

we are running out of time



act now before it's too late

Let  
*Climate Change*  
guide **Agriculture**  
**RDE Agenda**

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# Outline

## 1. Background Information

- Poverty, Food Production, & Population Nexus
- Predicted Changes in Climate
- Change in annual temperatures (2050s)
- Impact of CC in Agriculture

## 2. Bhoochetana Program

- Soil health as major entry point: A case in India
- Narrowing the yield gaps
- Initiatives on Soil Restoration
- Yamang Lupa Program (YLP): A case in the Philippines
- Soil carbon sequestration

## 3. Hypothesis of Hope

## 4. RDE Framework on Climate Change: DA-BAR

## 5. In Brief: The Framework of a Modern Philippine Agriculture

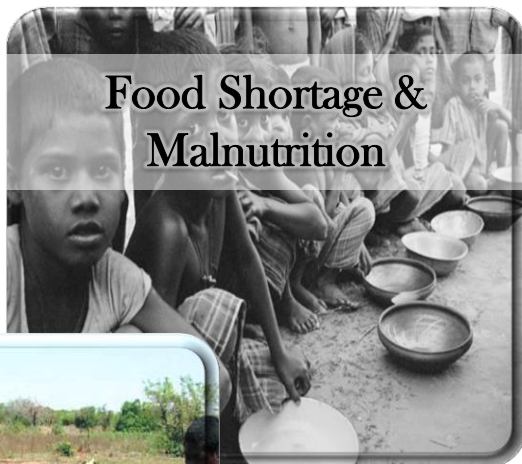


# Poverty, Food Production, & Population Nexus

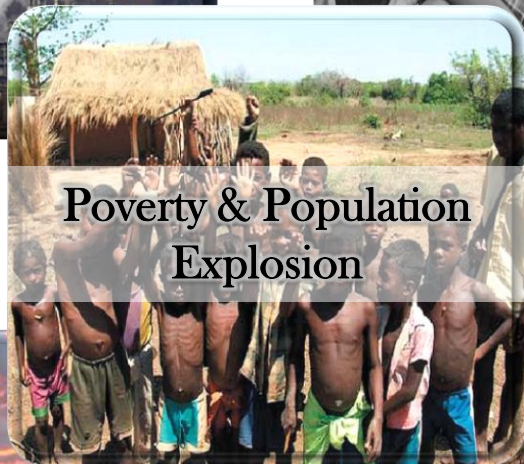
Fossil Fuel Shortage



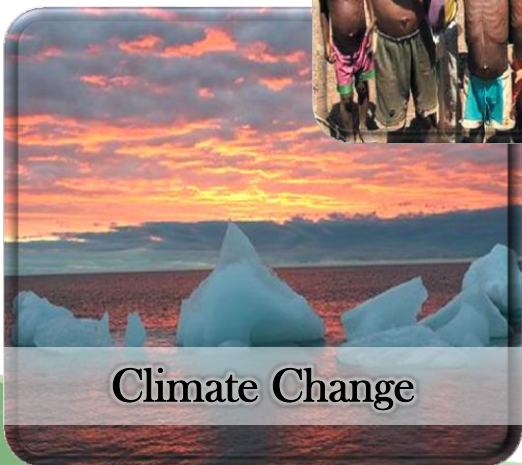
Food Shortage & Malnutrition



Poverty & Population Explosion



Climate Change



Land Degradation



