

# Improving Agricultural Productivity in Uganda amidst Climate Change challenges

## GROUP 1:

PURITY

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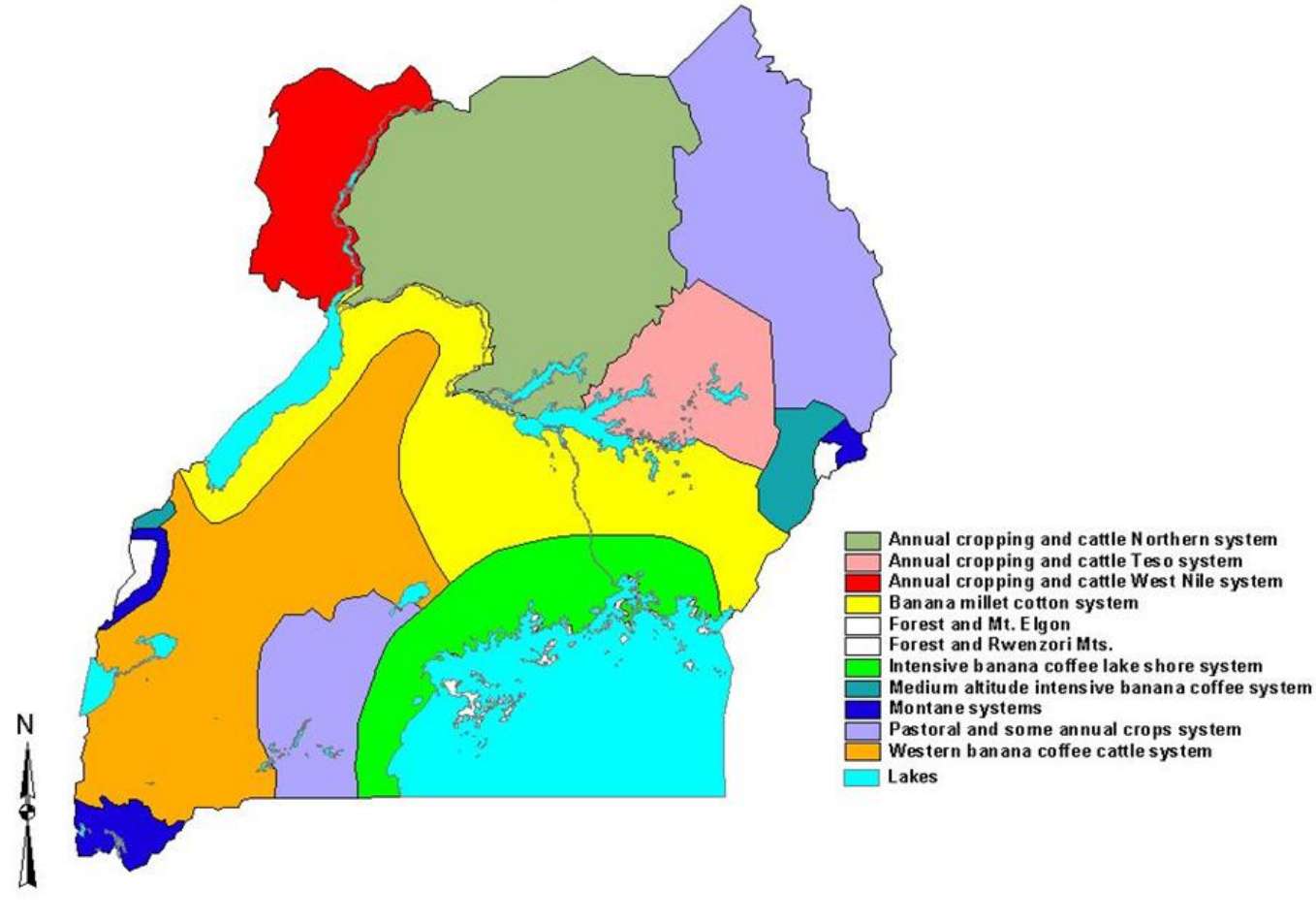
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## FARMING SYSTEMS OF UGANDA

