

Adaptation to Climate Change and Agricultural Sector in Thailand

**Anupit Supnithadnaporn,
Jirapa Inthisang,
Praphan Prasertsak,
Watcharin Meerod**

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Outline

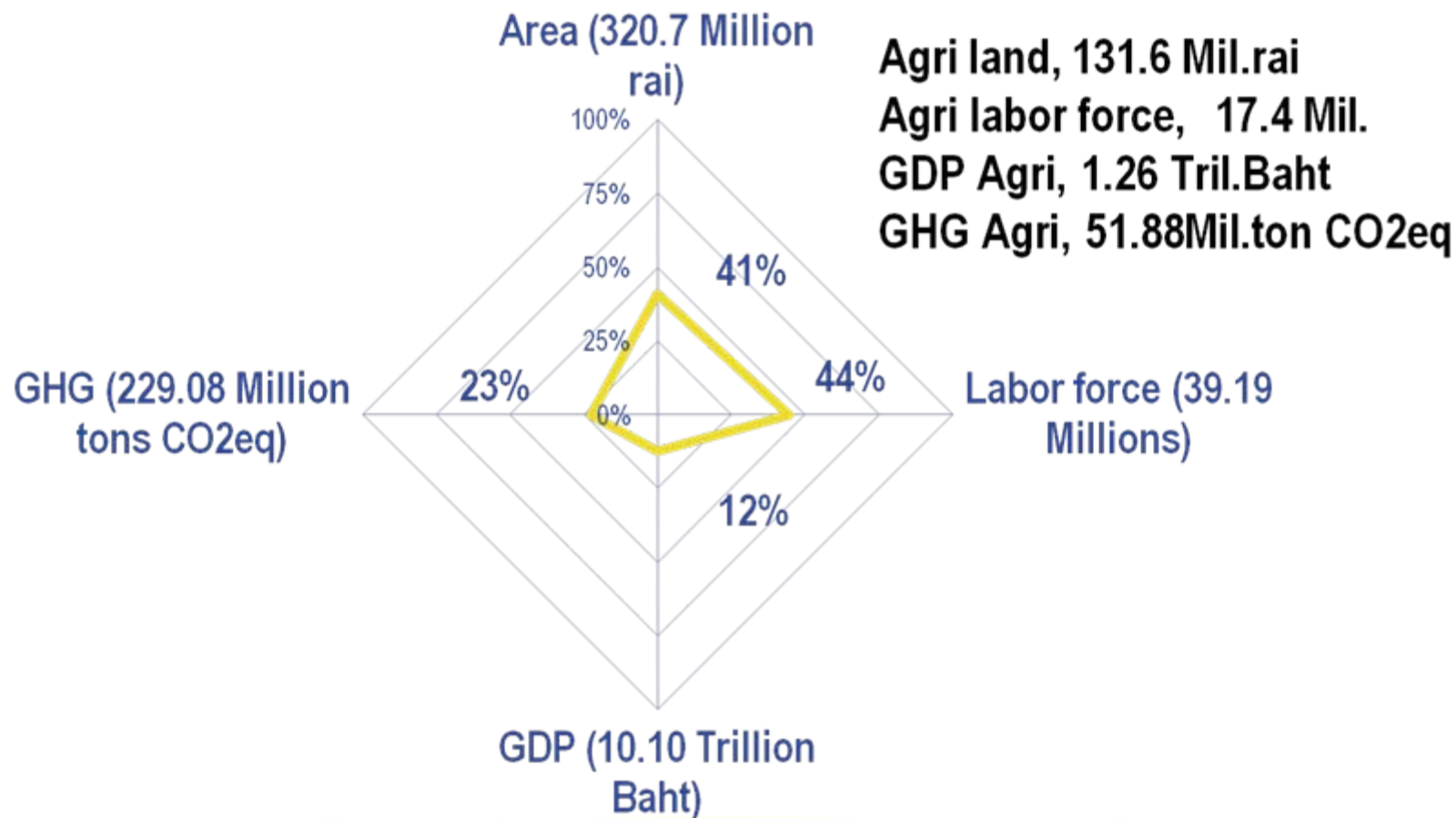
- Agriculture sector in Thailand
- Climate Change Projection
- Potential Impact of Climate Change on Major Crops
- Thailand's Adaptation to Climate Change
- Conclusion