## Global Poverty

**702 M** people or 9.6%  
of the global population in 2015

**902 M** people or 12.8%  
of the global population in 2012

*World Bank*

## Global Hunger

**795 M** (1 in 9 people in the world)  
Do not have enough to eat

**98%** of the **world's undernourished**  
live in developing countries.

*FAO*

## World Population

**7.4 B** – current world population  
*InangLupa*

*Worldometer*

# Predicted Changes in Climate

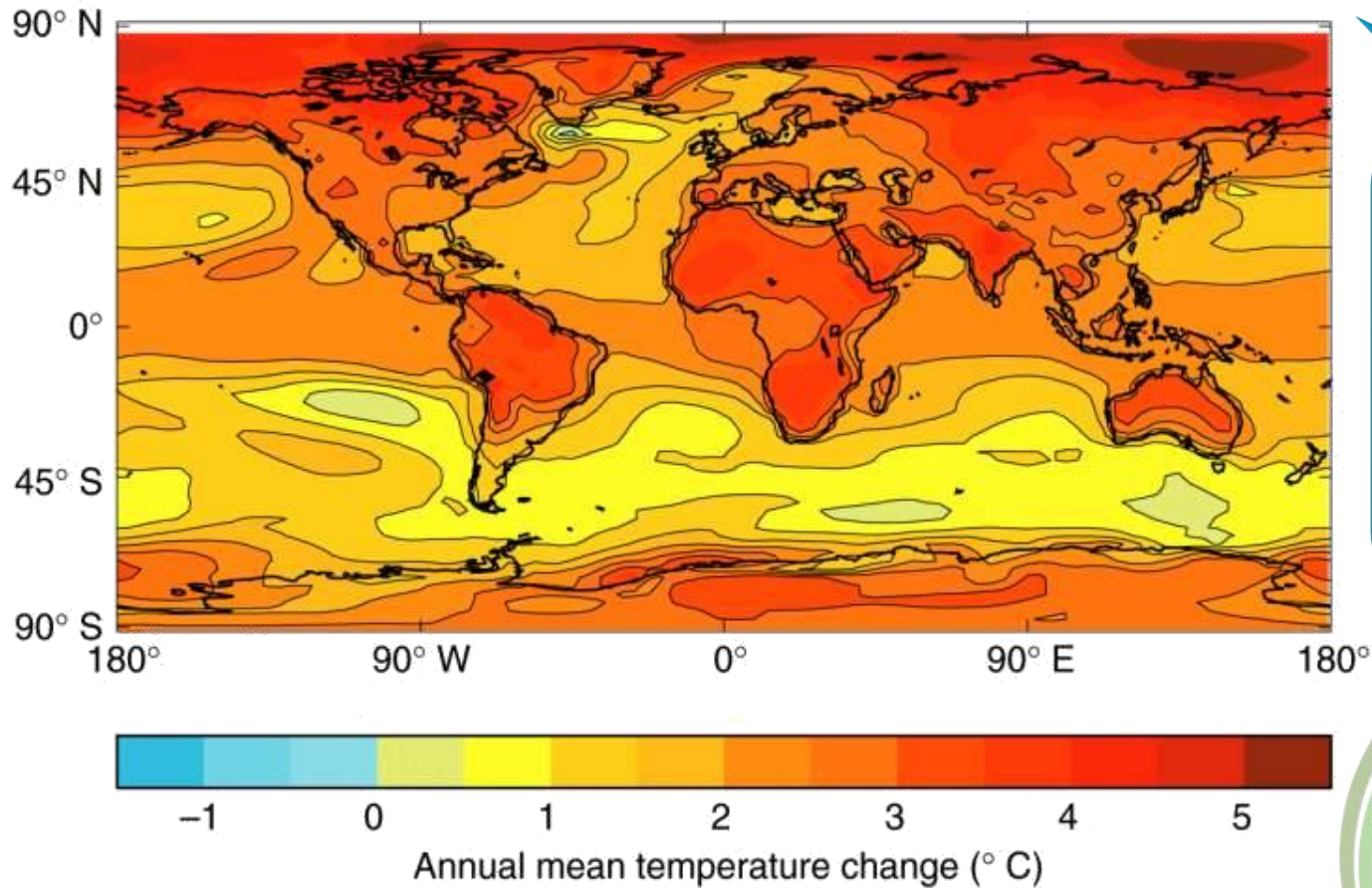
Background Info

Region	$\Delta$ Rainfall (%)	$\Delta$ Rainfall (mm)	$\Delta$ Average min. temp.	$\Delta$ Average max. temp.
<b>World</b>	<b>6.5 to 23.4</b>	<b>0.9 to 3.2</b>	<b>1.9 to 2.8</b>	<b>1.8 to 2.6</b>
South Asia	-0.7 to 8.9	-4.9 to 64.3	1.9 to 2.4	1.8 to 2.0
SE Asia	-1.0 to 1.2	-23.4 to 29.2	1.4 to 1.8	1.4 to 1.6
Southern Africa	-22.3 to 6.3	-89.6 to 25.3	1.7 to 2.8	1.7 to 2.5
Western Africa	-1.7 to 8.2	-10.9 to 51.3	2.1 to 2.8	1.6 to 2.0
Eastern Africa	0.5 to 14.0	4.1 to 120.5	1.9 to 2.6	1.3 to 2.0
Middle East	-5.1 to -0.2	-10.8 to -0.5	1.9 to 2.7	1.7 to 2.6

