Welcome to

International Symposium & Workshop "Level of Long-Term Stabilization of Global Warming and Climate Change Risks"

Organizers
Strategic research program S-4
Ibaraki University
National Institute for Environment Studies(NIES)
Integrated Research System for Sustainability Science(IR3S)
Ministry of the Environment, Japan

Background of This Workshop

1. Climate change as a global issue
   - Sustainable development and long-term global sustainability
   - Short-term security of the society

2. COP 15 in Copenhagen for the international framework after 2013

3. From IPCC AR4 to AR5
   - AR5 to be published in 2013 to 2014

Questions for Science

1. What is the relationship between stabilization level of climate and impacts?

2. What is the dangerous level of climate change

3. How can we achieve the goal to stabilize climate within the range which is not harmful to the human society?

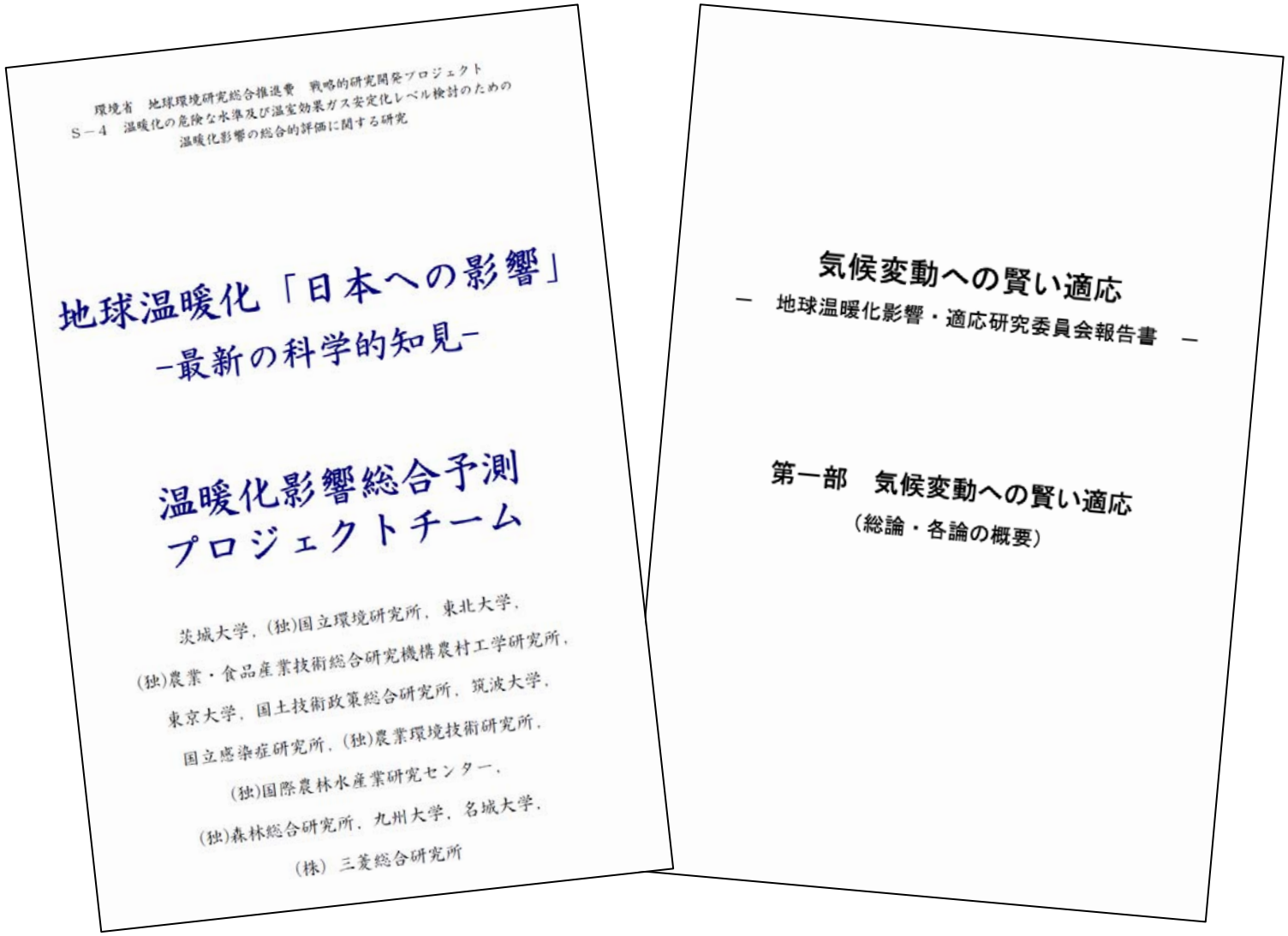
Purposes of the Workshop

1. Introduction of the research activities in different regions and countries

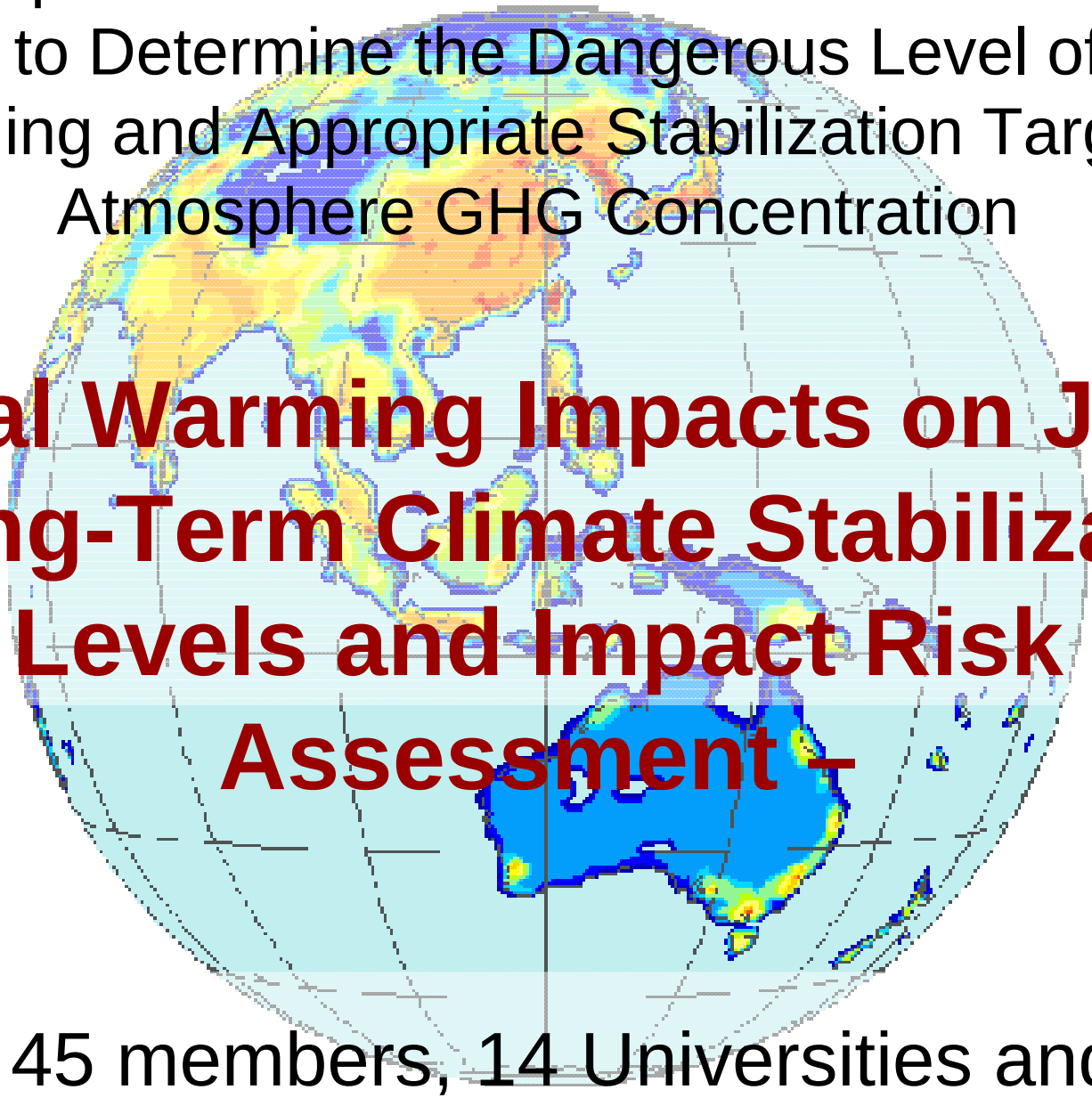
2. Exchange information on the present studies on impacts and risks estimated for different stabilization paths and dangerous levels of climate change

