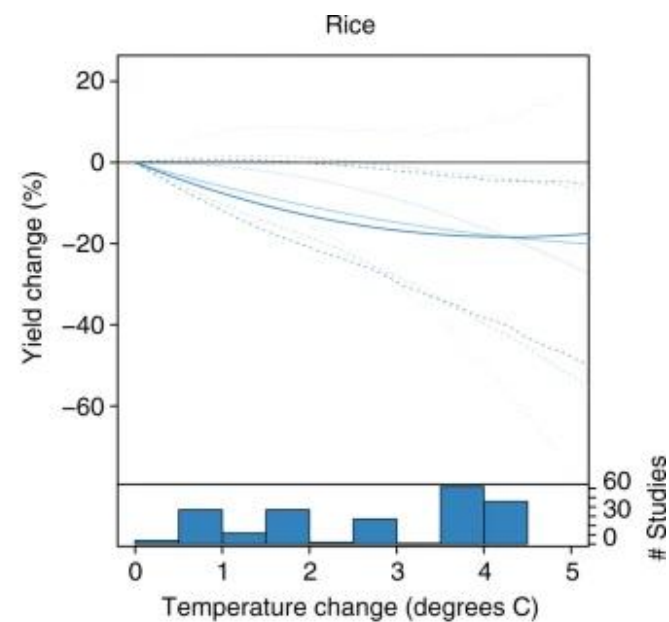
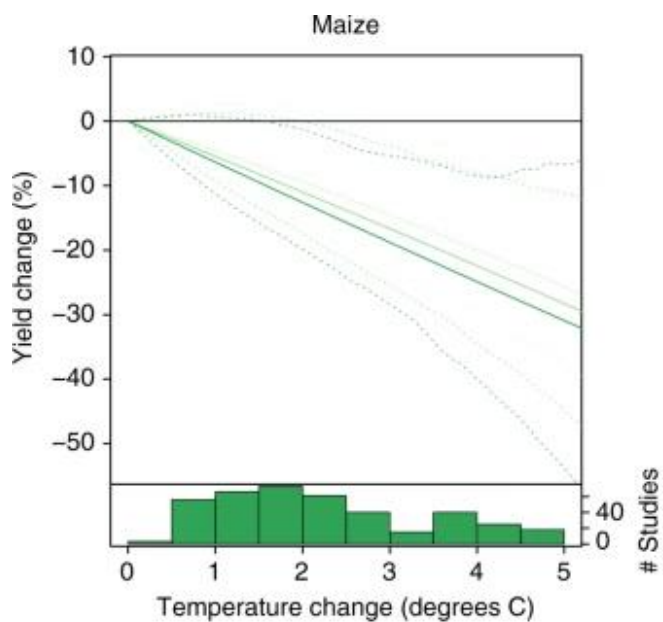


Agriculture and climate change

- About 23% of global human-caused greenhouse gas emissions come from agriculture, forestry and other land uses
- Agriculture is the second largest employer of the global population after services, employing about 24% of employment
- Significant contributor for GHG emissions, but also provides opportunities for mitigation



Climate change impacts



Consequences

- Changes in crop yield
- Smallholder poor farmers in the resource poor areas are the most vulnerable to food insecurity
- Lack of efficient/sufficient resources to cope with
- Increased production costs for adaptation, causing increasing food prices – for consumers
- Some areas could gain from warm temperature – polar regions, thawing permafrost
 - May not be a good signal
 - Add to more complex challenges in the north

