



Climate Change: Impact on Thailand's Agriculture

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Climate Change

UNFCCC

A change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

IPCC

A change in climate over time, whether due to natural variability or as a result of human activity.

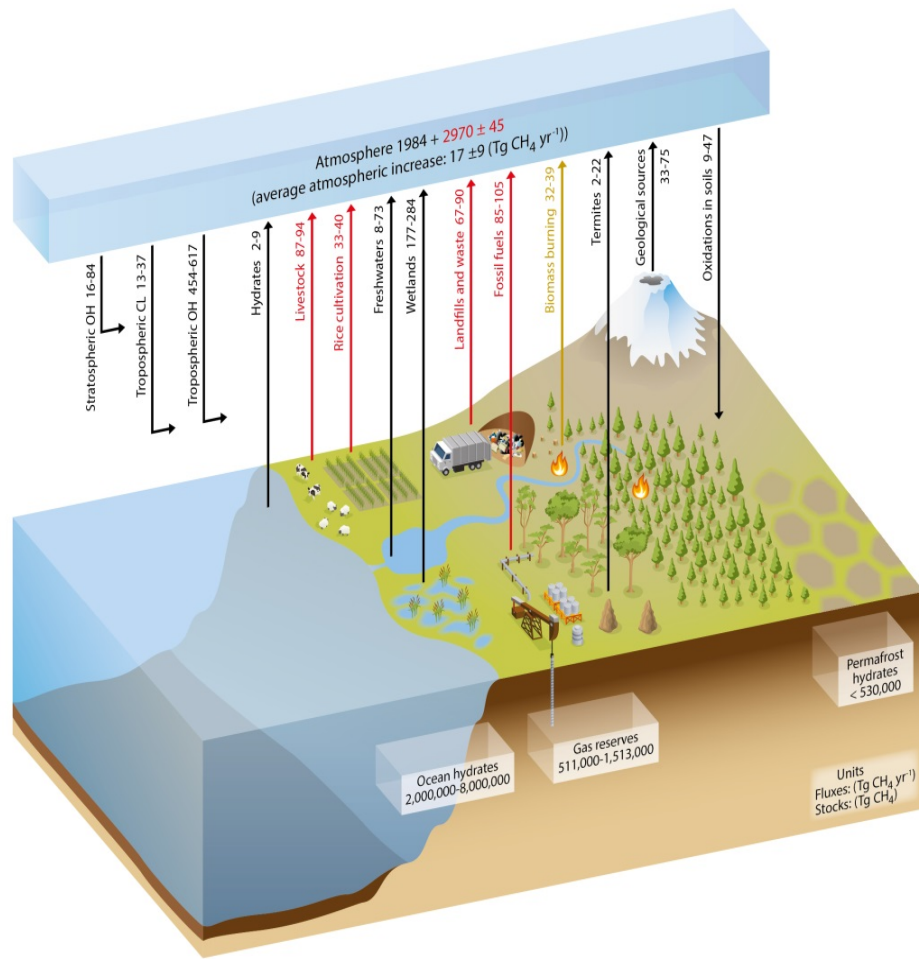
Global warming

A gradual increase in the overall temperature of the earth's atmosphere generally attributed to the greenhouse effect caused by increased levels of carbon dioxide, chlorofluorocarbons, and other pollutants.

Greenhouse gases

Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation. It's result form human activities.

Source of Greenhouse Gases



Primary greenhouse gases are:

Carbon dioxide (CO₂)
Nitrous oxide (N₂O)
Methane (CH₄)
Fluorinated gases

Between 1750-2011

CO₂ increase 40% from 278 to 390 ppm
CH₄ increase 150% from 722 to 1803 ppb
N₂O increase 20% from 271 to 324 ppb

Source of greenhouse gases

- Fossil fuel
- Industrial process
- Change in land use
- Deforestation
- Agriculture activities (Rice field, Livestock, Fertilizer, Crop Burning)
- Waste disposal