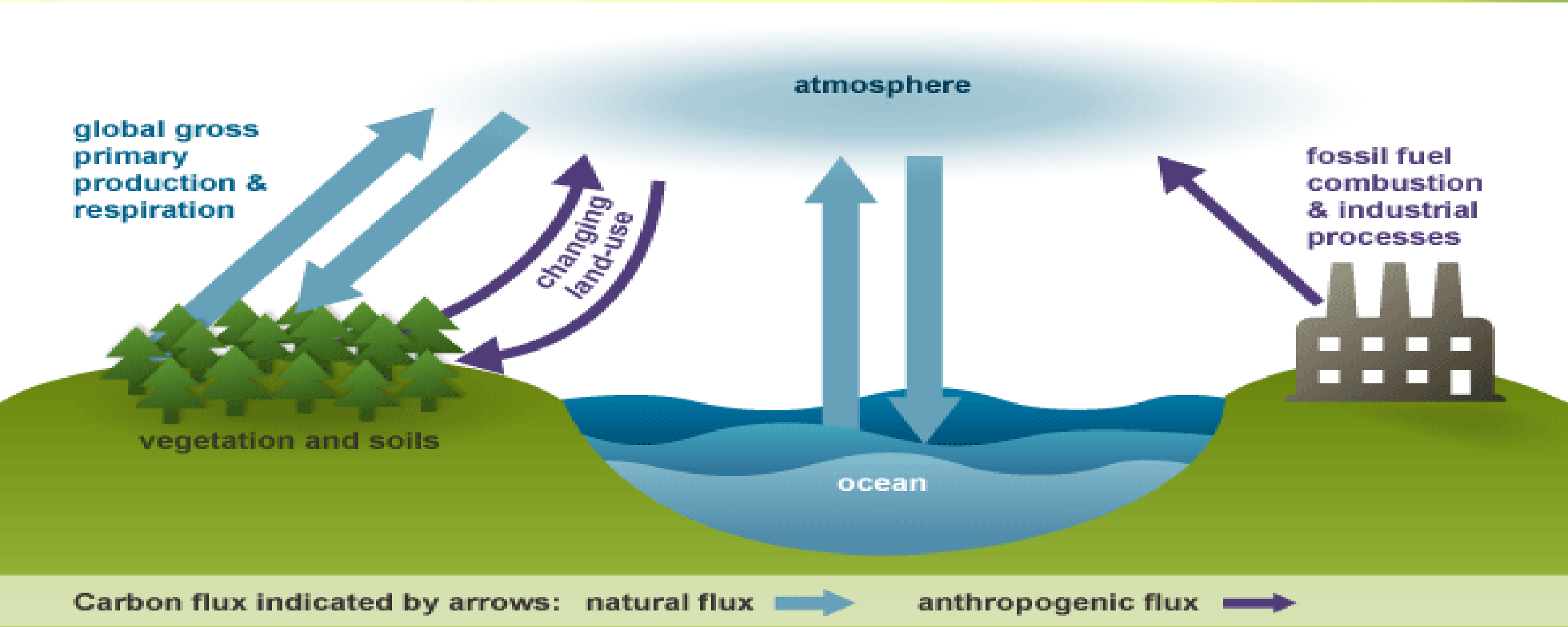


- Annual cropping and cattle Northern system
- Annual cropping and cattle Teso system
- Annual cropping and cattle West Nile system
- Banana millet cotton system
- Forest and Mt. Elgon
- Forest and Rwenzori Mts.
- Intensive banana coffee lake shore system
- Medium altitude intensive banana coffee system
- Pastoral and some annual crops system
- Western banana coffee cattle system
- Lakes

## Background

- Main Economic sector 25% GDP
- Employs 70% of the population
- Climate change challenges biggest constraint in Agriculture
- Increase in temperature and change in Rainfall patterns
- Implications are so significant