Short-term fixes may create long-term problems



Opportunity for innovation

- Climate smart crop varieties



BILL & MELINDA
GATES foundation

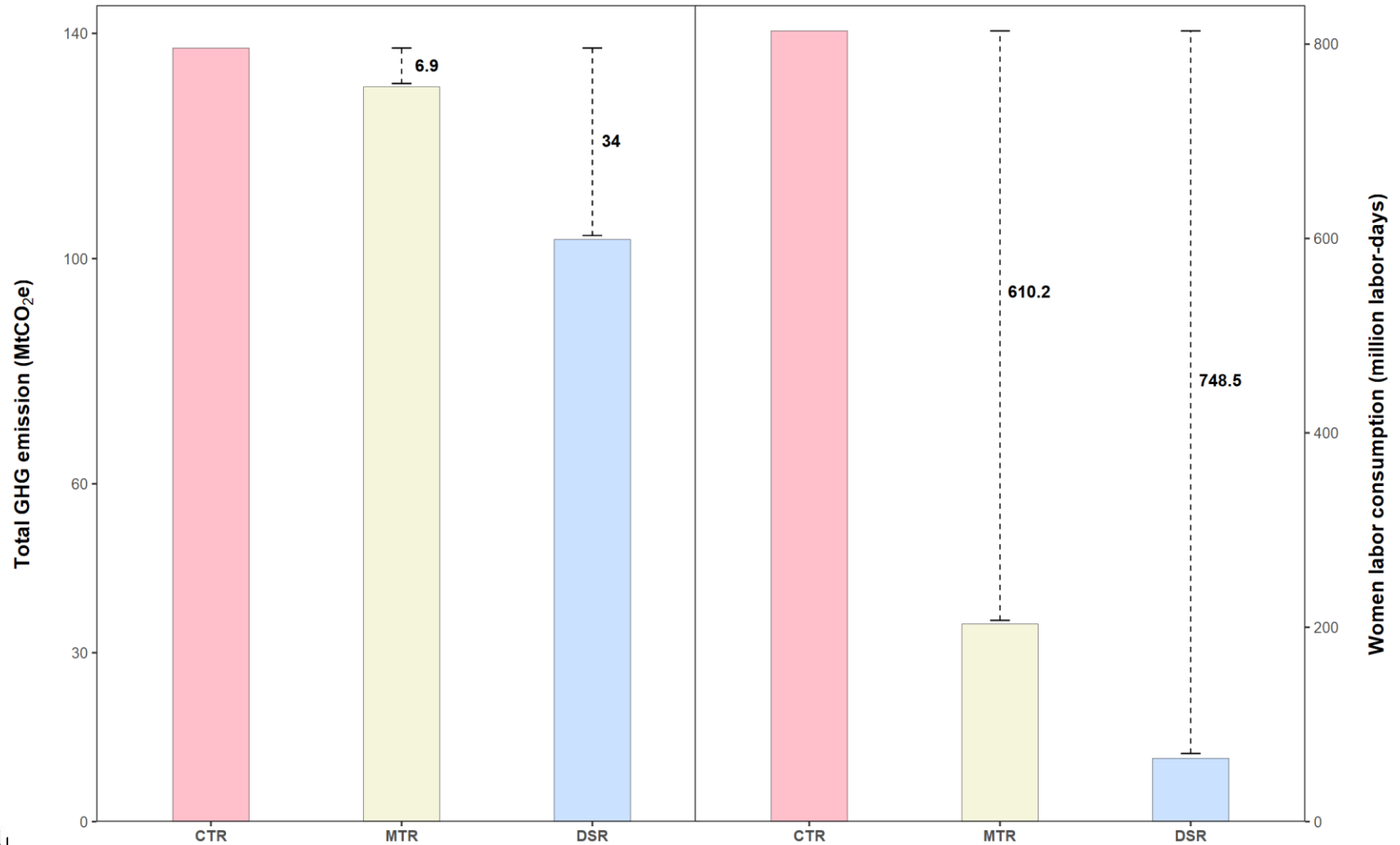


Opportunity for innovation

- Climate smart farming
 - Conservation agriculture
 - Zero/minimum tillage technology
 - Crop diversification
 - Stover retention
 - Mechanical transplanted rice
 - Mini-tillers