3. Future directions of researches on impacts, adaptation and vulnerability to contribute to the IPCC AR5.

Japan's Studies on Impacts and Adaptation



S-4 Comprehensive Assessment of Climate Change Impacts to Determine the Dangerous Level of Global Warming and Appropriate Stabilization Target of Atmosphere GHG Concentration



Global Warming Impacts on Japan – Long-Term Climate Stabilization Levels and Impact Risk Assessment –

45 members, 14 Universities and Institutes

Research Scheme

Impact Projection

Water resources

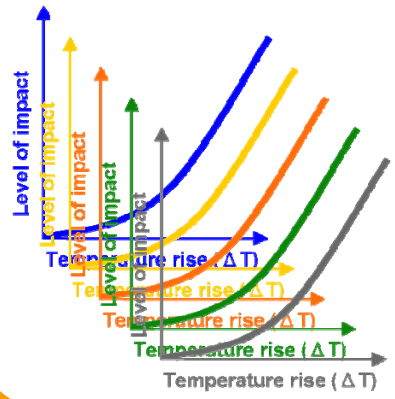
Human health

Agriculture

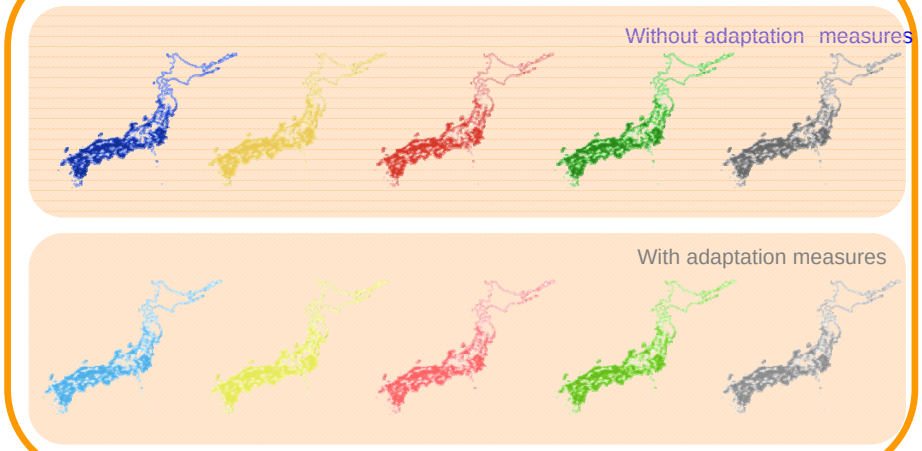
Forests

Coasts

Impact Functions



Risk Map



Adaptation measures

Common scenario

Climate scenario

Population scenario

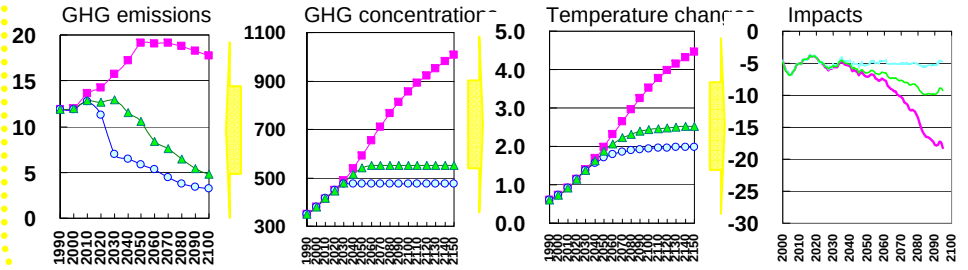
Integrated Assessment

Economic assessment

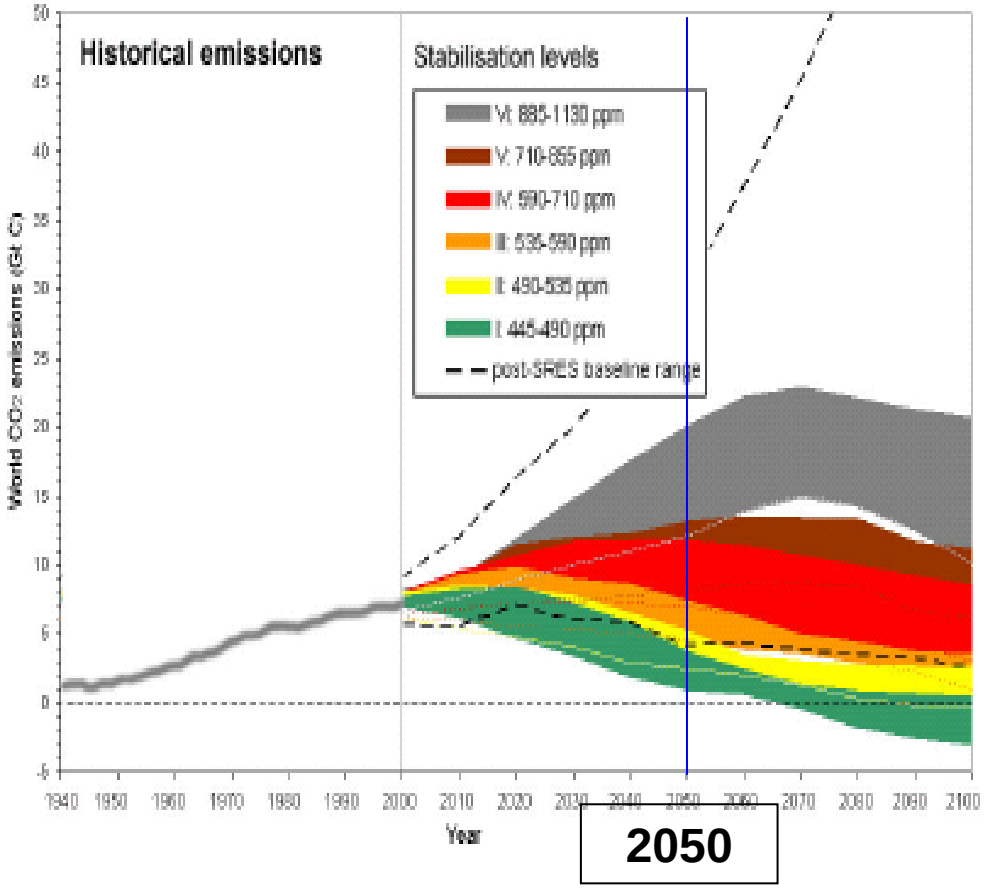
Proposal of economic assessment method

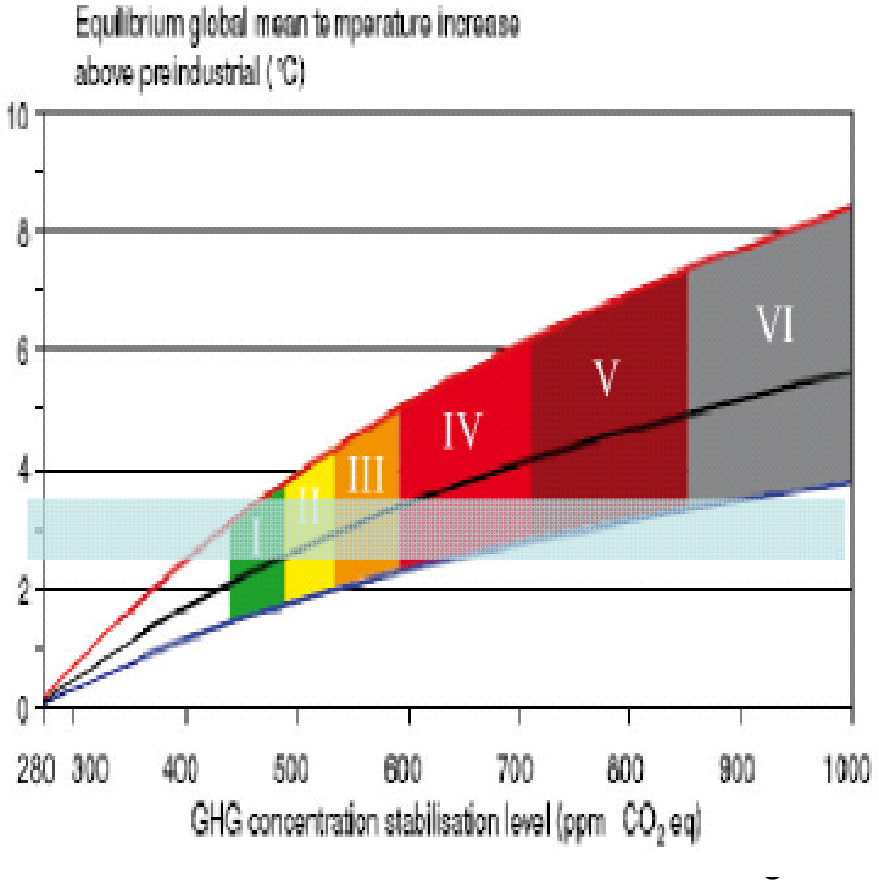
Development of monetary assessment basic unit