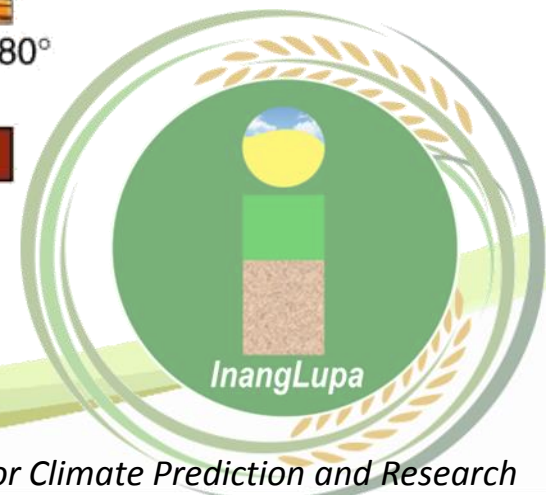
InangLupa

Source: ICRISAT

# Change in annual temperatures (2050s)

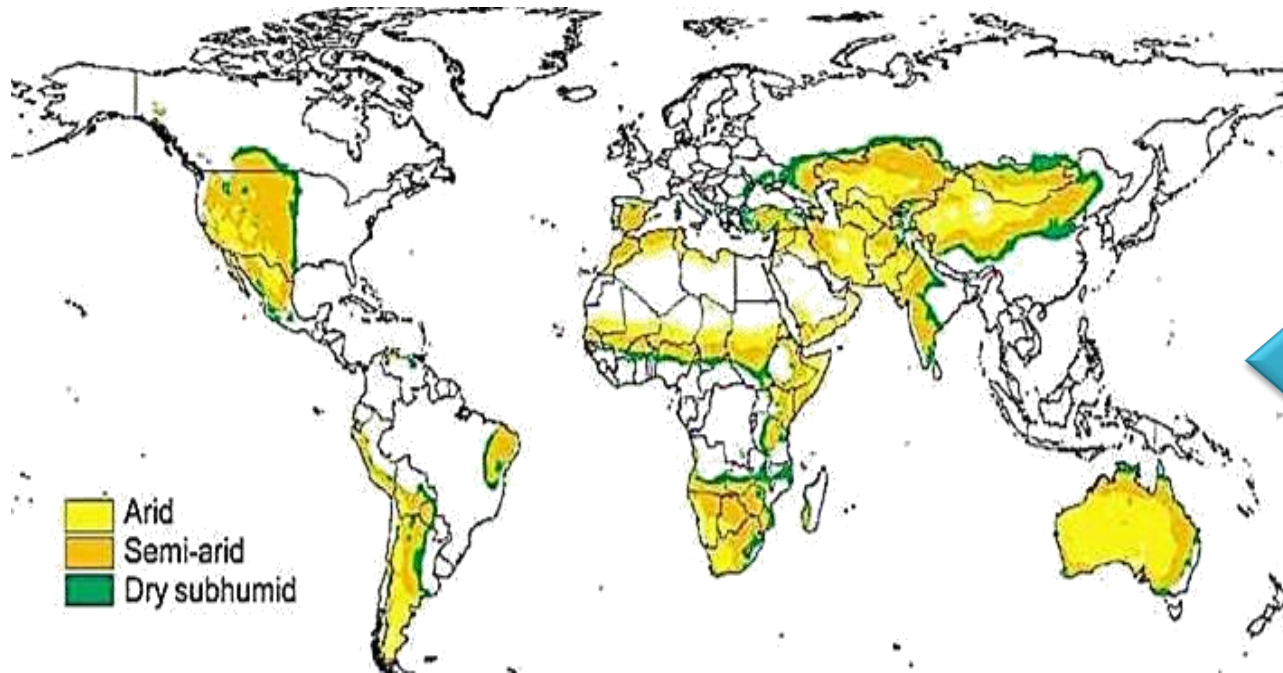


Global warming  
by **2°C**  
projected; we  
are half way  
there!



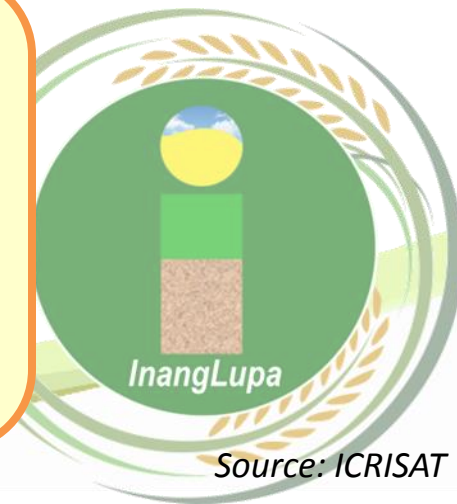
# Impact of CC in Agriculture

Background Info



- Dryland cover nearly 41% of land surface
- 72% of the dryland area lies within developing countries
- Diversity in agroclimatic condition

- Poverty
- Extreme rainfall variability
- Land degradation and low soil fertility
- High temperatures
- Unpredictable droughts and water scarcity
- Low and unpredictable crop and livestock production
- Threat of malnutrition



Source: ICRISAT

# **Bhoochetana:** The transition to land health

**Monitor the outcome**

**Assess the symptoms**



**Treat the problem**

**Diagnose the causes**



# Bhoochetana

## (Soil Rejuvenation)

is a mission mode project of ICRISAT that harness science for sustainable use of natural resources among farmers and increase rainfed crop yields by 20%.