Source: IPCC AR5, Climate Change 2013: The Physical Science Basis

Effect of Global Warming

Sea level rise



Sea level rise causes major flood in riverside area

Effect of Global Warming

Extreme Natural Disasters and Severe Weather



Major flood cause damage on plantation in Northern and Eastern part of Thailand (2011)

Effect of Global Warming

Natural Disasters and Severe Weather



Impact of flood on rice production in North-East of Thailand

Effect of Global Warming

Extreme drought



In 2014, Government declared drought “emergency area” in 25 provinces

Effect of Global Warming

Extreme drought: water scarcity



Lack of accessible water damaged rice field and plantations

Effect of Global Warming

Extreme and unpredictable weather



Tropical rainstorm and Hail cause serious damage on properties

Effect of Global Warming

Rising of average temperatures:
More pest and disease



Pinkish mealy bug

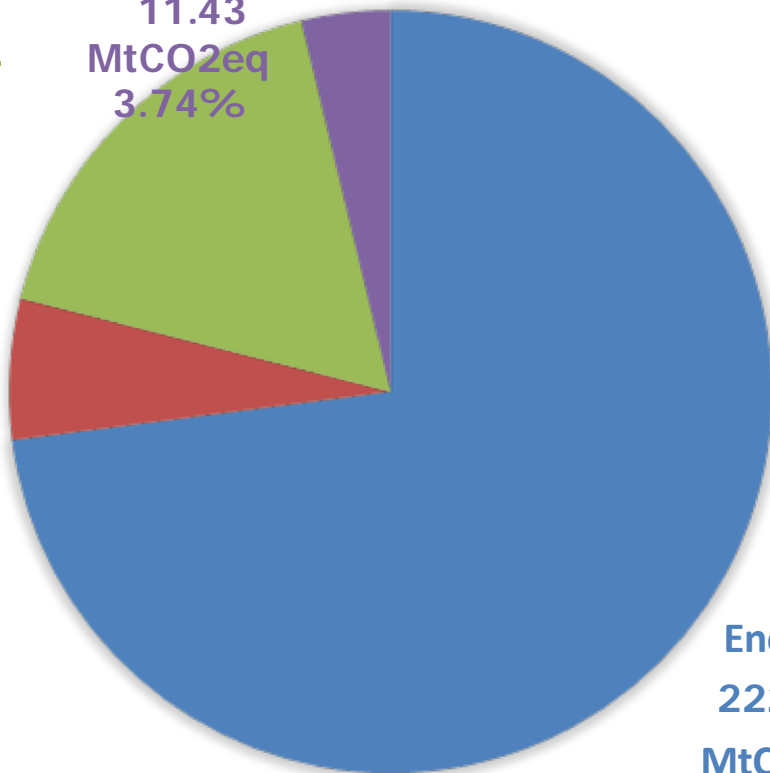


Brown planthopper

climate change and agriculture sector in Thailand

Agriculture
52.92
MtCO₂eq
17.32%

Waste
11.43
MtCO₂eq
3.74%



Industrial
18.23
MtCO₂eq
5.97%

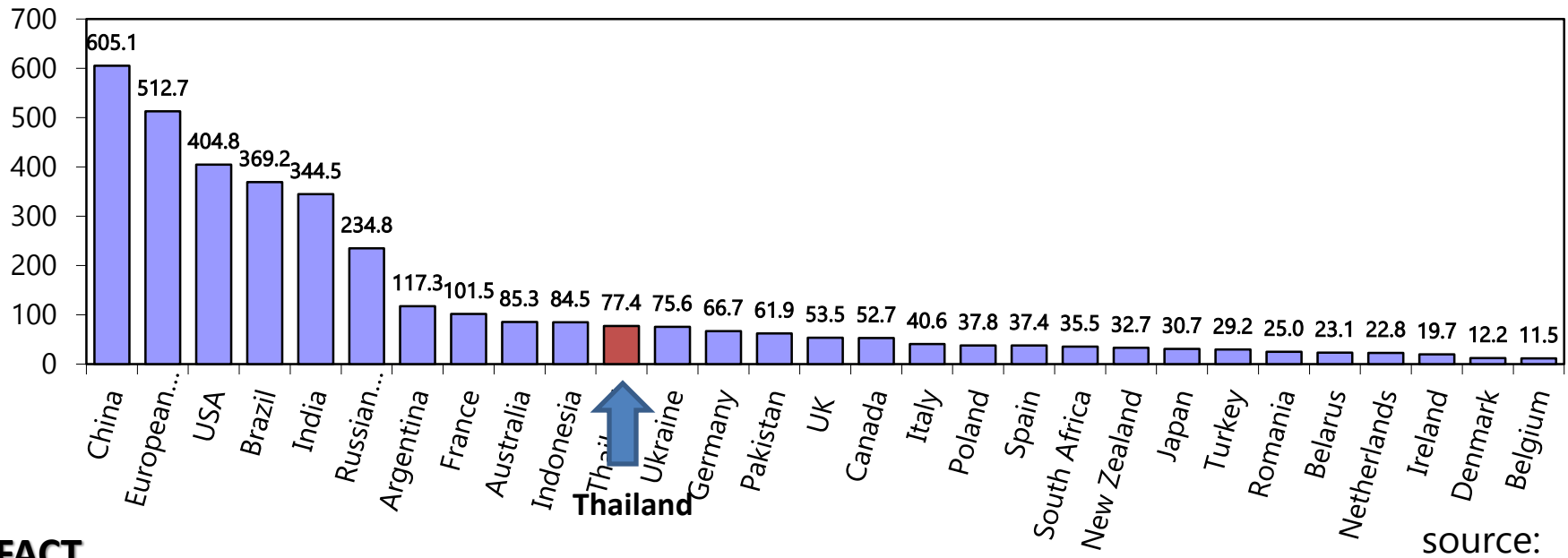
Energy
222.94
MtCO₂eq
72.97%

Greenhouse gases emission in Thailand 2011

Exclude Farm land and forest area	305.52 MtCO ₂ eq
With farm land and forest area	234.52 MtCO ₂ eq