Integrated assessment model



Stabilization Paths- IPCC AR4



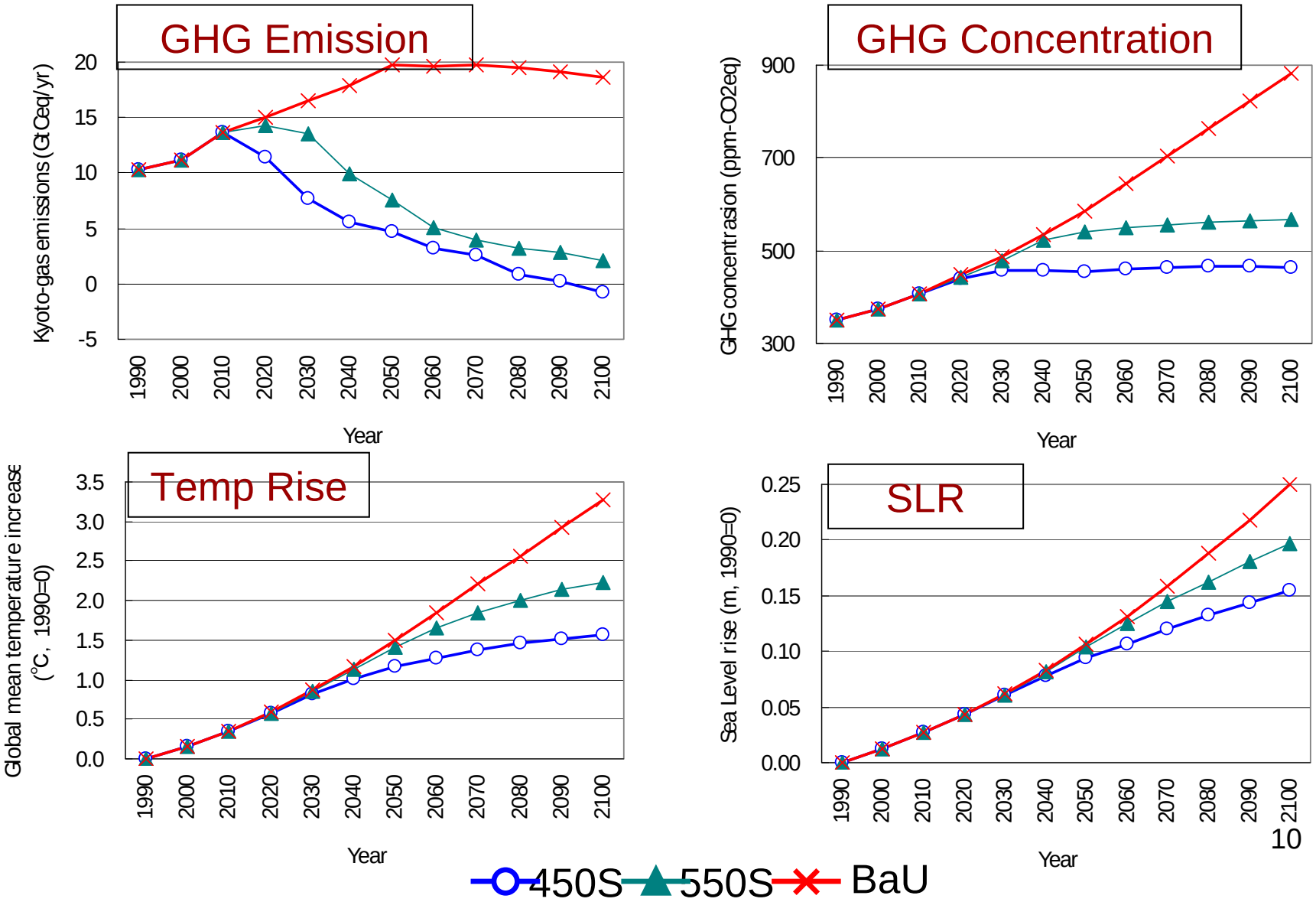


（IPCC WGIII AR4 SPM）

Impact Sectors

Water resources	Ecosystems	Agriculture	Disaster	Human health
Water shortages (municipal water)	**Forest ecosystems (beech and pine)**	**Agriculture (rice)**	**Floods**	**Heat stress**
Water shortages (agricultural water)	Forest ecosystems (other than *above*	Agriculture (other crops)	**Landslides**	**Atmospheric pollution**
Water shortages (industrial water)	Alpine plants	Fruit trees	**Storm-surge**	**Infectious diseases**
Snow water resources	Natural grasslands	Tea	**Liquefaction**	
Water quality	Bogs	Vegetables	**Beach erosion**	
Groundwater	Oceans	Livestock		
	Coasts	Fishery		
	Fresh water			
	Tidal flats			

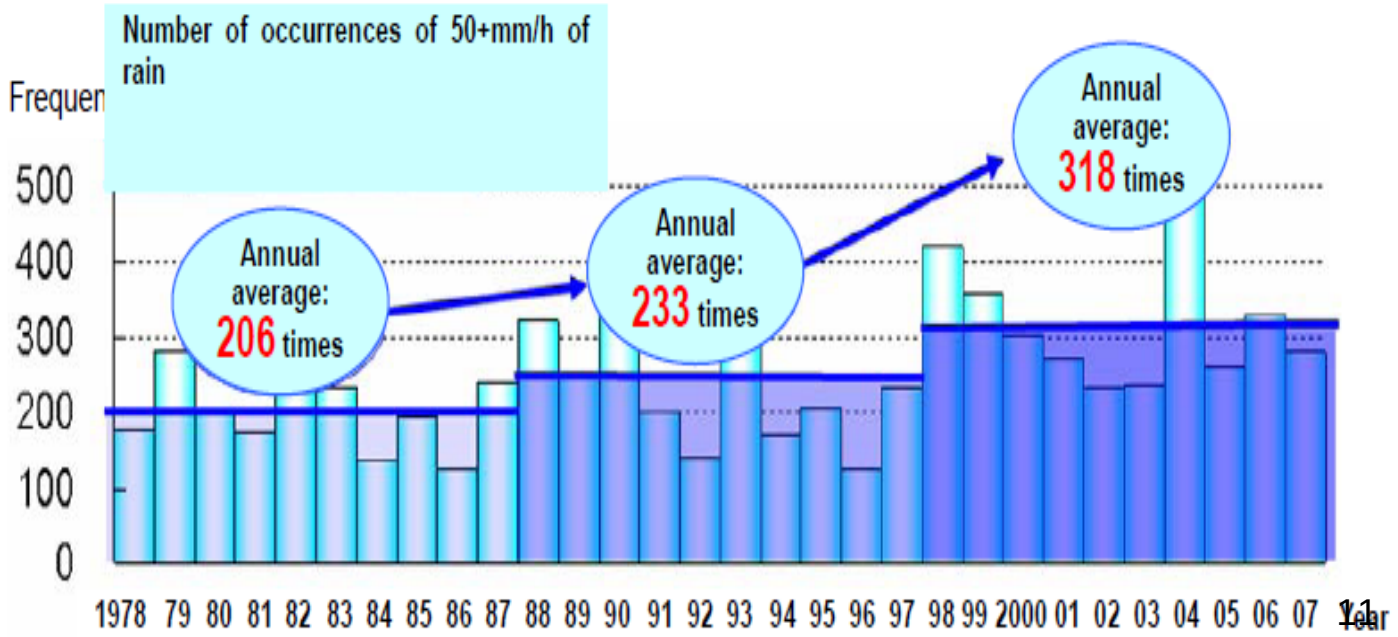
Scenarios


GHG Emission