Agricultural sector in Thailand

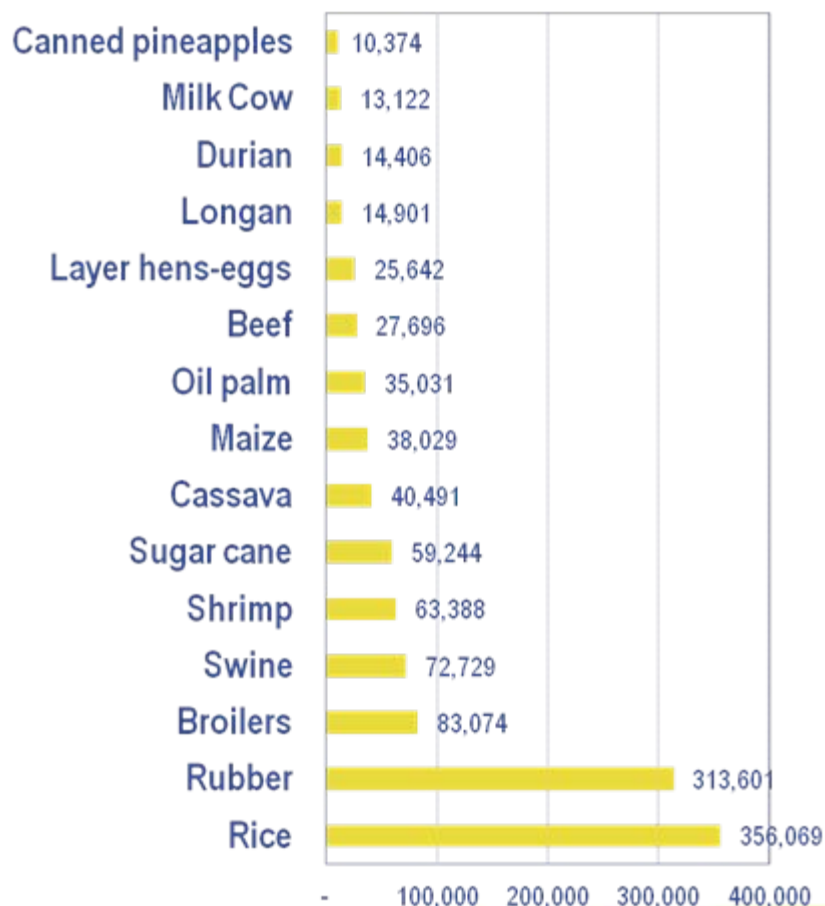


Agriculture Sector in Thai Economy

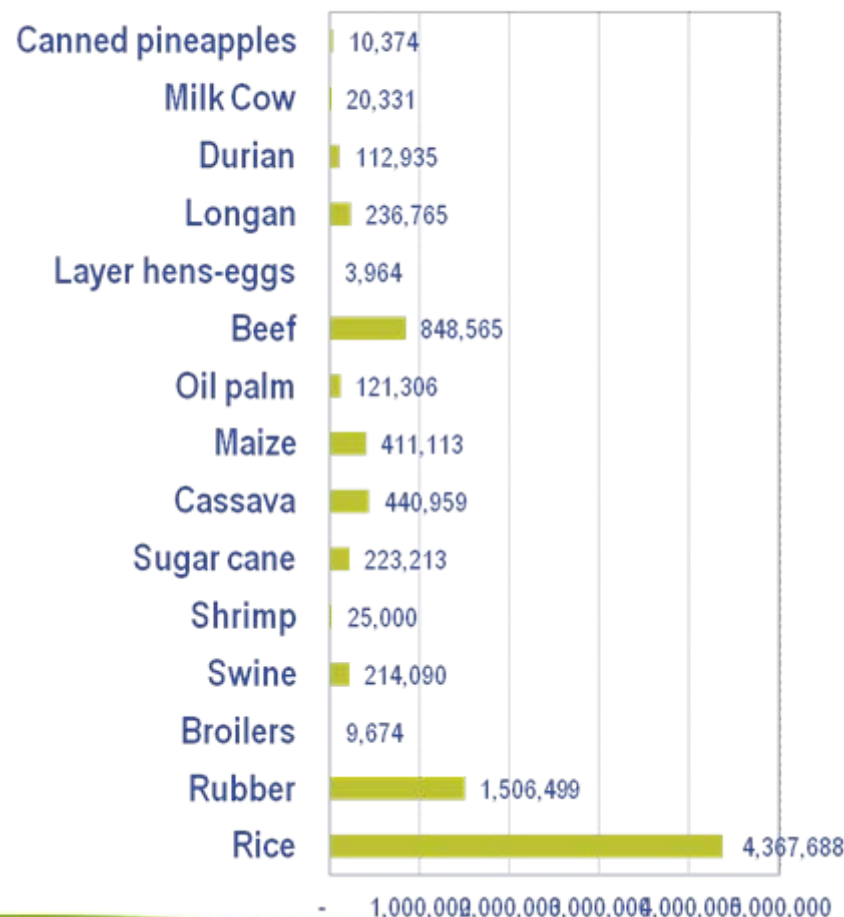


Major Agriculture Products and Numbers of Farms Involved

Agriculture Products, 2011 (Mil.Baht)



Numbers of Farms, 2011



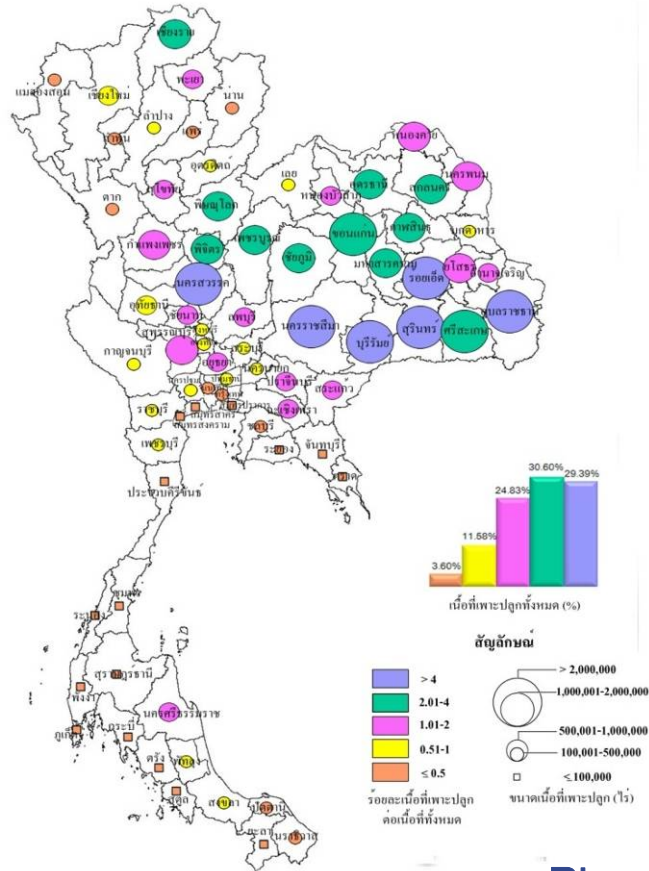
Climate and Optimal Climate for Major Crops

2010	Northern	Northeastern	Central	Southern
Temperature (Celsius)				
Minimum	6.7	7.0	15.2	18.5
Average	26.6	26.7	27.8	27.3
Maximum	42.3	40.6	38.8	36.8
Rainfalls (Millimeter)	1,112	1,504	1,393	2,264

Crop	Growing period	Temperature			Rainfalls		
		Min	Optimal	Max	Min	Optimal	Max
Rice	120 – 150	8	25 – 35	43	600	800 – 1,200	2,000
Rubber		10	24 – 27	45	1,350	2,000 – 4,000	6,000
Sugar cane	300 – 450	15	30 – 35	40	600	1,500 – 2,000	3,000
Cassava	240 – 365	10	25 – 37	45	500	1,000 – 1,500	2,500
Maize	100 – 120	10	25 – 35	40	600	1,000 – 1,200	1,800
Oil Palm		12	22 – 32	38	1,400	1,800 – 2,500	2,800