GHG in Thailand

Thailand GHG emission compare to the rest of the world



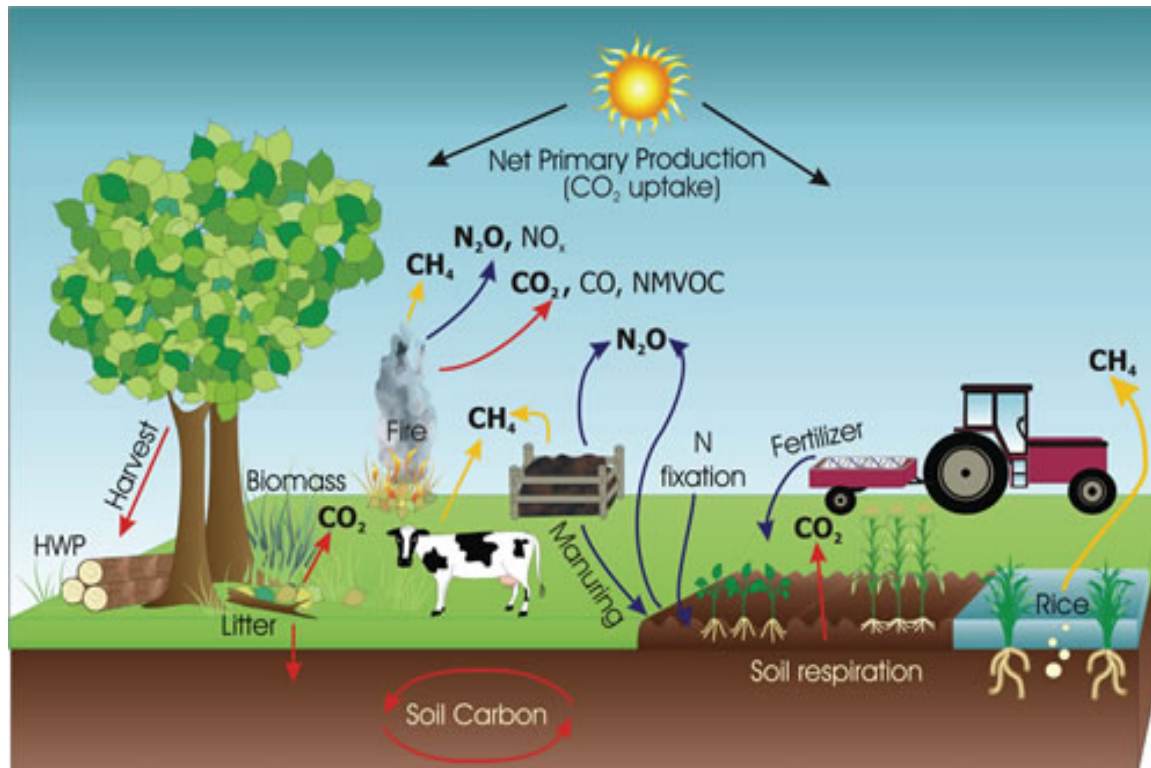
FACT

- Thailand contribute about 0.8% of global GHG emission
- China and USA contribute about 40% of global GHG emission
- IN 2000-2004, Agriculture sector in Thailand generated between 51-60 Mil. Ton CO₂ per year and increase 1.06% per year

source:

GHG Emission in Thailand

GHG EMISSION FROM AGRICULTURE AND FORESTRY



GHG in Agriculture:

- Methane from rice field
- Methane from livestock digestive system
- Methane and N₂O from manure
- N₂O from fertilizer and CO₂ from land use in Agri
- Methane and N₂O from the burning of agricultural waste

source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories

GHG Emission in Thailand

Agriculture sector have potential to absorb and reduce GHG

- JGSEE indicated that agriculture sector in Thailand has potential to reduce GHG 12% in 10 year
- **Reduce GHG in rice field**
 - Proper water management
 - Proper use of NH₄ as fertilizer
- **Reduce GHG from livestock**
 - Utilize waste for bio-energy
 - Improve feed recipe that lower GHG
- **Reduce GHG by properly management of land use**
 - Analyze soil composition for optimal fertilizer use
 - Change to Slow-release fertilizer
 - Prevent the practice of burning agricultural waste

Climatic Change Impact Estimation

Item	Change in yields (2010-2050)	Economic Impact: Direct calculation ¹ (Thousand baht)	Economic Impact: Surplus analysis ² (Thousand baht)
Cassava	2.67%	277,270	15,002
Maize	-11.28%	-1,850,799	-694,636
Rice KDML 105	3.60%	651,688	177,867
Rice (others)	0.48%	430	207,900
Sugarcane	-4.33%	-2,209,014	-2,493,207
Total		-3,130,425	-2,787,074
Durian	-49.36%	-2,697,929	-4,372,572
Longan	-98.22%	-1,281,148	-5,259,612
Lychee	-19.07%	-106,586	-130,615
Mango	-0.63%	-894,657	-80,000
Mangosteen	-7.92%	-180,947	-64,135
Oil Palm	-4.80%	-83,024	-32,895
Orange	-13.37%	-57,032	-16,025
Pineapple	-17.44%	-374,780	-122,834
Rubber	-125.64%	-1,123,283	-1,120,898
Rambutan	-0.70%	-76,173	-11,713
Soybean	2.40%	116,618	23,228
Grand Total		-9,889,366	-13,975,145

Source: CIAT (2012)

Note: ¹ Direct calculation assumes only yield has changed in the calculations while others remain unchanged.

² Surplus analysis measures the total change in welfare of producers and consumers. In estimation, a partial equilibrium model with dynamic prices is used.