Kyoto-gas emissions (GtCeq/yr)
20
15
10
5
0
-5
1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100
Year
GHG Concentration
GHG concentrasion (ppm-CO2eq)
900
700
500
300
1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100
Year
Temp Rise
Global mean temperature increase (°C, 1990=0)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100
Year
SLR
Sea Level rise (m, 1990=0)
0.25
0.20
0.15
0.10
0.05
0.00
1990 2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100
Year
450S
550S
BaU

Impacts on Water

- Increased heavy rain events and possibility of floods
- Increased landslides
- Increased drought risk
- Increased water temperature in reservoirs and lakes
- Coastal erosion
- Salinization of ground water due to sea-level rise

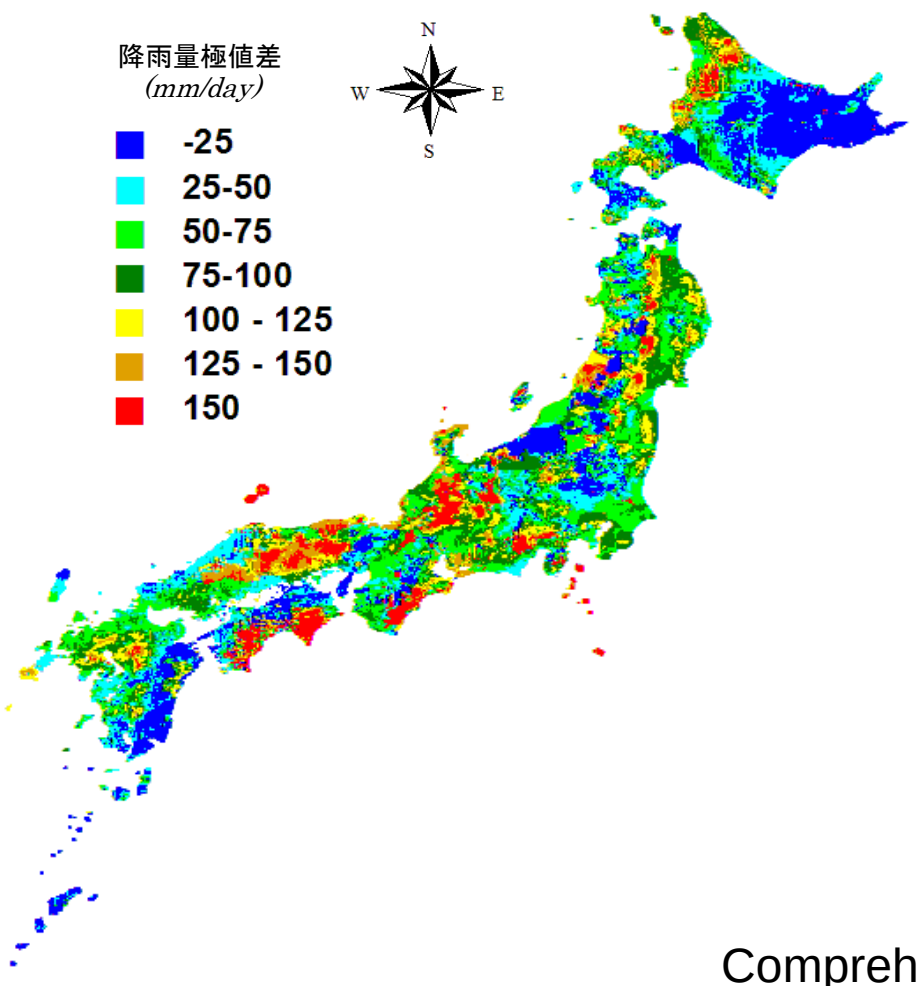
Increase in heavy rain events for the past 40 years