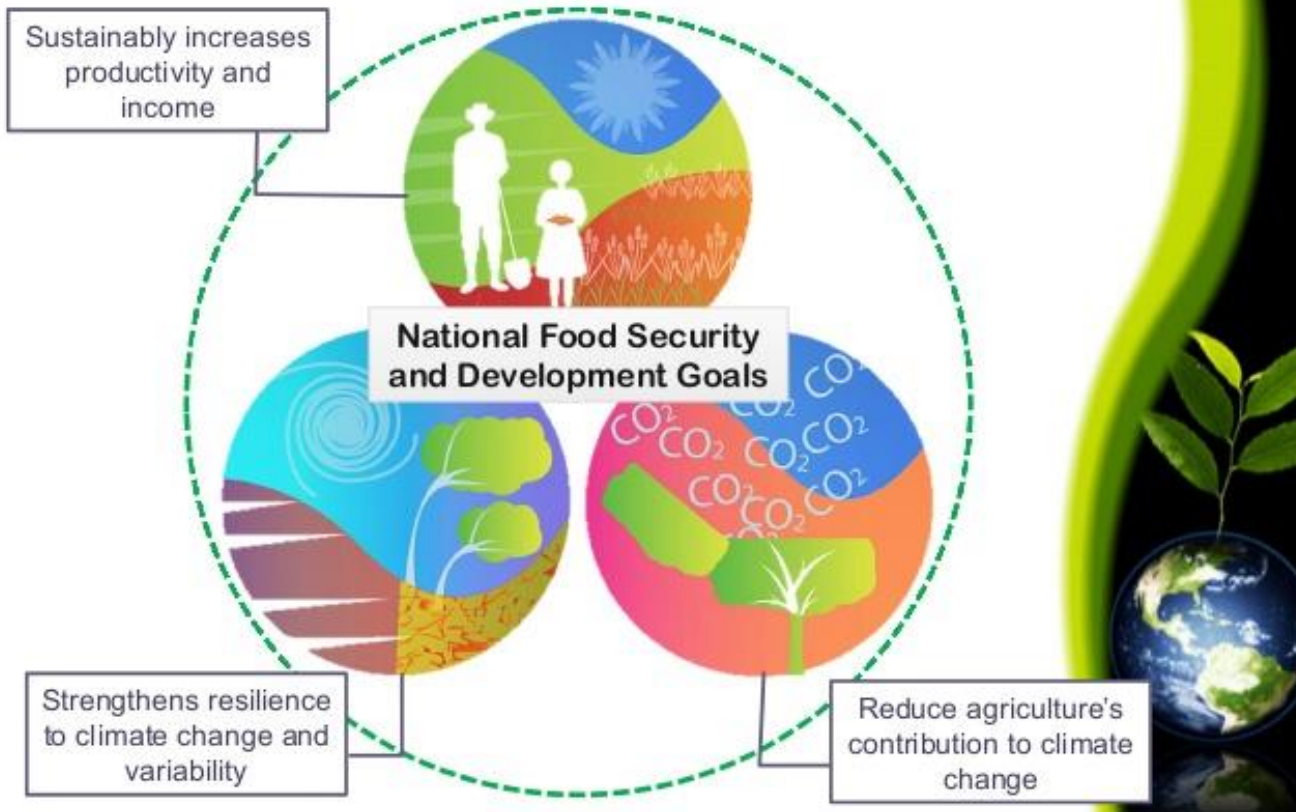


Opportunity for innovation



Opportunity for innovation

What is CSA?



Opportunity for innovation

CLIMATE SMART VILLAGE / FARM

Weather smart

- Seasonal weather forecasts
- ICT based agro-advisories
- Index based insurance
- Climate analogues



Water Smart

- Aquifer recharge
- Rainwater harvesting
- Community management of water
- Laser leveling
- On-farm water management



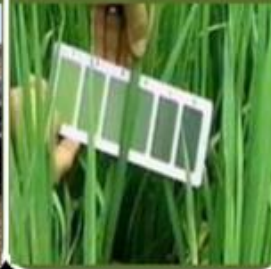
Carbon smart

- Agroforestry
- Conservation tillage
- Land use systems
- Livestock management



Nitrogen smart

- Site specific nutrient management
- Precision fertilizers
- Catch cropping / legumes



Energy Smart

- Biofuels
- Fuel efficient engines
- Residue management
- Minimum tillage
- Solar solutions for agriculture



Knowledge Smart

- Farmer-farmer learning
- Farmer networks on adaptation technologies
- Seed & fodder banks
- Market info
- Off-farm risk management-kitchen garden





**Thank you
for your
interest!**