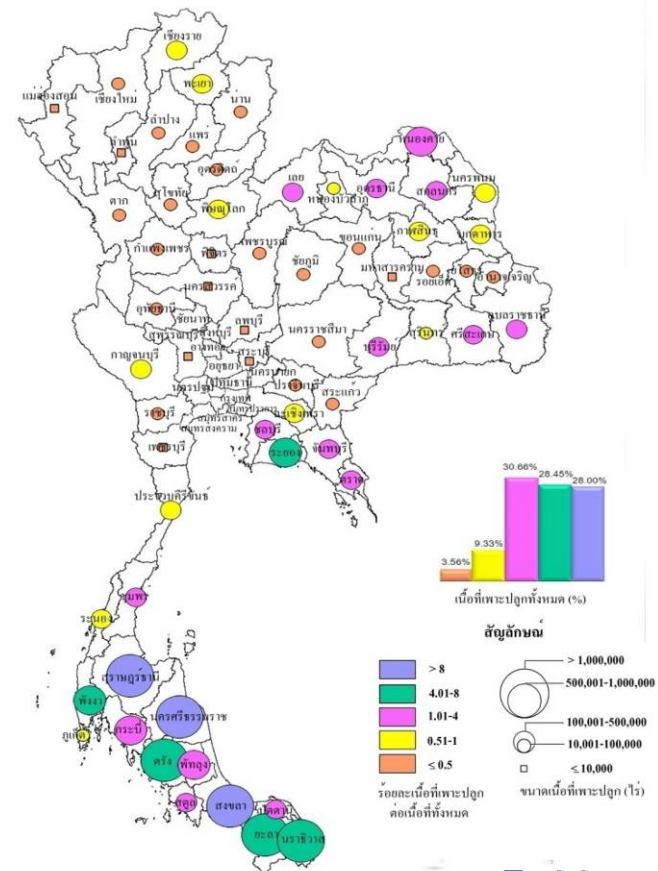
Major Crops Planting Areas

ภาพแสดงแหล่งเพาะปลูกข้าวของประเทศไทย



Rice

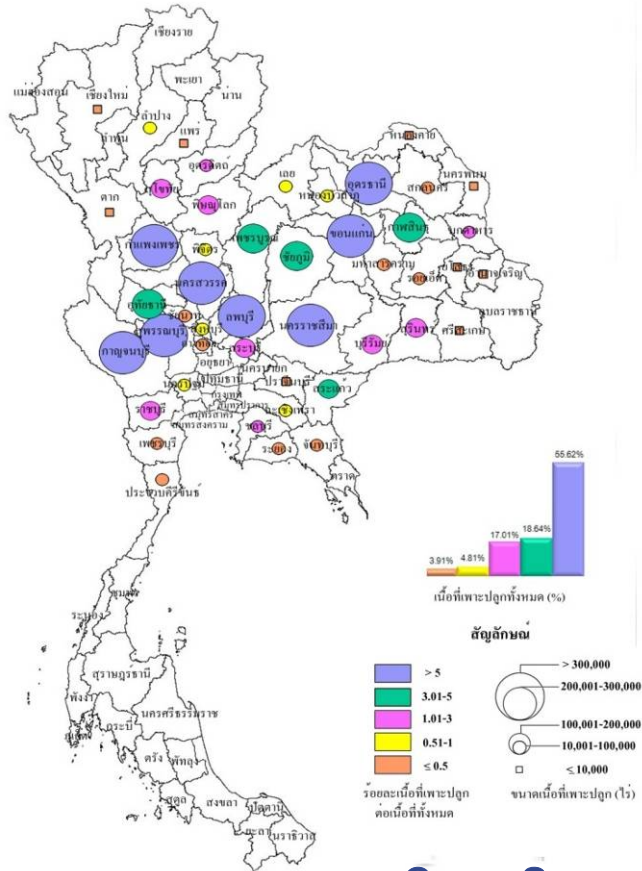
ภาพแสดงแหล่งเพาะปลูกยางพาราของประเทศไทย



Rubber

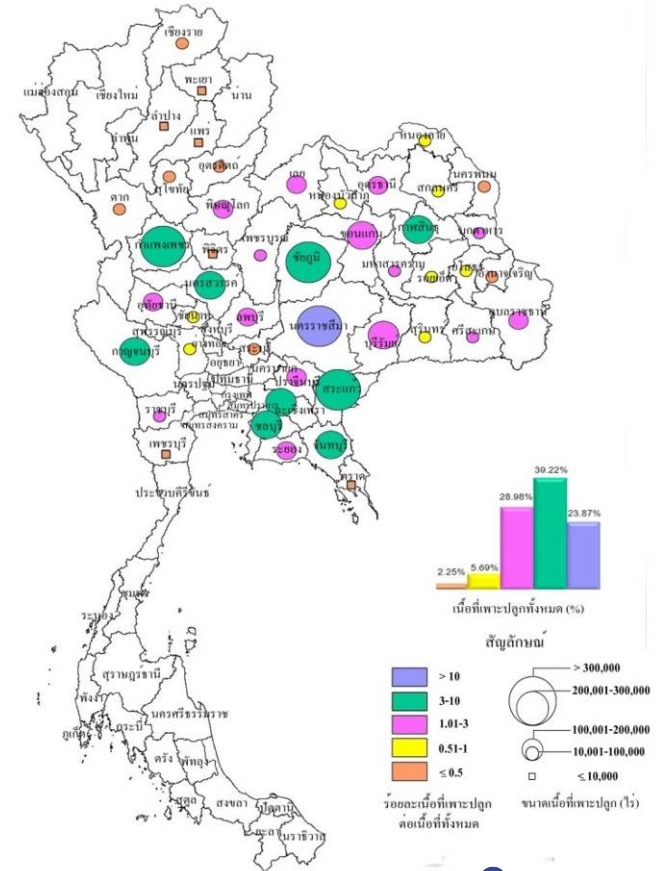
Major Crops Planting Areas

ภาพแสดงแหล่งเพาะปลูกอ้อยโรงงานของประเทศไทย



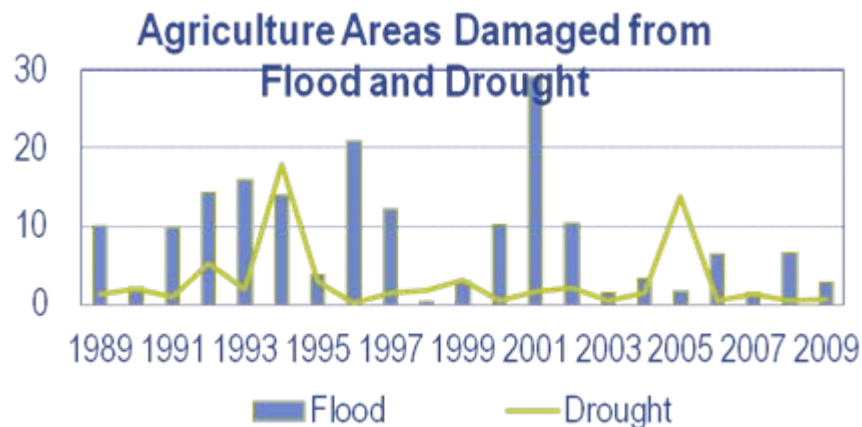
Cane Sugar

ภาพแสดงแหล่งเพาะปลูกมันสำปะหลังของประเทศไทย

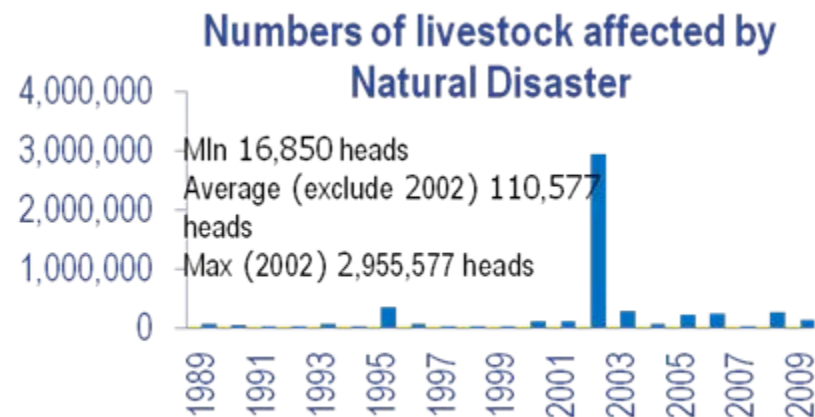


Cassava

Natural Disaster and Agricultural Damage



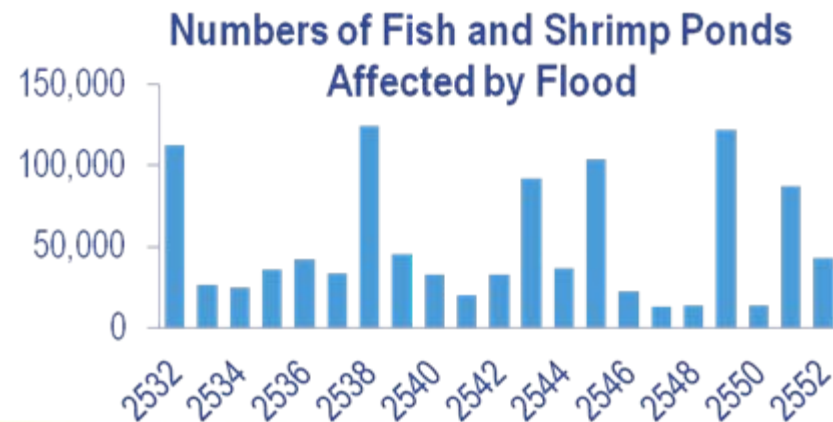
Source: Department of Disaster Prevention