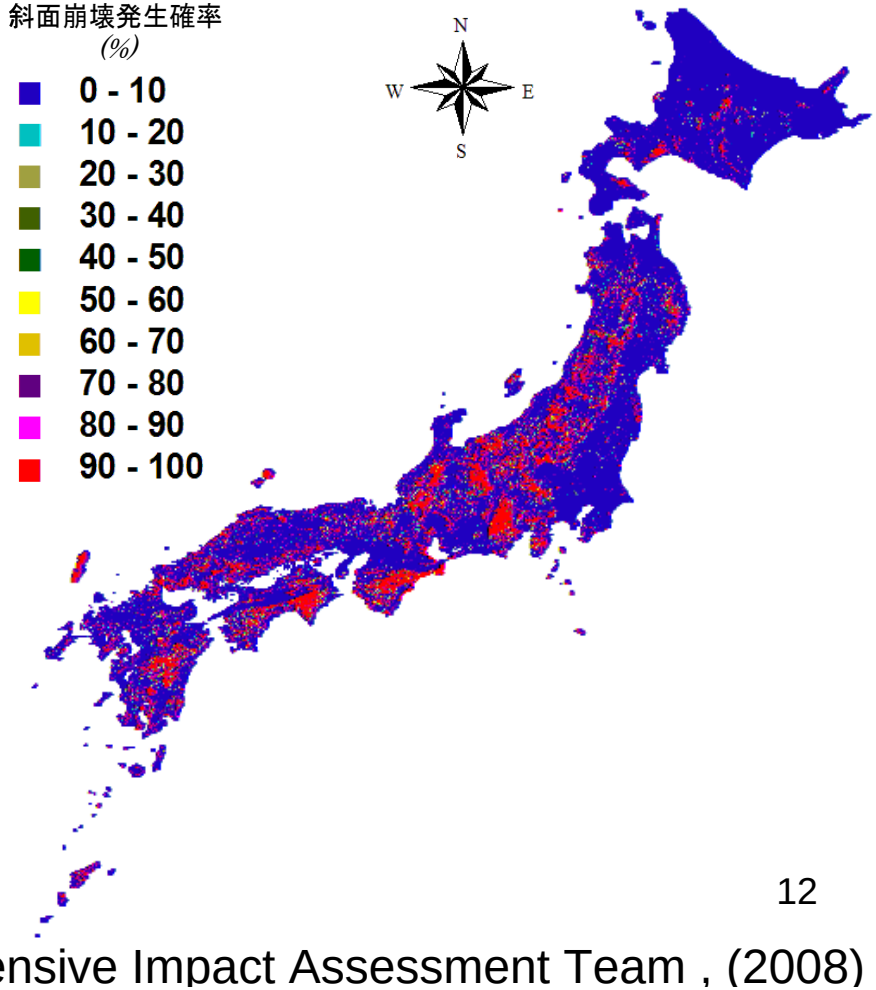
MILT(2007)

Changes in Precipitation In 2030 (Kazama et al., 2008)

- 1/50 present becomes 1/30



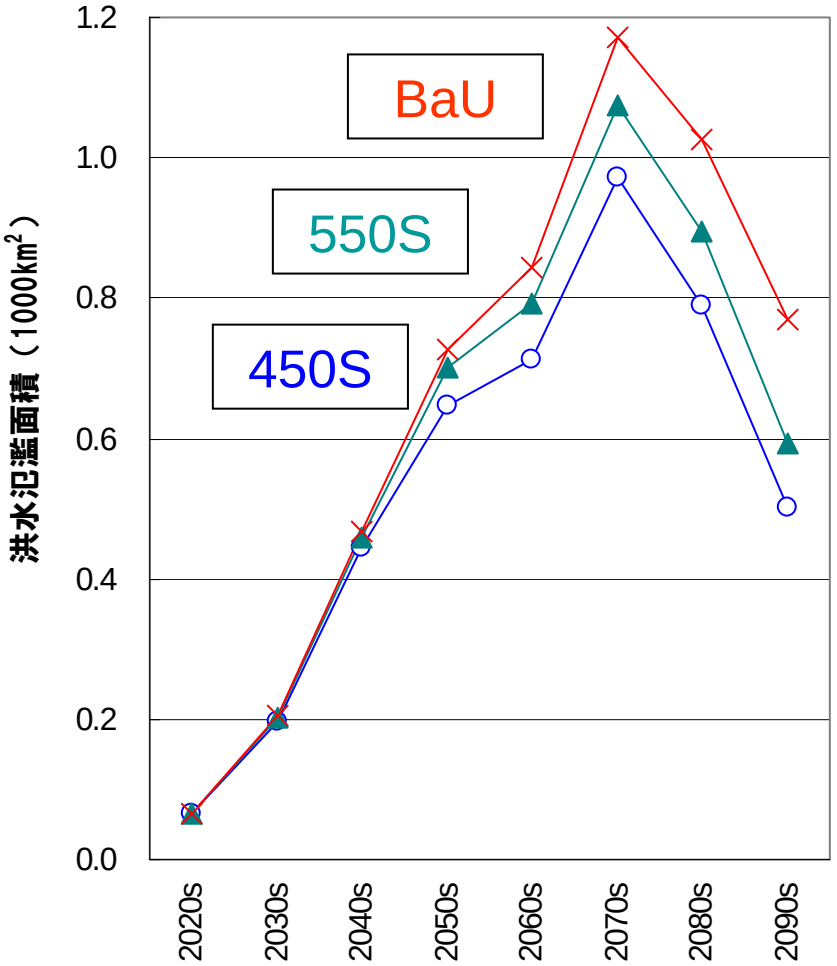
Increased land slide probability in 2050 (Kazama et al., 2008)