Impact on agriculture products in Thailand

Productions	Yield change (2011-2050)
Rubber	-125.64%
Longan	-98.22%
Durian	-49.36%
Lychee	-19.07%
Pineapple	-17.44%
Orange	-13.37%
Maize	-11.28%
Mangosteen	-7.92%
Oil palm	-4.80%
Sugarcane	-4.33%
Rambutan	-0.70%
Mango	-0.63%
Other rice	0.48%
Soybean	2.40%
Cassava	2.67%
Jasmine rice 105	3.60%

The work of Ministry of Agricultural and Cooperatives

Thailand have initiated National Plan for Climate change since 2008

At national level

- 2007 established National organization for management of Greenhouse gasses
- 2008 National Strategy for Climate Change 2008-2012
- 2009 established of Climate Change Office (CCO) - MNRE
- 2015 National Master Plan for Climate Change 2015-2050

Ministry of Agriculture and Cooperatives (MOAC)

- 2007 Plan for Mitigating Climate Change Impacted on Agriculture 2008-2011**
- 2010 Comprehensive project for climate change**
- 2014 Strategy for Climate Change in Agriculture 2014-2016**
- 2016 Agriculture and Cooperatives Development Strategy (draft) 2017-2021**
- 2016 Strategy for Climate Change in Agriculture 2017-2021**