Source: Department of Disaster

Agricultural Areas Damaged from Natural Disaster (Mil.rai)

	Flood	Drought	Storm	Fire
Average	8.639	2.956	0.026	0.002
Minimum	0.466	0.102	0.001	0.000
Maximum	29.134	17.924	0.139	0.006



Source: Department of Disaster

Flood Damage in Agriculture Sector in 2011 (May-13 Dec)

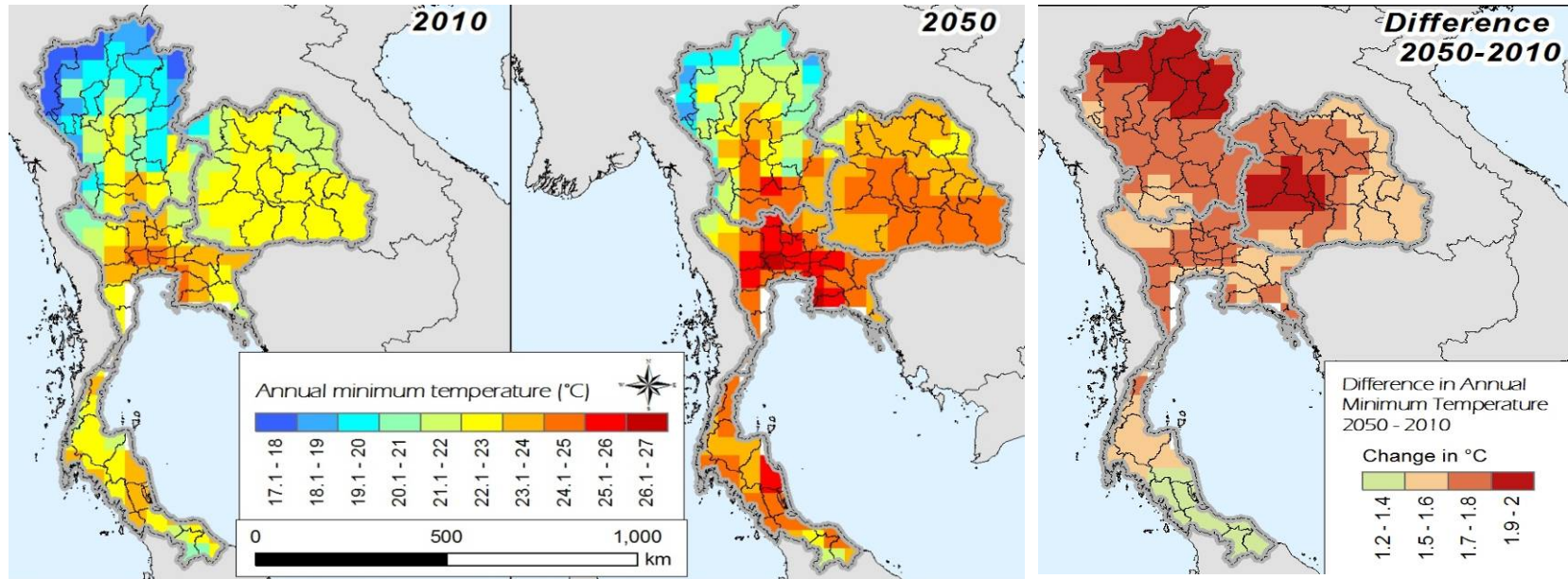
Cases	Damages	
Farmers (Mil.HH)	1.28	
Agriculture areas (Mil rai)	12.61	(2.02 Mil.Ha)
Rice	9.99	(1.6 Mil.Ha)
Upland crops	1.87	(0.03 Mil.Ha)
Horticulture	0.75	(0.12 Mil.Ha)
Aquaculture area (Mil rai)		
Fish	0.215	(0.03 Mil.Ha)
Shrimp/crab/shells	0.053	(0.008 Mil.Ha)
Livestock (Mil. heads)	30.32	