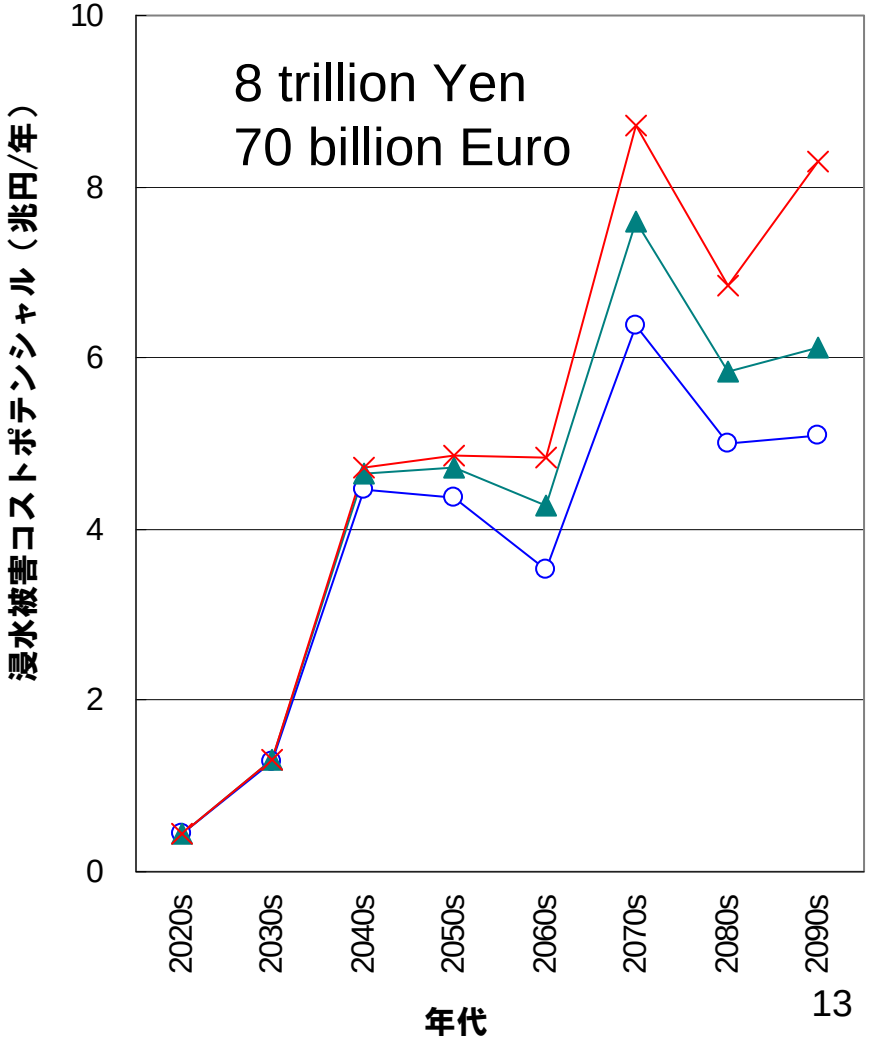


Comprehensive Impact Assessment Team , (2008)

Flood Risk

BaU: +3.8℃ (2100), 550s: +2.7℃, 450s: +2.1℃





氾濫面積は今回の計算に用いた降雨シナリオに基づく算定値であり，降雨シナリオが変われば面積も変わることに注意が必要

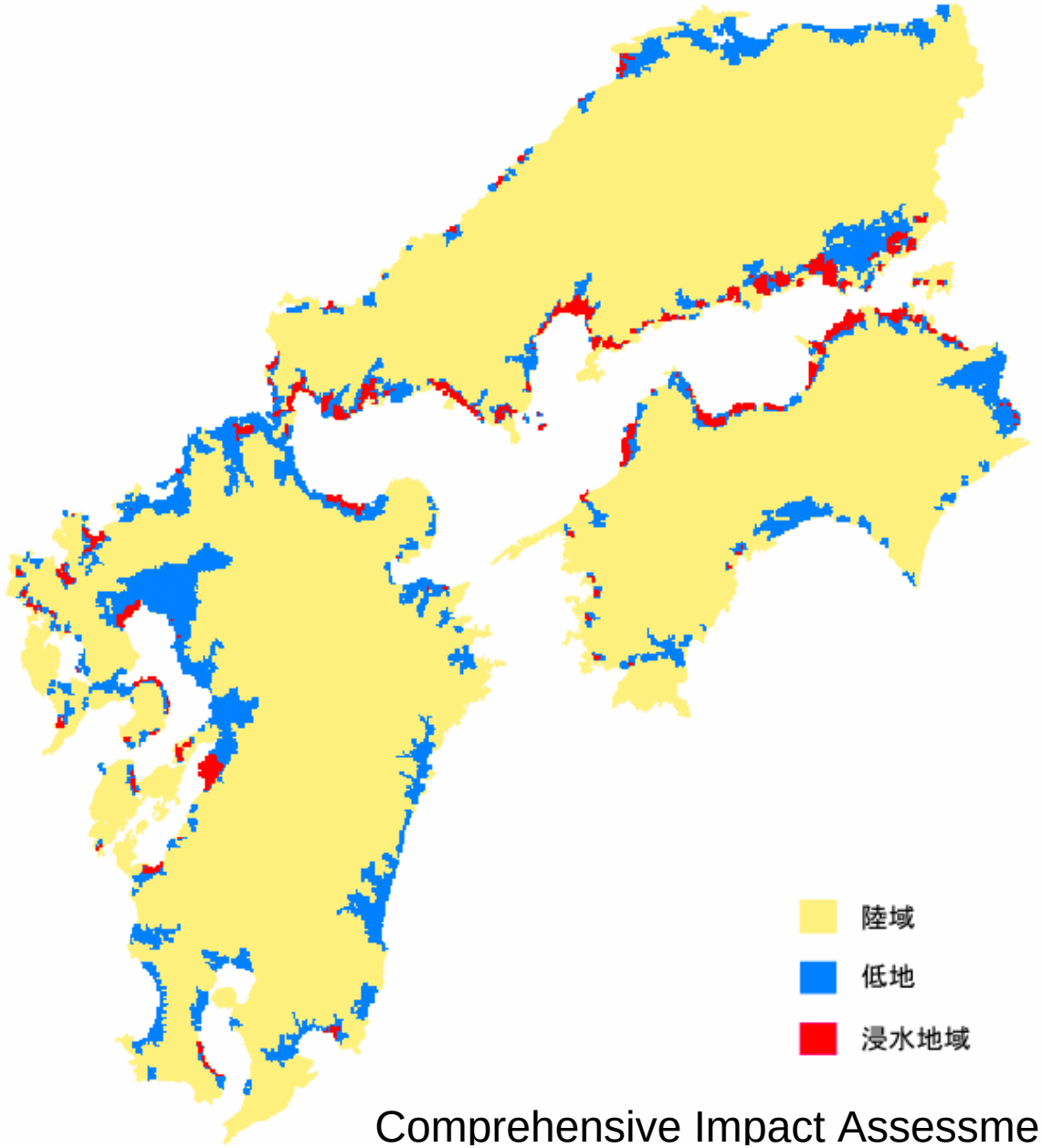
Coastal Disasters

- More coastal floods due to sea-level rise and higher storm surges
- More coastal erosion
- Intrusion of sea water to rivers and ground water
- Lowering supporting capacity of ground