International Cooperation

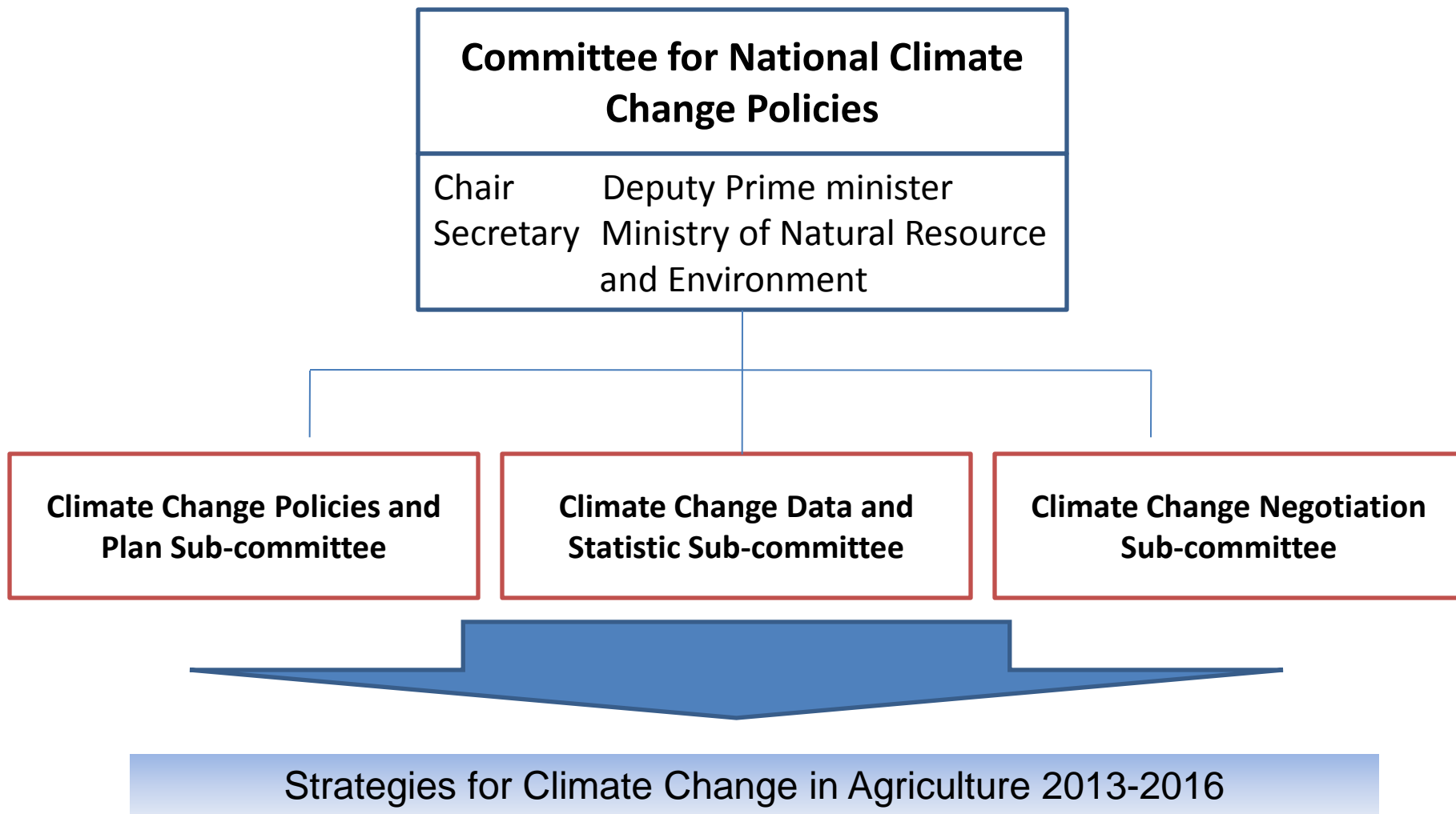
Thailand is a member of UNFCCC

Thailand has been a member of UNFCCC since 1994.



“On Thailand’s part, we reaffirm our commitment under the **INDCs** to reducing our greenhouse gas emissions between 20 and 25 percent by the year 2030”

Climate Change management structure in Thailand



Committee for National Climate Change Policies

Strategies for Climate Change in Agriculture 2013-2016

Vision *“Resilience in agriculture sector driven sustainable agriculture development in context of climate change”*

Missions

- Enhance resilience and capacities for farmer to adapt
- Increase capacities to better manage agricultural resource
- Research and development of scientific knowledge, Technologies and Innovations with local knowledge
- Promote leaning, cooperation, network and exchange knowledge in all sector

Objective

- Agriculture sector and adapt to climate change
- Agriculture sector contribute in progress to mitigate climate change
- Support the development and management of knowledge
- Promote the synergies between social and environment

Strategies

- **Strategy 1:** Adapt to climate change
- **Strategy 2:** Reduce GHG emission in agriculture sector
- **Strategy 3:** Steering of climate change strategies

Examples of work under strategy 1

1.1 Project: Agricultural Economic studies of climate change (OAE)

1.2 Project: Analyze of the climate change, adaptation and impact on plant productions

1.3 Project: Research and development on crop productions and alternated energies in context of climate change

1.4 Project: Studies on the impact of climate change on River Kwai dam