Climate Change Projection

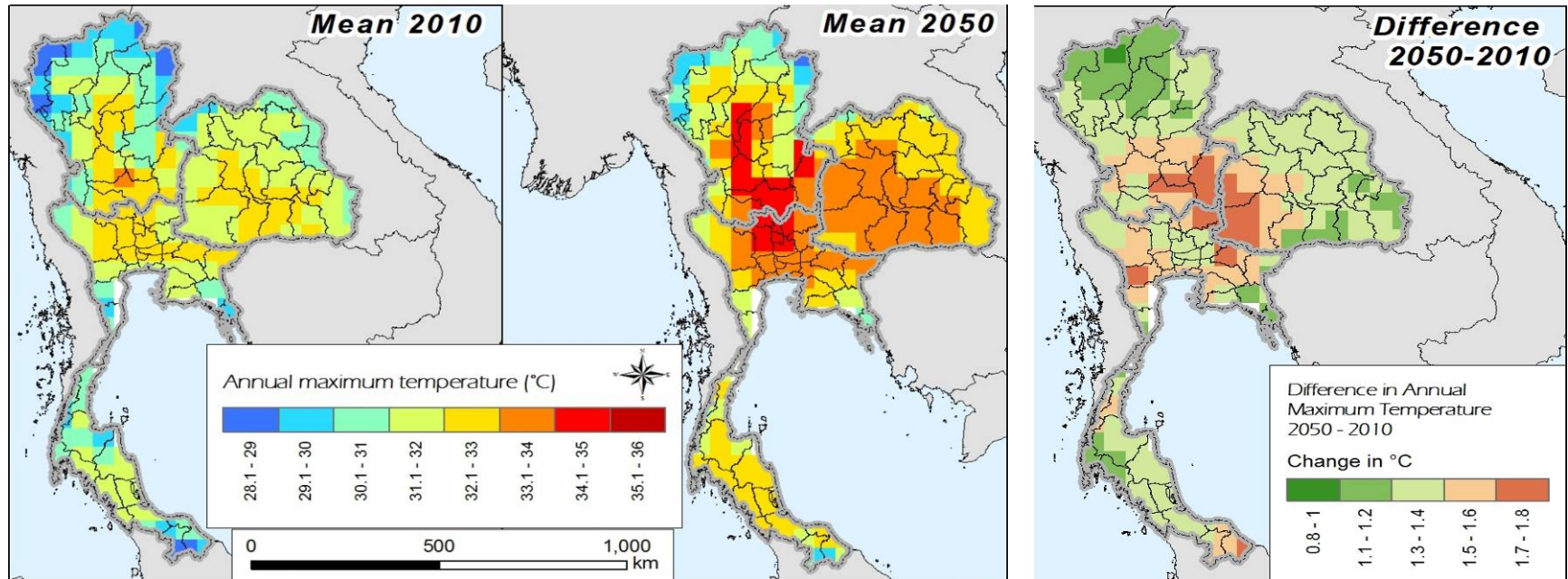


Minimum Temperature Projection



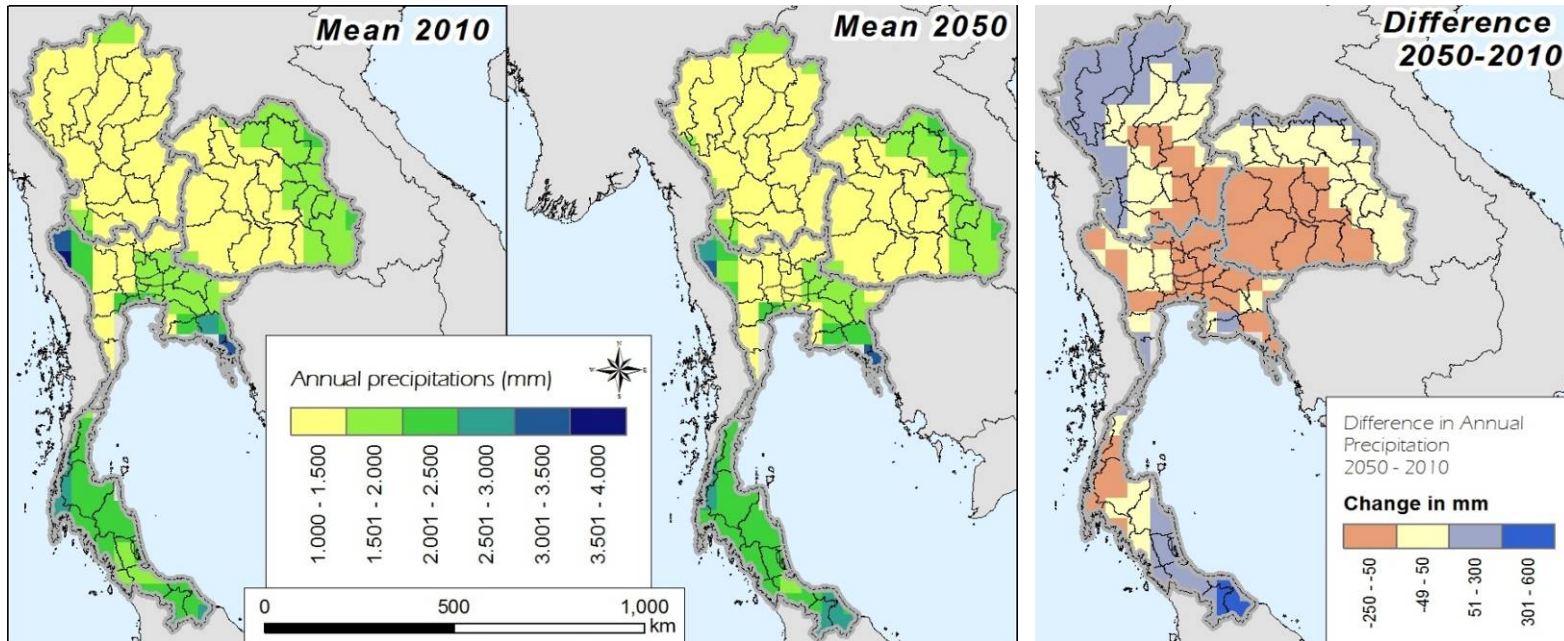
Minimum temperature will increase every region range between 1.2 – 2 Celsius. Temperature rise the most in Northern and central part of Northeastern.

Maximum Temperature Projection



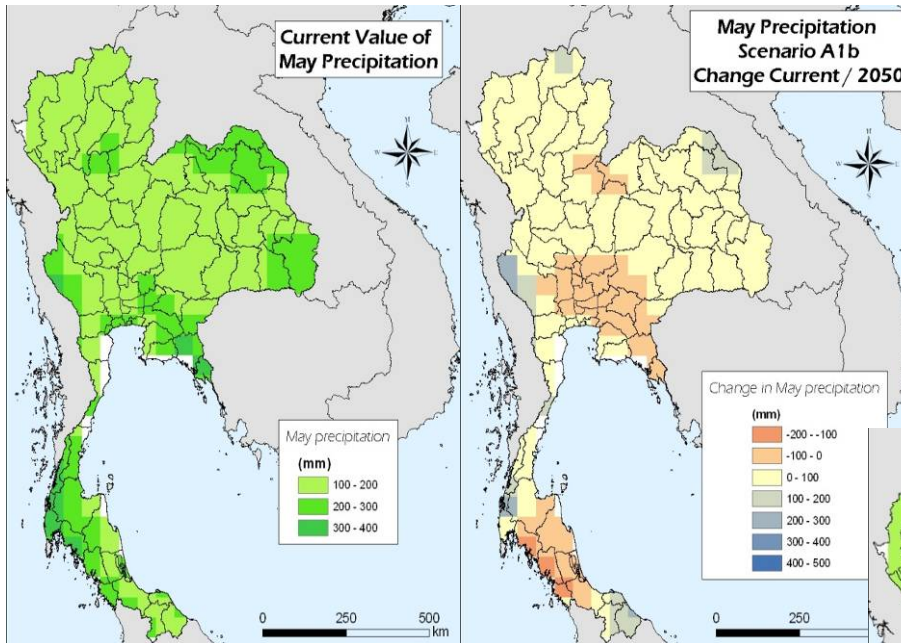
Maximum temperature tend to increase between 0.8 – 1.8 C. The temperature of the northern area will increase about 1 C and more towards the southern part of northern region and the northeastern region.

Annual Rainfall Projection



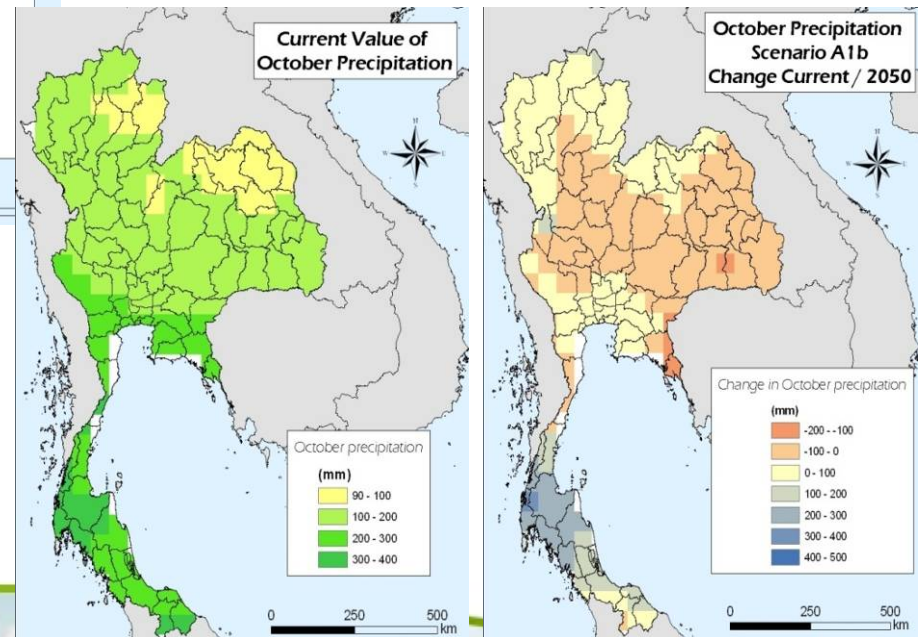
Rainfall in central area tend to decrease, while the rainfalls in Northern and the north of Northeastern Thailand tend to increase.