- Increased crop yield by **20-66%**
- Covered **3.1M** ha and benefitted **4.4M** families
- Contributed to rise in agriculture growth: above **5%** annually since 2009
- Benefit-cost ratio: **3-14:1**
- Accrued net benefit in 4 years: **\$ 240M**



Source: ICRISAT



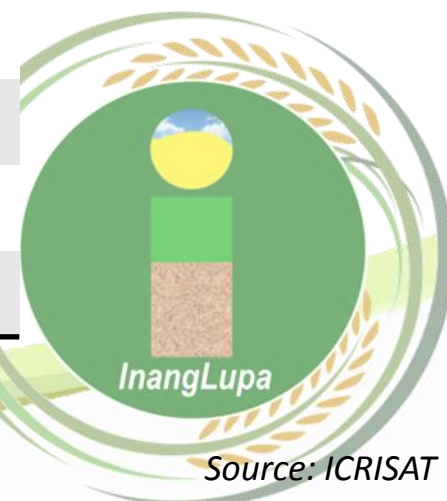
# Soil health as major entry point: A case in India

Bhoochetana

Percentage of farmers' fields deficient in soil nutrients in different states of India

State	No. of farmers fields	Org.C %	Av.P ppm	K ppm	S ppm	B ppm	Zn ppm
Andhra Pradesh	1927	84	39	12	87	88	81
Karnataka	1260	58	49	18	85	76	72
Madhya Pradesh	73	9	86	1	96	65	93
Rajasthan	179	22	40	9	64	43	24
Gujarat	82	12	60	10	46	100	82
Tamilnadu	119	57	51	24	71	89	61
Kerala	28	11	21	7	96	100	18

**SAT Soils**  
are not only  
thirsty but  
also hungry!

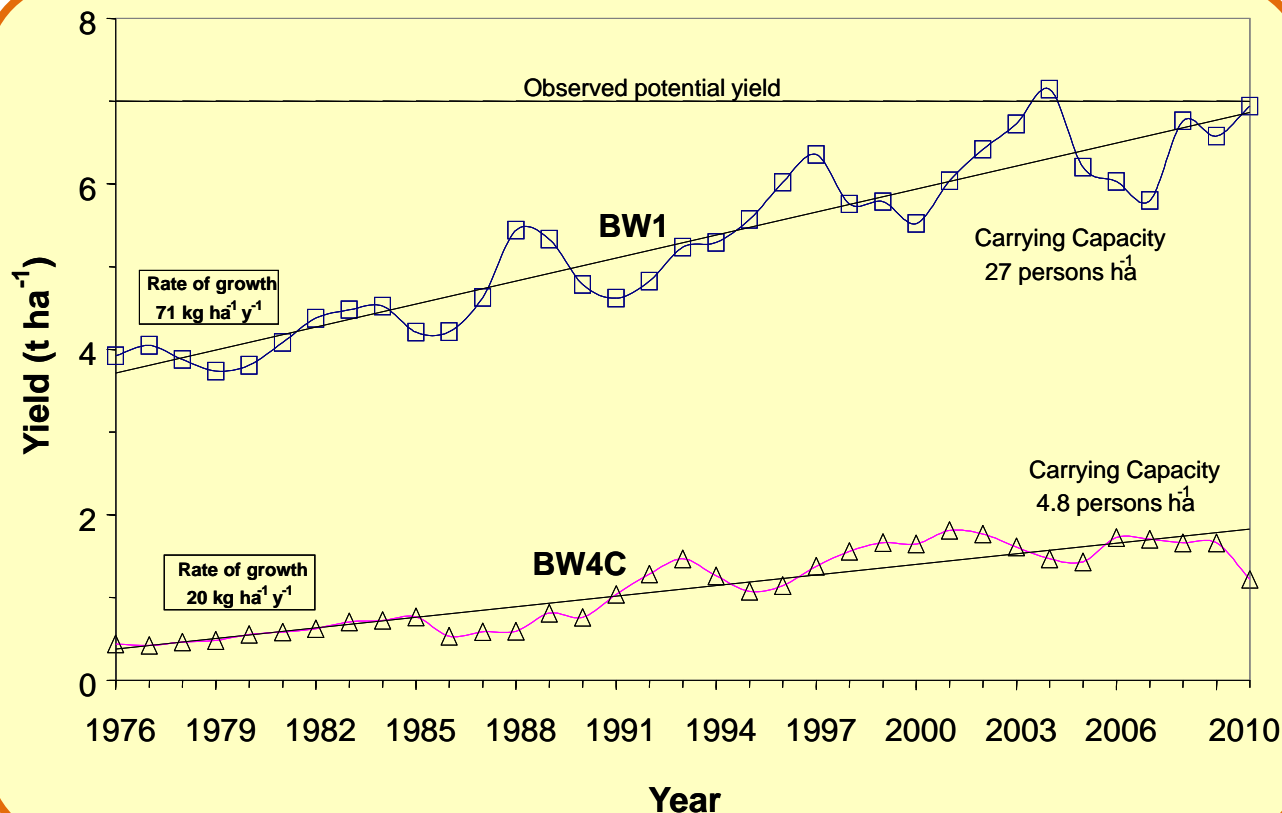


Source: ICRISAT

# Narrowing the yield gaps

Rainfed agriculture: a large untapped potential

Bhoochetana



- Current farmers' yields are lower by 2-5 folds than the achievable yields

- Vast potential of rainfed agriculture needs to be harnessed



Source: ICRISAT

# Initiatives on Soil Restoration

Bhoochetana

**1** Yamang Lupa Program  
(DA-BAR with LGUs)

**2** Participatory Engagement for Legislative  
and Key Stakeholders in Agriculture  
& Fisheries Development  
(InangLupa-BAR)