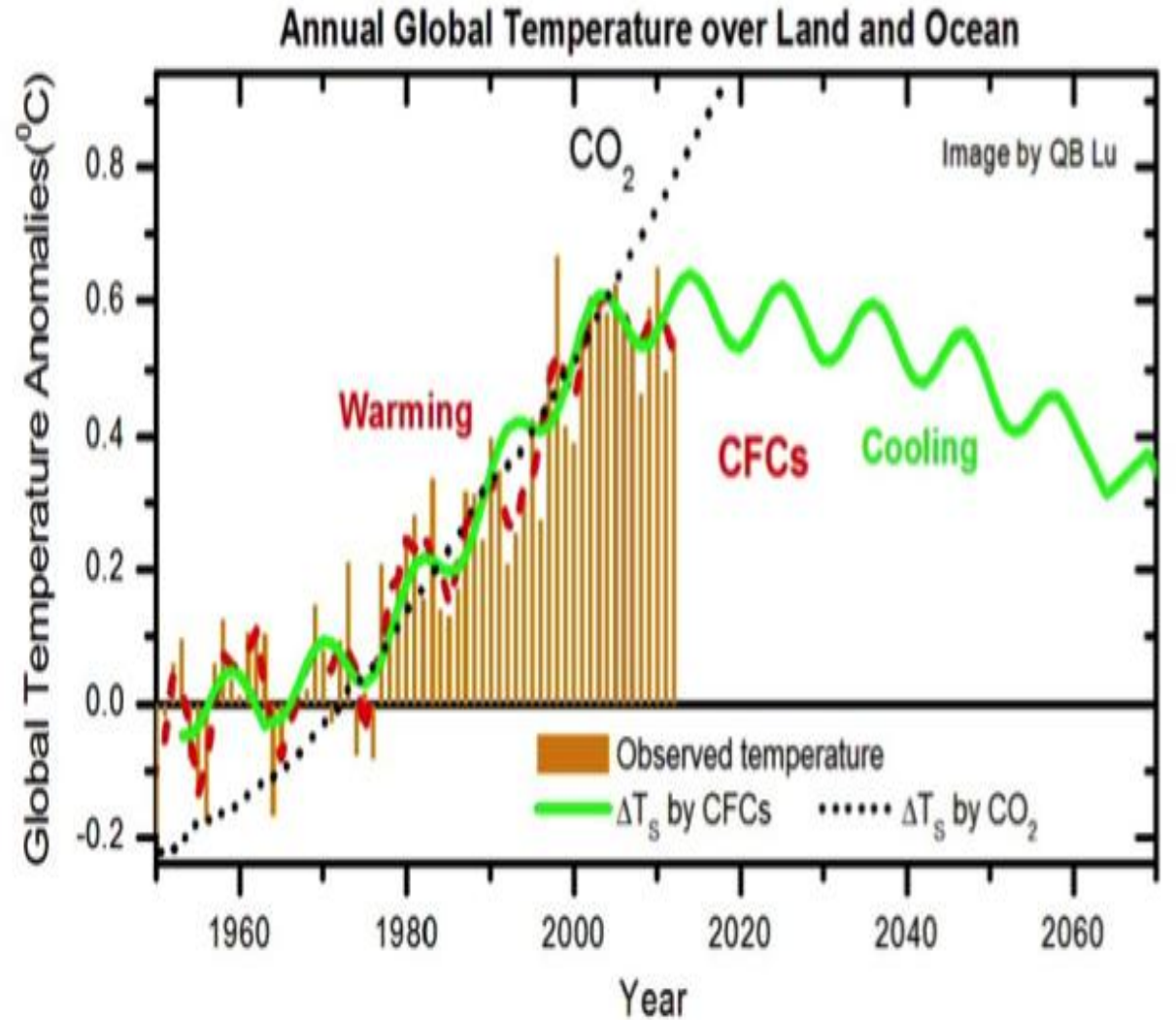