Rainfall at the beginning and the end of rainy seasons

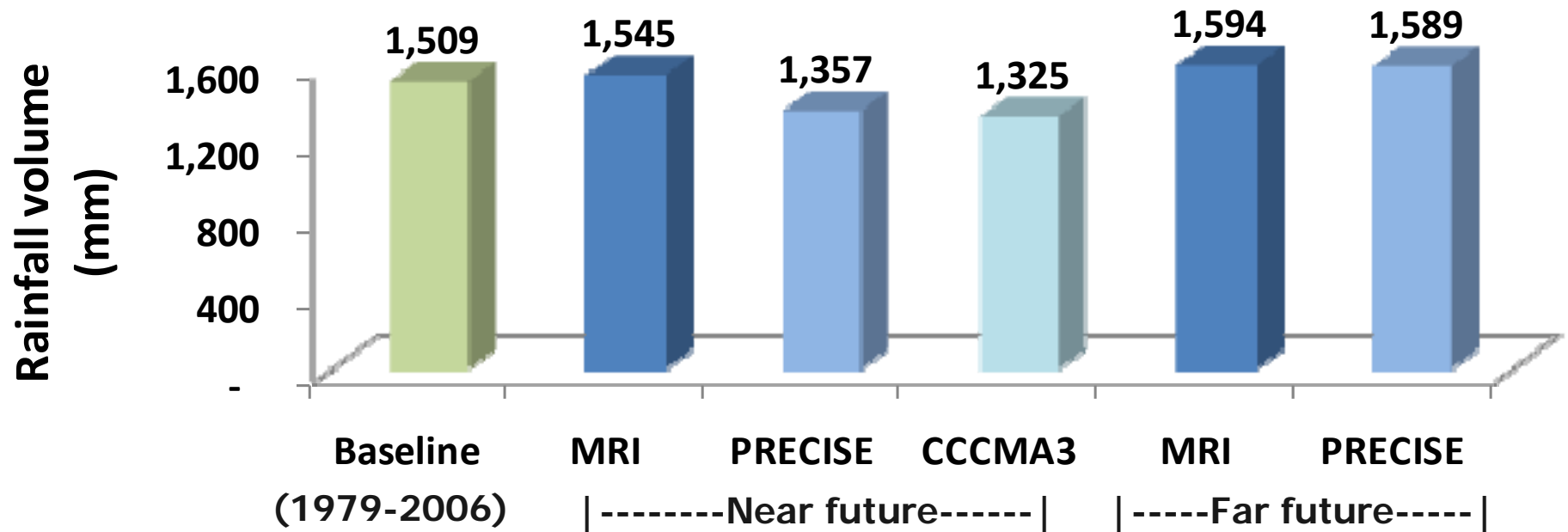


May precipitation (beginning of rainy season) will not change much.

October precipitation (end of rainy season) will decrease in N/E area, and increase in the Southern areas.



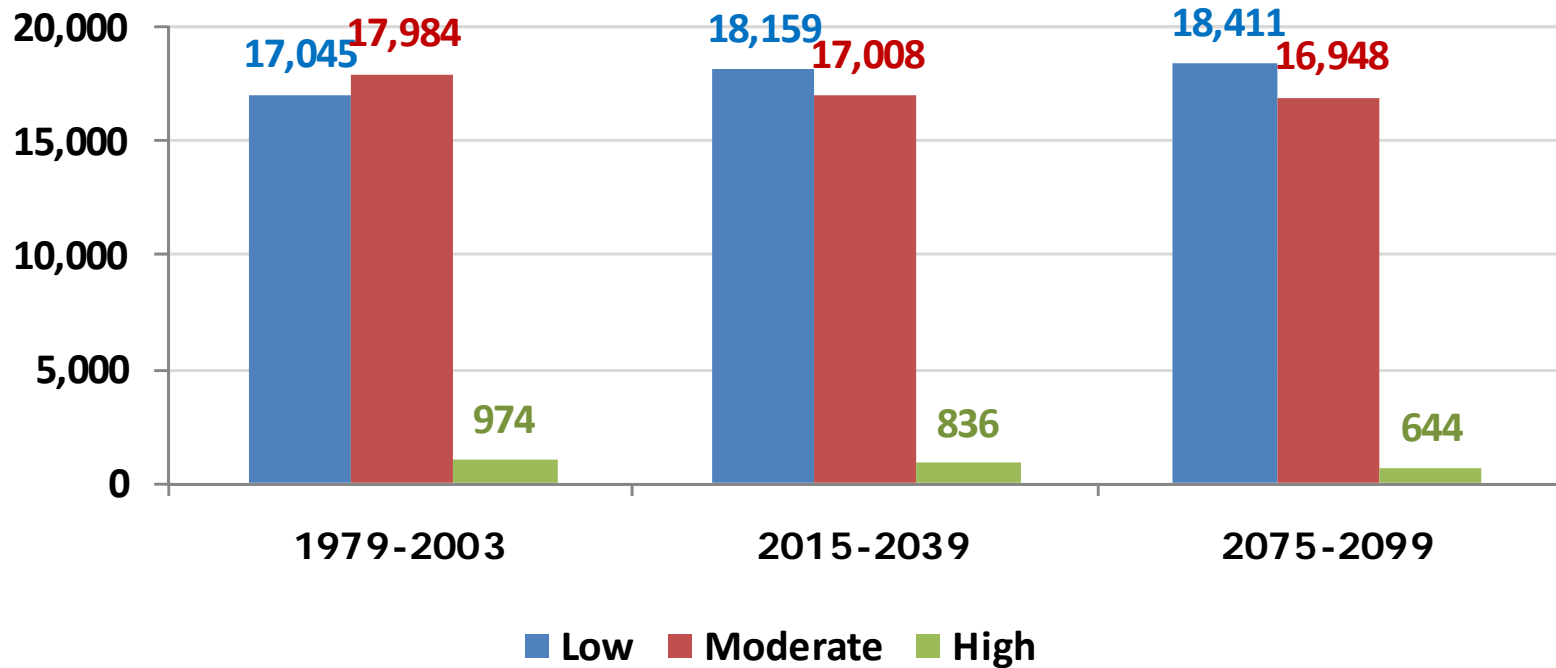
Rainfall Projection in near future and far future