# Yamang Lupa Program: A case in the Philippines

Bhoochetana

Is the Philippine adaptation of the *Bhoochetana* concept.  
It has 3 pilot regions – **4,927 ha** (as of 1<sup>st</sup> quarter of 2015)

- Quezon (Luzon)
- Samar (Visayas)
- Zamboanga Sibugay (Mindanao)



## Entry Point

- Assessing the soil health status using the stratified soil sampling
- Preparing a GIS-based soil fertility status maps
- Developing the **Soil Health Cards** with specific nutrient management recommendations



# Soil carbon sequestration

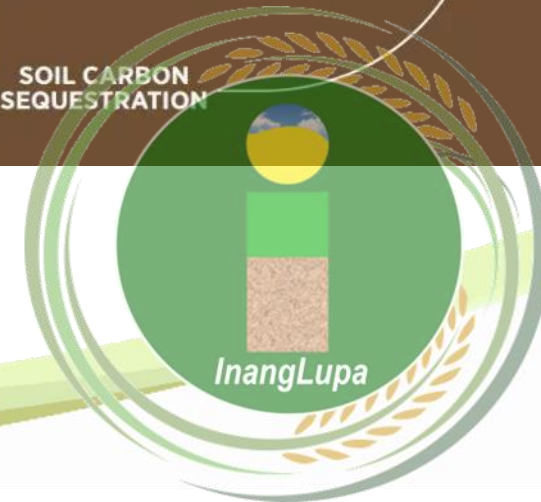
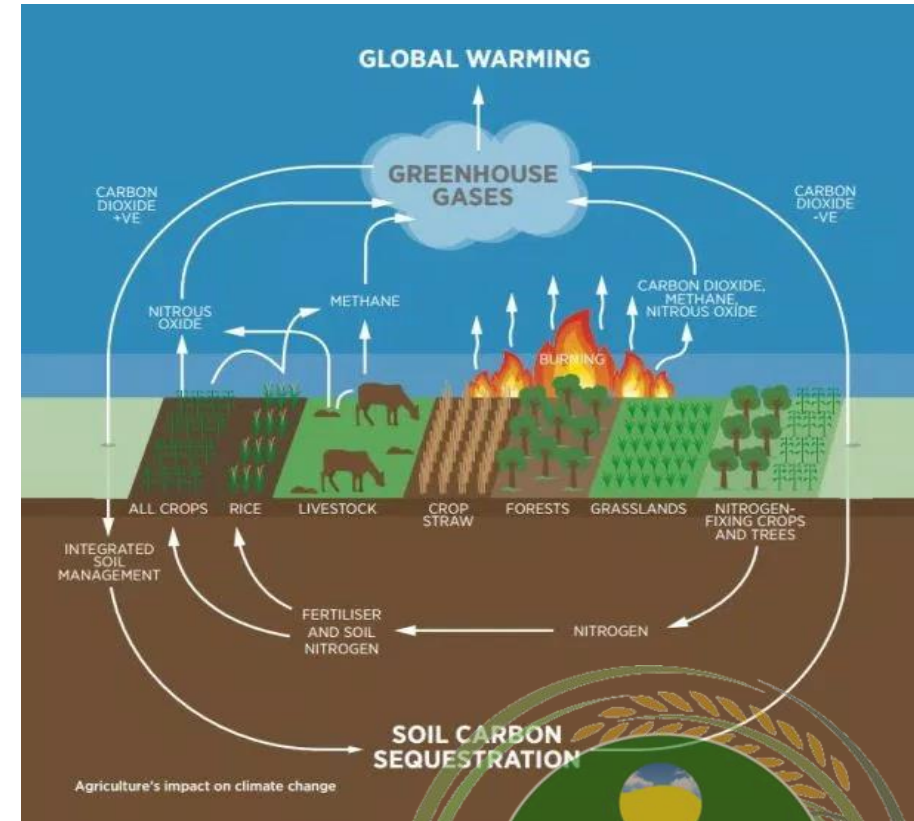
- A process in which CO<sub>2</sub> is removed from the atmosphere and stored in the soil carbon pool

## Soil carbon

- Improve water movement
- Retain soil organic matter (SOM)
- Mitigate greenhouse gas (GHG) concentrations
- Improve the movement of water into soil (its transfer to aquifers, and its retention for use in crop production)