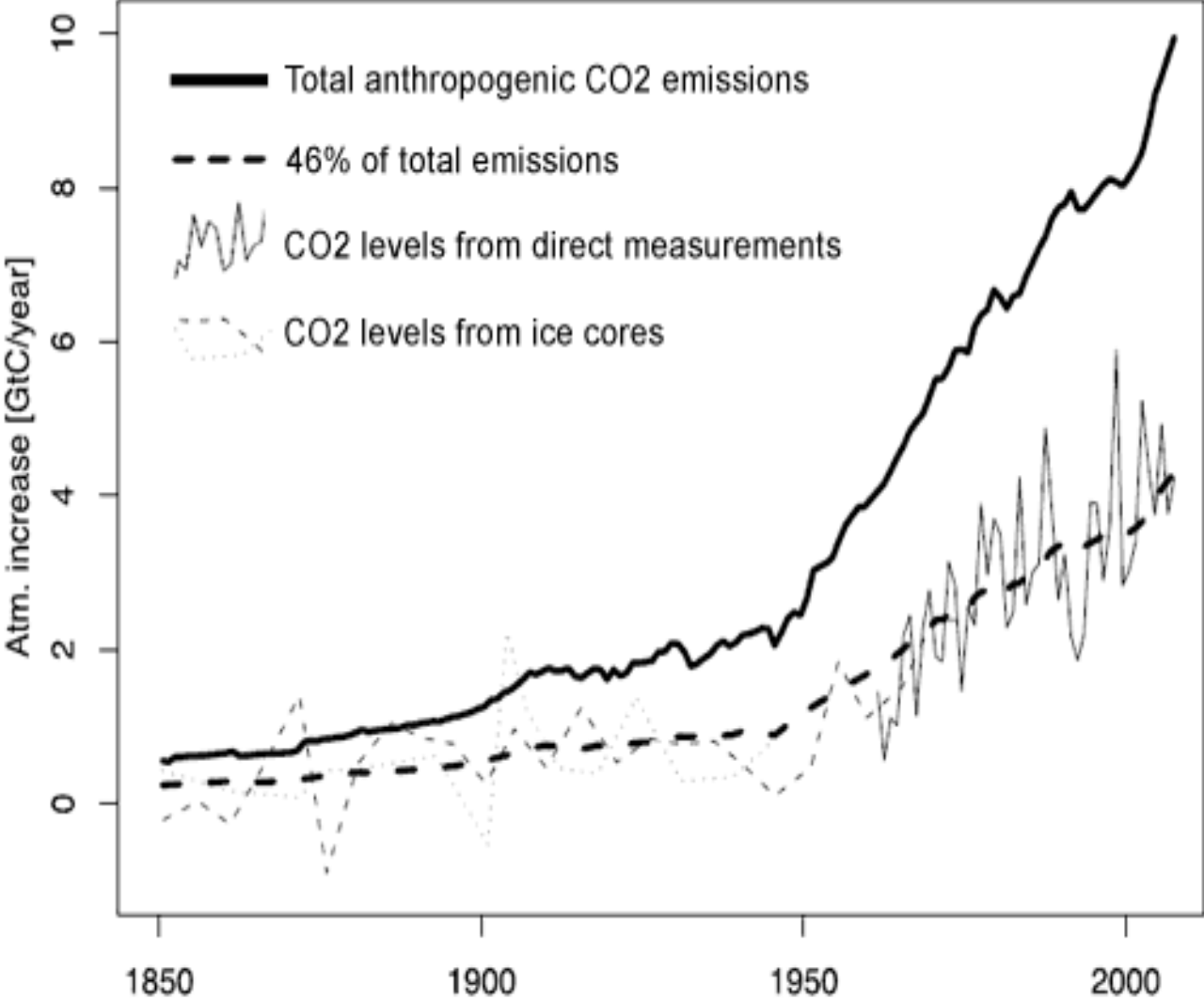
# CAUSES OF CLIMATE CHANGE