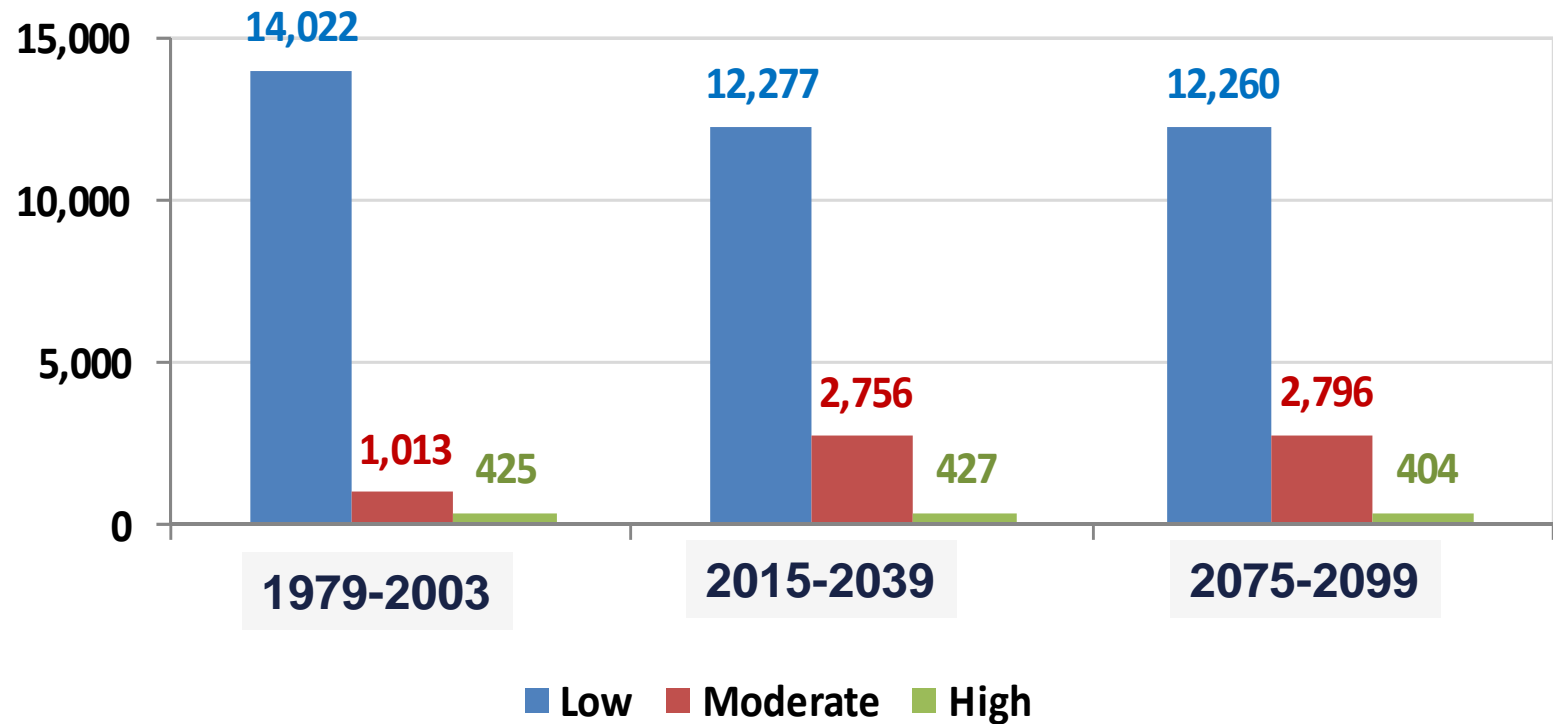
Potential Impact of Climate Change on Agriculture Production



Number of drought prone villages



Number of flood prone villages



Potential Physical Impact of Climate Change on Major Sector



Exposure factors of crops: beginning day of rainy season, min daily temp, max daily temp, off season storm

- Major rice: uncertain rainfalls at the beginning of rainy season; second rice: uncertain rainfalls at the end of rainy season
- Cassava: root damage due to heavy rain
- Cane sugar: water shortage
- Maize: beginning day of rainfall, and decease



Exposure factors of livestock: temperature, quantity and quality of water

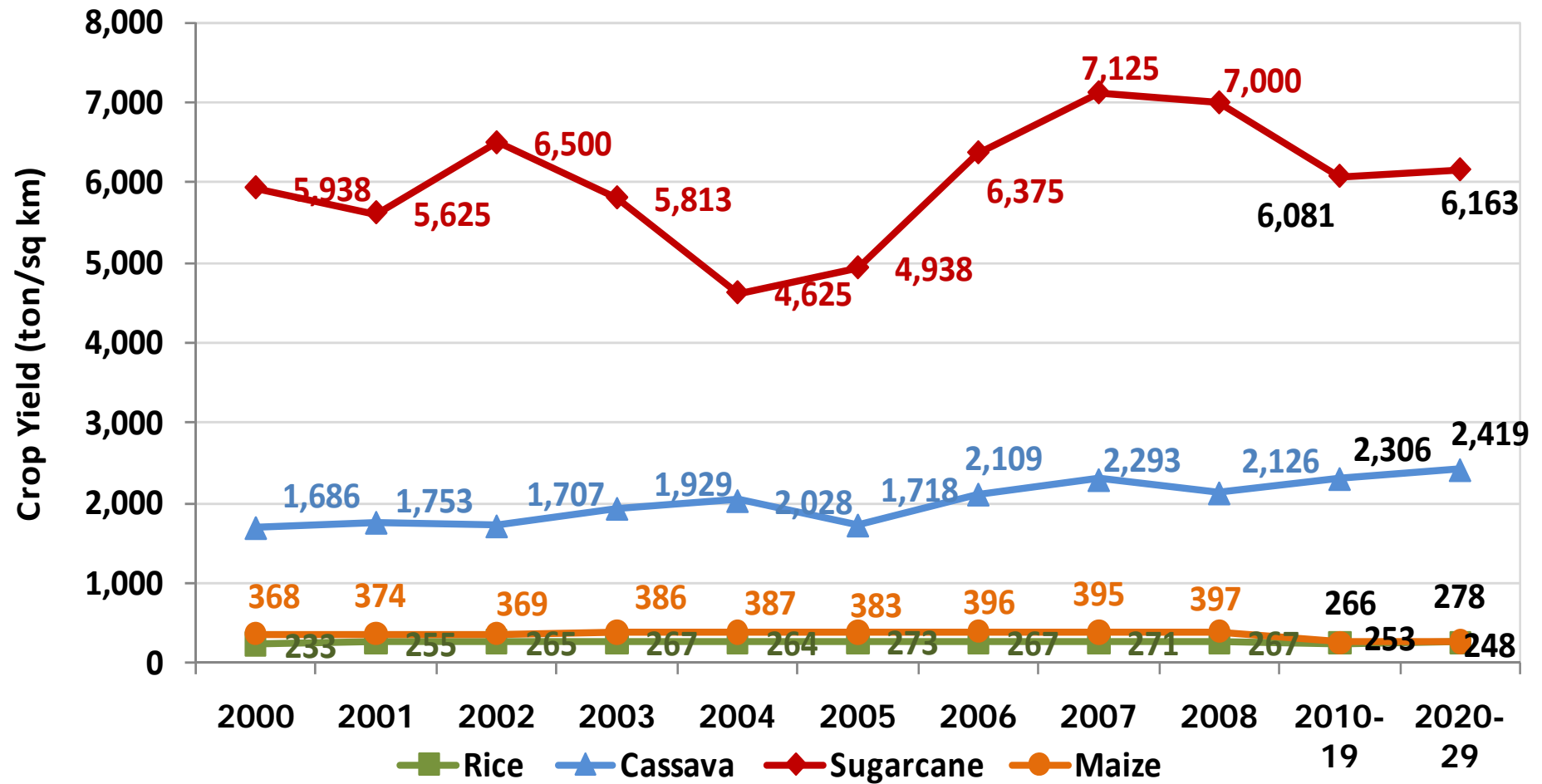
- Swine, cow, chicken: stress due to heat, affecting survival rate of babies, and immune system
- Quantity and quality of animal feed