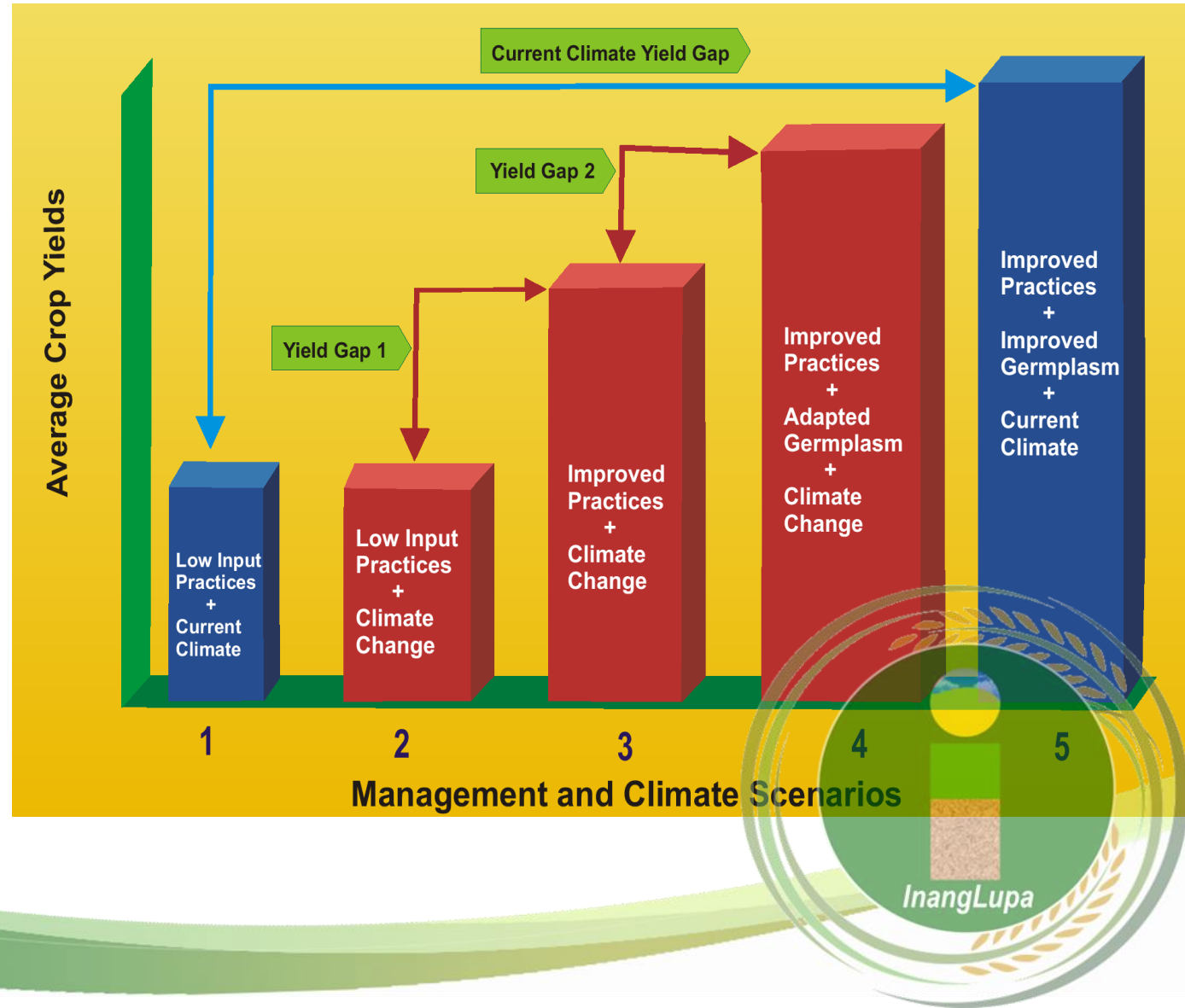
### Increasing soil carbon in all ecosystems (from tropical forests to pasture to wetlands)

- Replanting degraded areas
- Increased mulching of biomass
- Large-scale use of biochar
- Improved pasture management
- Effective erosion control
- Restoration of mangroves and sea grasses



# Hypothesis of Hope (ICRISAT)

- Practice low input agriculture as CC will have minimal effects to it
- Adoption of recommended improved soil and water management practices
- Adaptation of better 'temperature-adapted' varieties
- Adaptation and mitigation requires strengthened capacity