Source: Adopted from Intergovernmental Panel on Climate Change, *Climate Change 2007: The Physical Science Basis*, Figure 7.3 (U.K., 2007)

- CO<sub>2</sub> (one of the greenhouse gases) causes rise in TEMPERATURE

## CO<sub>2</sub> emissions versus CO<sub>2</sub> levels



# IMPACTS OF CLIMATE CHANGE IN UGANDA

- **Heavy rains**
- **Flooding**
- **Landslides**
- **Drought**
- **Disease outbreaks**
- **Epidemics, like malaria and cholera, as well as lightning strikes.**

These aspects are likely to have significant implications for agriculture, food security, and soil and water resources.

# WHAT HAS BEEN HAPPENING?

## INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE (IITA)

A NON-PROFIT INSTITUTE THAT GENERATES INNOVATIONS TO:

- IMPROVE LIVELIHOODS
- ENHANCE FOOD AND NUTRITIONAL SECURITY
- INCREASE EMPLOYMENT
- PRESERVE NATURAL RESOURCE INTEGRITY

IN AFRICA

### About IITA

**Leading partner on agricultural research for development in Africa**

- 18 Countries, 4 Regional Hubs

**Hosted by**

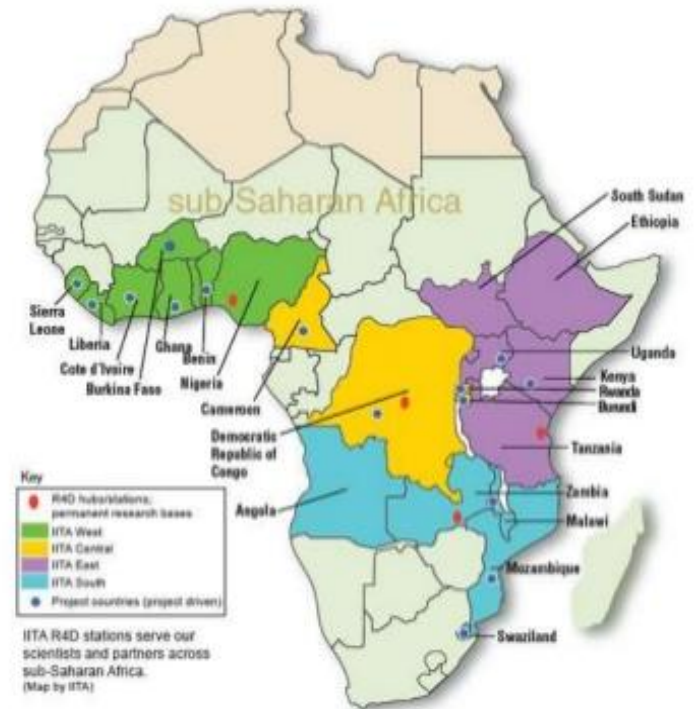
- Government of Uganda
- In collaboration with NARO

**Staff**

- >100 national staff and students
- 10 international scientists

**Major achievements with partners**

- Control of crop pandemics
  - Cassava Mosaic Virus
  - Cassava Brown Streak
  - Banana Xanthomonas Wilt
- Breeding banana, cassava, soybean...
- Climate change adaptation
- Agricultural investment planning



# IITA STRATEGIC INITIATIVES

- **BIORISK MANAGEMENT FACILITY (BIMAF)**
- **YOUTH EMPOWERMENT**
- **TECHNOLOGIES FOR AFRICAN AGRICULTURAL TRANSFORMATION (TAAT)**





# Strategies for enhancing productivity under climate change

- Awareness
- Land management
- Recycling
- Soil health card
- Check dams

- DOS
- RDF
- Selection of variety
- Deforestation
- Precision agriculture





*Serve the land feed; the hungry*



# Biotechnology adaptations



# Rich natural resources



# Achivements

In 1993

- Biotechnology: BST hormone in Uganda cattle

Research

- Molecular marker, gene resistance to pathogens

Confined  
filed trials

- Banana resistance against fungus
- Herbicide tolerant and insect resistant transgenic Bt cotton
- Cassava resistant to cassava brown streak virus

# Future develop orientations

- Increase CO<sub>2</sub> concentration  
=> Engineering nitrogen fixation
- Extremely weather  
=> Engineering drought, salt and heat tolerance.