Exposure factors of fisheries: temperature, saltiness, light

- Giant tiger prawn, fish, shell: higher death rate with rising temperature and many of them death at 37 C

Impact of Climate Change on Major Crops



Thailand's Adaptation to Climate Change



Climate Change Policies

- **1994: UNFCCC ; 2005: Kyoto Protocol**
- **2007: Office of the Prime Minister Regulation on Climate Change Management (2007)**
 - National Climate Change Policy Committee, chaired by PM
 - Set up Thailand Greenhouse Gas Management Organization (TGO)
- **2008: National Strategy for Climate Change Management (2008-2012)**
 - Building adaptive capacity & reducing vulnerabilities to climate change impacts
 - Promoting GHG mitigation activity in harmony with sustainable development
 - Promoting climate change R&D
 - Raising awareness & encouraging public participation
 - Building capacity of relevant personnel & institution
 - Supporting international cooperation on climate change mitigation & sustainable development
- **2007: Climate Change Alleviation Plan for Agriculture (2007-2011)**
 - Knowledge management; Prevention & correction; Public relation



Adaptation Actions

- **Climate Change Knowledge Information Center**
 - Conduct research on risk and vulnerability of coastal areas
 - Organize policy dialogues
 - Process & disseminate climate change knowledge
 - Encourage society & coastal community
- **Water Resource Management in Agricultural Sector**
 - Royal projects on water resource development
 - Irrigation systems for low land areas
 - Top soil conservation using Vetiver grass
 - R&D on local plants & animals
- **Natural Disaster Management**
 - Disaster Prevention & Mitigation Act 2007
 - National Disaster Prevention & Mitigation Committee



More specific adaptation actions implemented

- Early warning system:
 - Utilize climate model for projection, assess impact and vulnerability of climate change on agriculture
- Water harvesting in rainfed area:
 - Excavate a 1,260 cubic meter well per household (co-fund by government)
- Insurance for Natural disaster:
 - started pilot project in 2006 in northeastern region, later expand to many crops
- R&D in rice varieties:
 - New varieties being developed are more focus on varieties resistant on drought, saline soil, short- live harvest crop in certain area, and of course high yield varieties.



Adaptation Strategies at Different Levels

Farm level: cropping patterns, delay growing seasons

Institution level: raise awareness, build adaptive capacity, provide reliable climate and crop information, infrastructure development (irrigation system)

Technology level: R&D in climate change, soil improvement, drought & flood resistant varieties



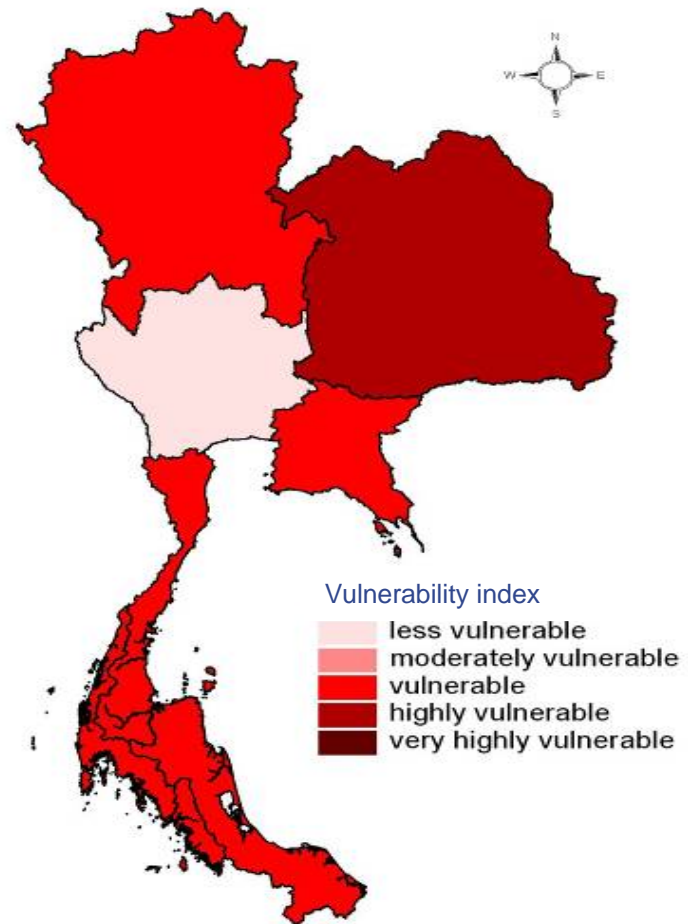
Farmers Perception on Climate Change and Adaptation Strategies

“Vulnerability to climate change:
Adaptation strategies and layers of resilience”
Project by ADB, ICRISAT, and DOA (Thailand)



Farm level adaptation

- The Northeast region is the most vulnerable region
- Main adaptation strategies:
 - **Landless:** rent land/supplementary occupation/ migration
 - **S&M farm-holder:** delay growing season to avoid drought / supplementary occupation
 - **Large farm-holder:** change cropping pattern, delay growing season



Technology Development and Transfer (government, farmer organization, private sector)

"Chonlasit submergence tolerance" have been transferred to farmers in Authaya, Chainat, Angthong, and Uttaradit



Rice flower



Flooding for 12 days



After flooding

It can survive under the water for up to 2 weeks after the occurrence of flash flooding off-season rice. Homcholasit rice (KDML 105 submergence tolerance) can provide yield of 3 tons per hectare.

Sikhio Model (by farmer organization)



Drip irrigation system



Sikhio model, Nakhon Ratchasima, demonstrates precision farming technology (such as drip irrigation system and customized fertilizer) to increase the productivity of cassava to about 30-40 ton/hectare

GranMonte Smart Vineyard (by private sector)



GranMonte Smart Vineyard project was piloted in 2008 by Mahidol University and NECTEC. The project utilized an integrated set of technologies in a vineyard

- ▶ Information Technology
- ▶ Smart Viticulture
- ▶ Networks of Multi-functional and Multi-dimensional Sensors
- ▶ RFID, GIS, Radio-Controlled,
- ▶ Robotics
- ▶ Agro-informatics
- ▶ Nanotechnology)

Farm managers can monitor changes in the farm via the Internet or by mobile phone

Conclusion: Remaining Issues & Recommendations

Issues

- Lack of concrete national adaption action plan
- Inadequate policy tools
- Inefficient knowledge and technology
- Lack of reliable and accurate information system

Recommendations

- Ensure local participation
- Experiment new policy instruments
- Need of technology transfer and creating critical mass of agricultural scientists
- Promote R&D and establish reliable and accurate information system