# National Climate Change Action Plan



Food security



Water sufficiency



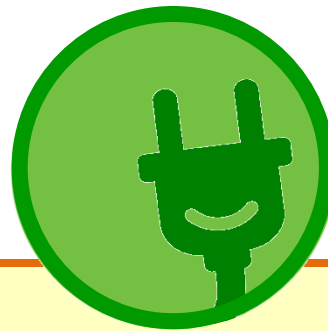
Environmental &  
ecological stability



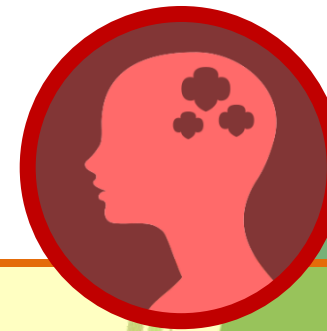
Human security



Climate-friendly  
industries & services



Sustainable  
energy



Knowledge & capacity  
development

InangLupa

# RDE Framework on Climate Change: DA-BAR

## Increased understanding & knowledge

- Crop improvement
- Adaptive production and post-production practices
- Conservation & utilization of threatened species
- Location specific studies
- Improved design standards
- Assessment & analysis of impact

## Integration & mainstreaming of appropriate and relevant technologies

- Climate-related data
- Integrated models for monitoring and evaluation
- Comprehensive analysis and recommendation of policies, plans, and programs

## Farm to community-based climate risk management & off-farm opportunities

- Adaptive production and post-production
- Farmers practices for managing risks
- Localized decision support system

## Climate Change

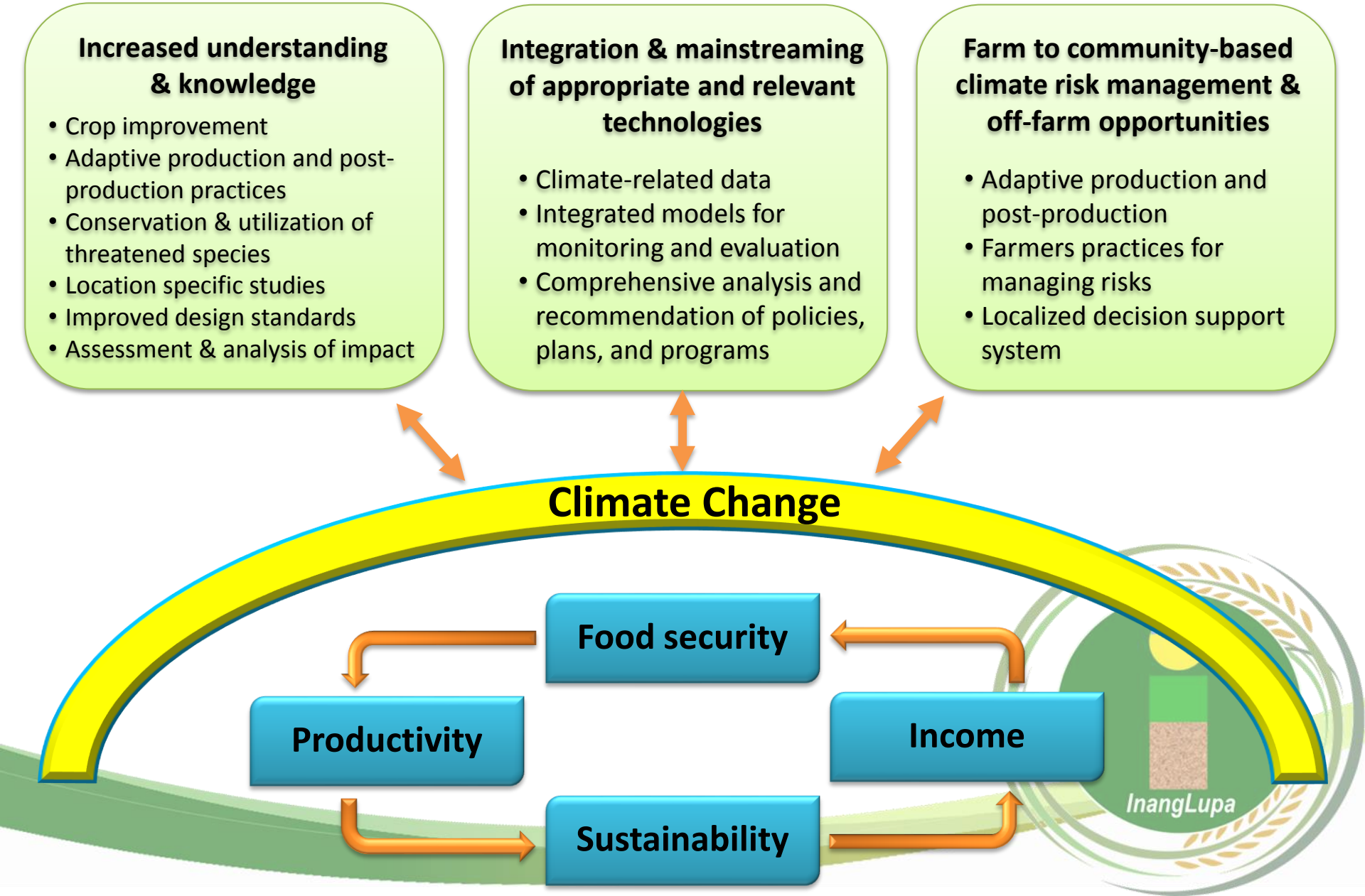
Productivity

Food security

Income

Sustainability

InangLupa





# The Framework of a Modern Philippine Agriculture

## Vision

A Modern and Industrialized  
Philippine Agriculture

**Strategy:** Inclusive Philippine Agri-Industrialization (IPAI)

### 4 Pillars

- Inclusive
- Science-based
- Resilience
- Market-oriented

### 4 Sustainable Development Goals\*

- Food Sufficiency
- Economic Security
- Nutritional  
Sufficiency
- Environmental  
Security