**The orientation depends on Uganda**



# Future of Agri biotech

- Improving crop productivity by overcoming climatic challenges

# Climate changes-right time to discuss?



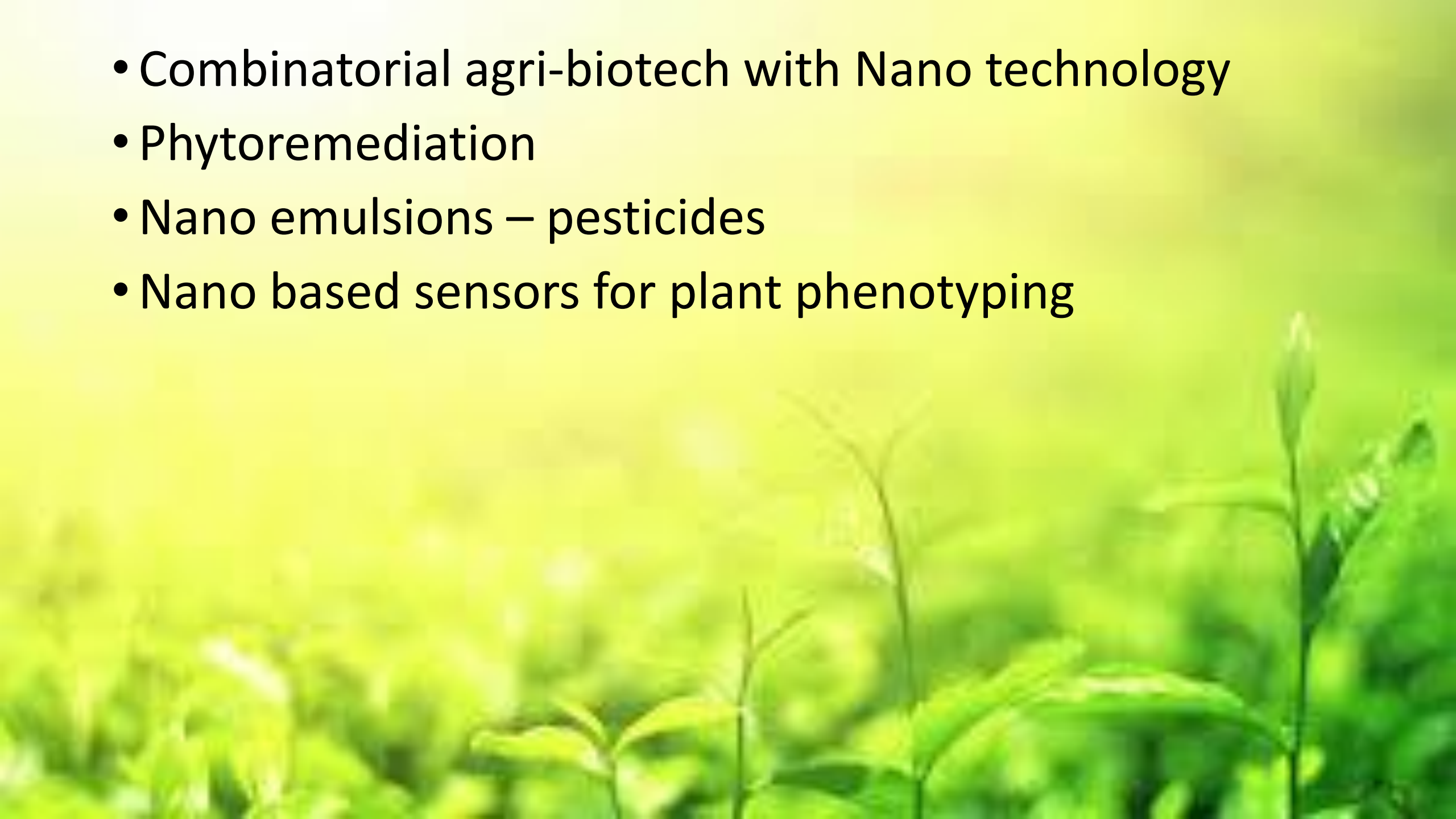
# Future of agriculture with?



# Biotechnology to overcome agricultural challenges

- Overcoming green house gases – biofuel – no tilling
- Increasing pollination – CCD in bees
- Advanced molecular breeding techniques
- Water efficient agriculture systems – underground farming
- Plastics dumped lands – infertile lands to fertile lands
- Controlling plant responses at epigenetic level
- iRNA based technologies
- High throughput screening methods

- Combinatorial agri-biotech with Nano technology
- Phytoremediation
- Nano emulsions – pesticides
- Nano based sensors for plant phenotyping