Coastal disasters

Coastal erosion

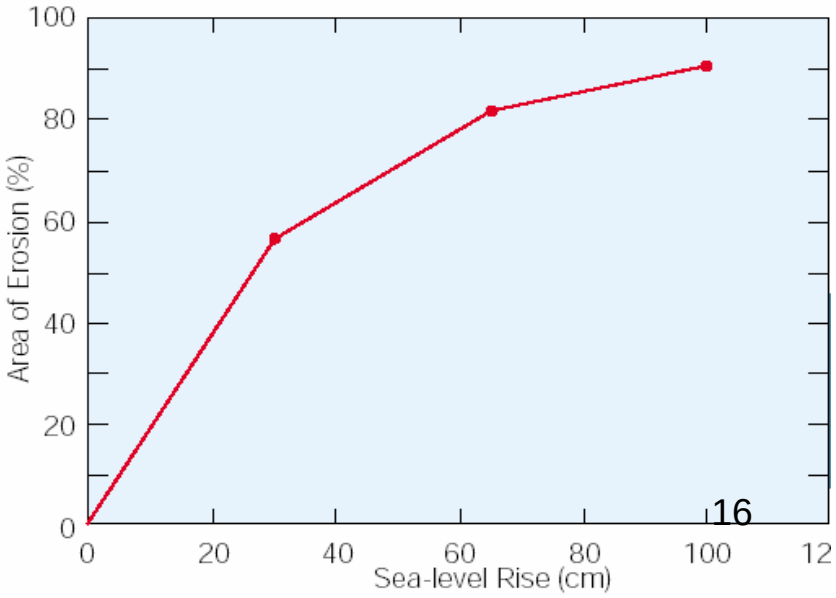
Inundation areas due to sea-level rise and storm surges in S-W Japan (Suzuki, 2008)



Comprehensive Impact Assessment Team, (2008)

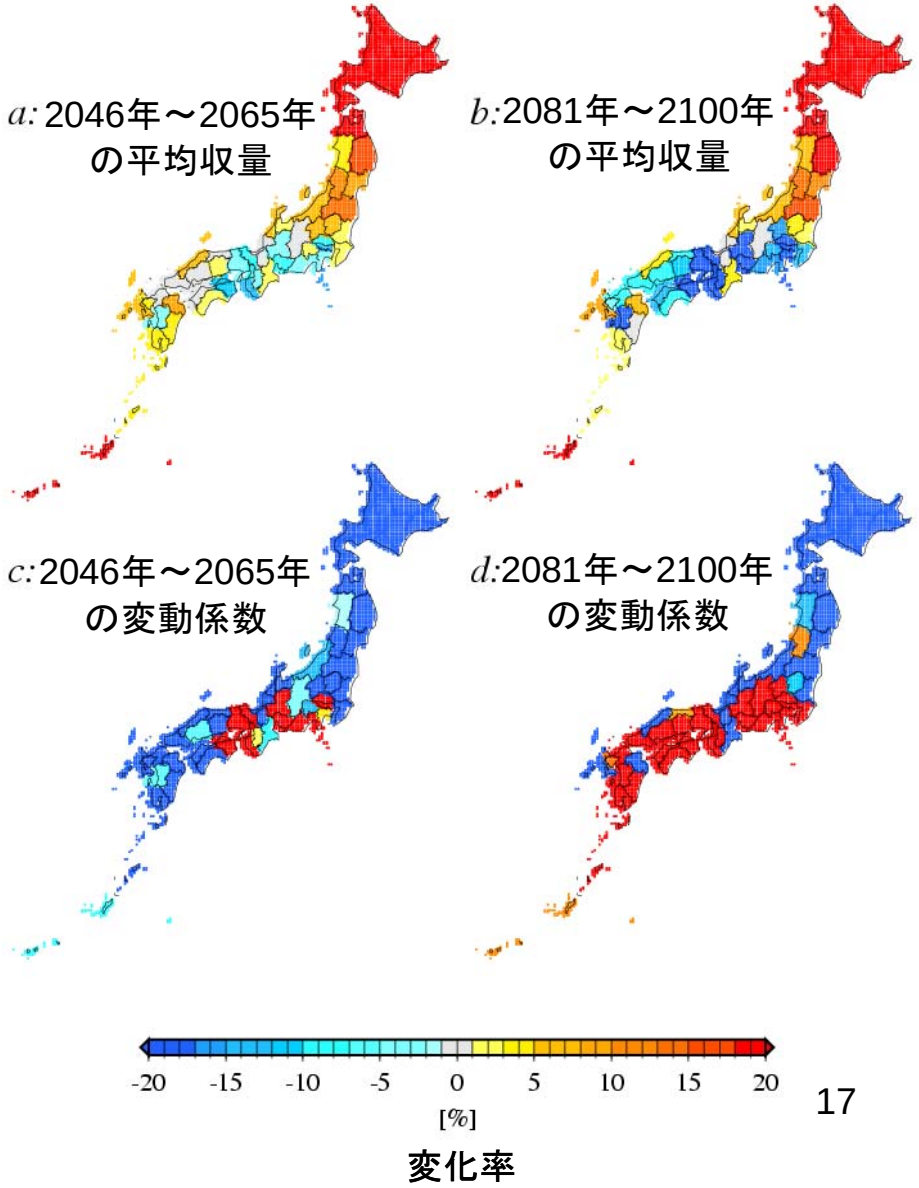
Erosion of Japanese coasts

- Japan lost about 100km^2 of sandy beaches for the past 100years.
- Heavy measures against erosion.
- Will the national land be covered by concrete walls?