1.5 Project: Improvement of rice harvesting technologies as adaptation for climate change

Examples of work under strategy 2

- 2.1 Project: Campaign to the practice of burning of rice stubble
- 2.2 Project: Research on the using of biocharcoal to reduce the methane emission in paddy field
- 2.3 Project: Carbon foot print and carbon emission in livestock
- 2.4 Project: The evaluation of energies usage of GHG emission per production units
- 2.5 Project: Establish the demonstration side for Shrimp breeding farm that help reduce energy use

Examples of work under strategy 3

3.1 Project: Preparation for UNFCCC meeting

3.2 Project: International Alliance for GHG in agriculture research

3.3. Project: Rise awareness to the impact of climate change on agriculture

3.4 Project: Rise awareness to the GHG emission in agriculture

Major Project Implemented under INDC Goal 2030

- Evaluation and reducing Nitrous oxide in main agriculture product (Department of Agriculture, MOAC)
- Convince the public to stop the practice of burning in agricultural land (Department of Agriculture Extension, MOAC)
- Project: Research in improving water and fertilizers efficiencies in high land
- Examining the “Alternate wet and dry” water management system and proper management in rice field
- Extend the use of “Alternate wet and dry” water management system in irrigated area

Difficulties

- People Awareness
 - Not the man-made
 - Not by developing countries
- Farmer Adaptation
 - Large number of farmers (29 million)
 - Poor, small scale, low educated, traditional farmers

Needs from International Organization

- Knowledge
- Technologies Transfer
- Fund for “Start-up”

End of the presentation
Thank you