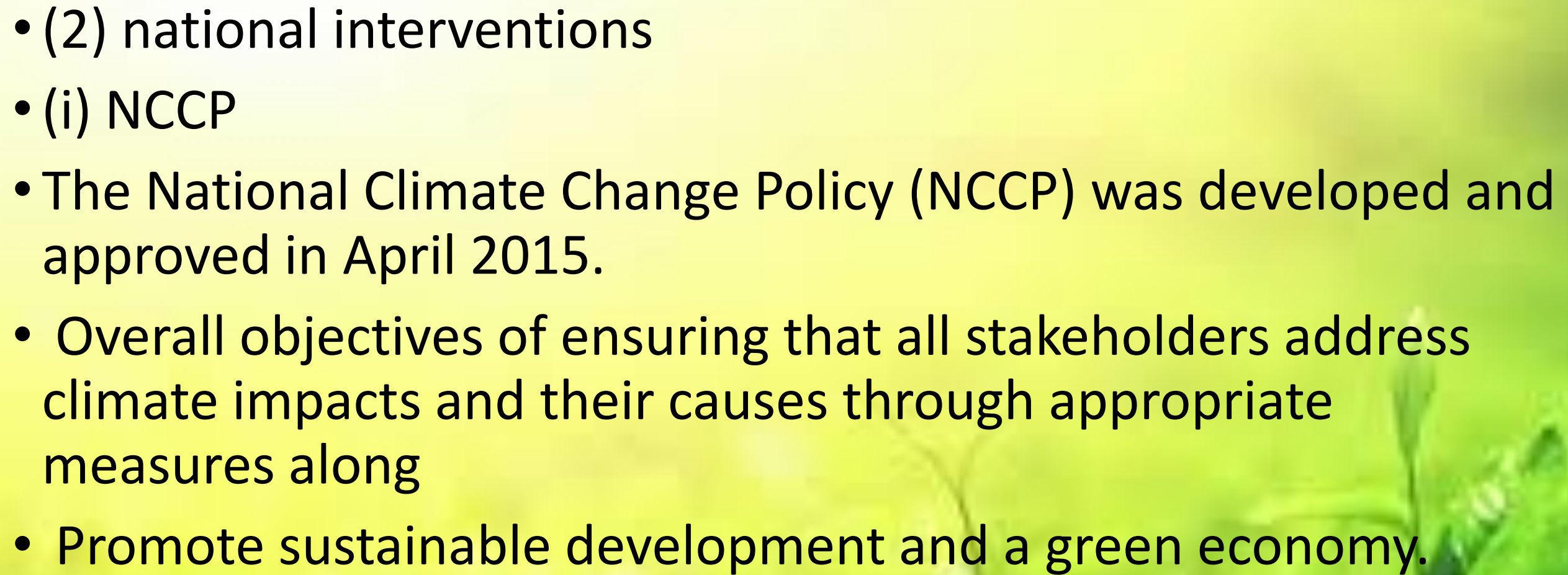
# Uganda's agricultural policies on climate change

- International and national interventions
- 1) The UN aid
- (i) UNFCCC
- the United Nation Framework Convention on Climate Change (UNFCCC) was founded in 1992 to promote national adaption strategies. The program of Least Developed Countries(LDCs) functions to develop National Adaption Programs of Action (NAPA), which propose National Adaption Plans (NAPs) to cope with the medium and long-term effect in accordance with a country's perception of its most urgent and immediate needs.

- The Uganda government signed and ratified UNFCCC in 1992 and 1993 respectively and made its first national communication to the UNFCCC in 2002

### (iii) NAPA goals out of UNFCCC

- The NAPA is regarded as the national policy that fully aims at climate change adaptation. The NAPA prioritized five adaptation projects regarding agriculture:
  1. land degradation management;
  2. water supply for cultivation;
  3. drought adaptation;
  4. vectors, pests and disease control;
  5. climate change and development planning.

- 
- (2) national interventions
  - (i) NCCP
  - The National Climate Change Policy (NCCP) was developed and approved in April 2015.
  - Overall objectives of ensuring that all stakeholders address climate impacts and their causes through appropriate measures along
  - Promote sustainable development and a green economy.



## (ii) the agricultural sector of NAP

- Although the country has not had a comprehensive NAP, the agricultural sector of NAP has been developed with the goals:
- Increasing this sectors' resilience to the influence of climate change through coordinated interventions that promote sustainable agriculture, food and national nutrient security, livelihood.
- Improvement and sustainable development. All these policies are aligned with Uganda's Vision 2040 (GoU, 2015).

# CONCLUSION

- Uganda is no exception to impacts of climate change.
- New biotechnology solutions have to be utilized to ensure food security
- All sectors should be involved and work hand in hand: these include; policy makers, NGOs, Farming Communities, Researchers, etc.