### 4 Major Objectives

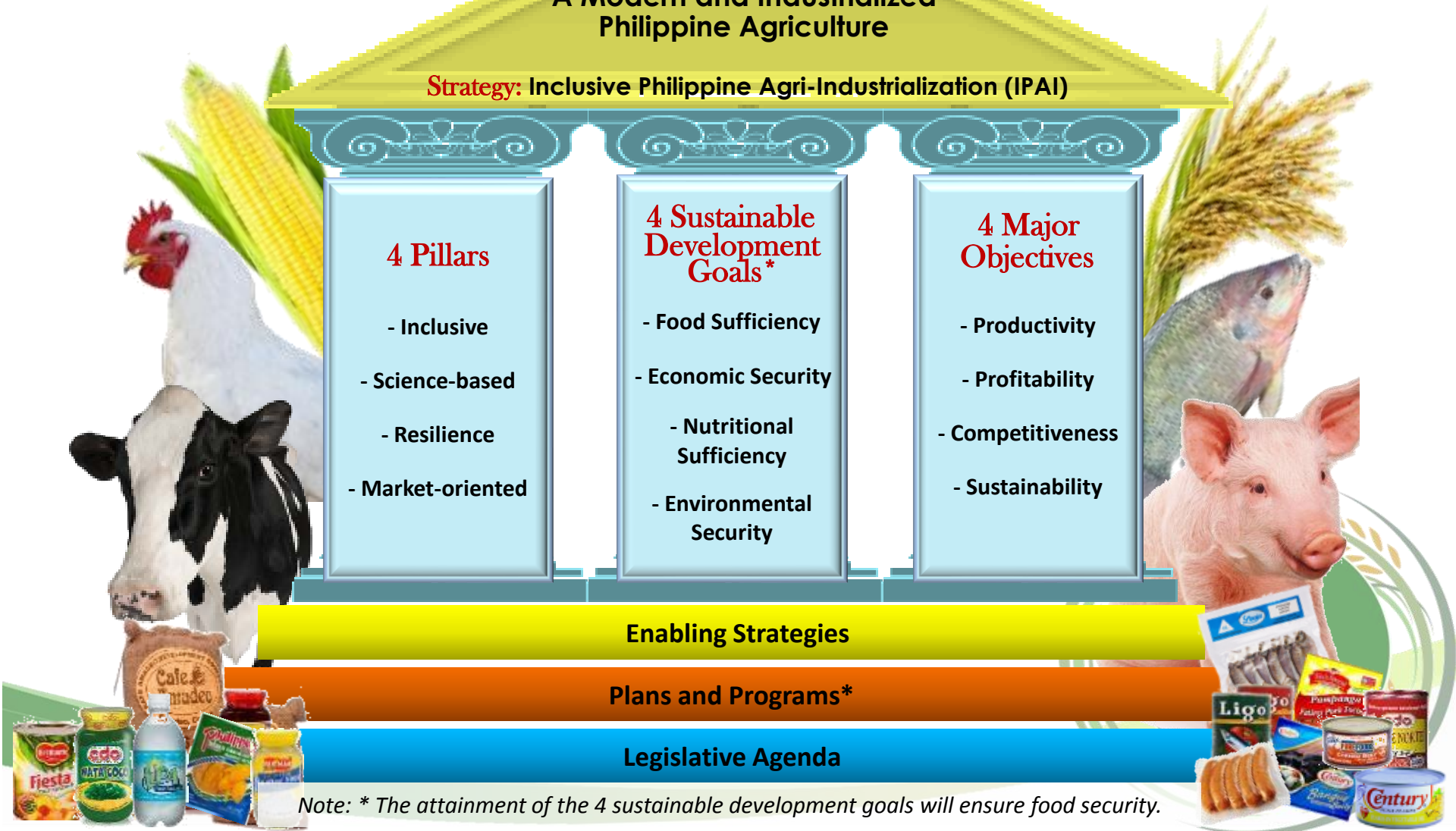
- Productivity
- Profitability
- Competitiveness
- Sustainability

Enabling Strategies

Plans and Programs\*

Legislative Agenda

Note: \* The attainment of the 4 sustainable development goals will ensure food security.



# *Thank you!*

Climate change will not wait!  
The time to act is now!



Email me at:  
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Become an InangLupa volunteer, register at :  
<http://inanglupa.weebly.com/become-a-volunteer.html>