Agriculture and Food Production

- Decrease in food production
- Increase in heat and water stresses on food production
- Change in areas in cultivation for crops and flouts
- Changes in target fish

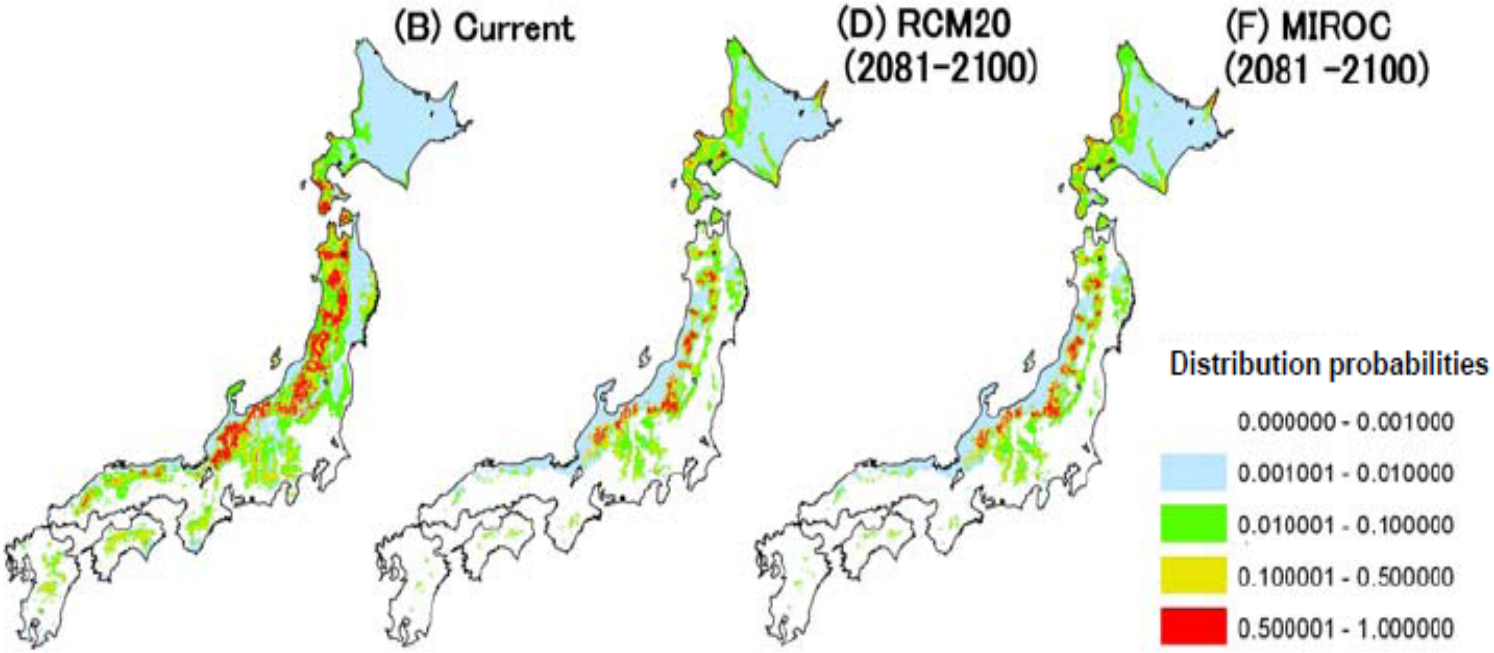


Forests and Ecosystem

Impacts

- Northward shift of forests
- Changes in habitats
- Increased number of invasive species
- Decrease in vertical mixing in lakes
- Breaching of coral reefs

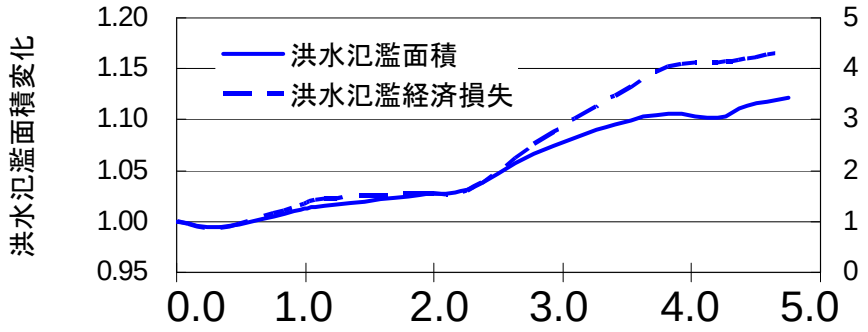
Projected changes of Japanese beech fores



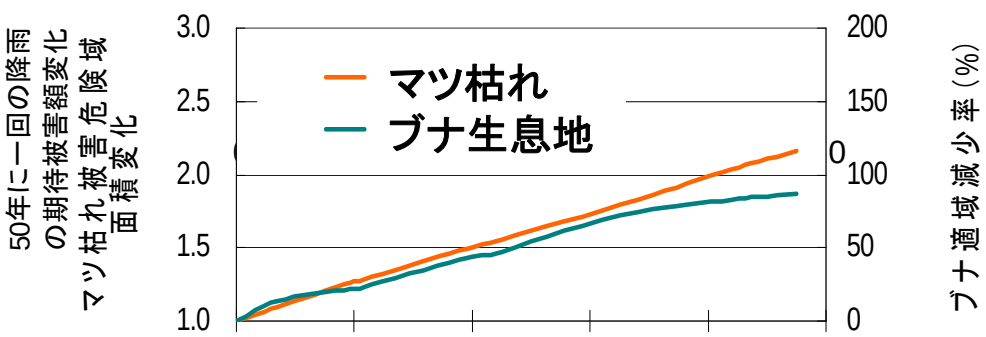
Comprehensive Impact Assessment Team , (2008)

Climate Change vs Impacts and Risks

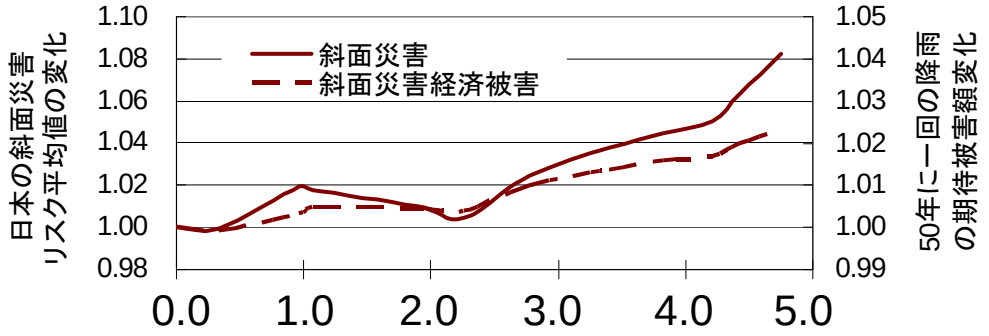
Flood Risk



Forests

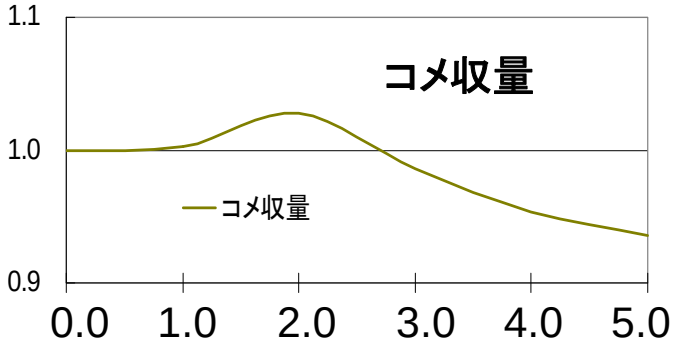


Land Slide



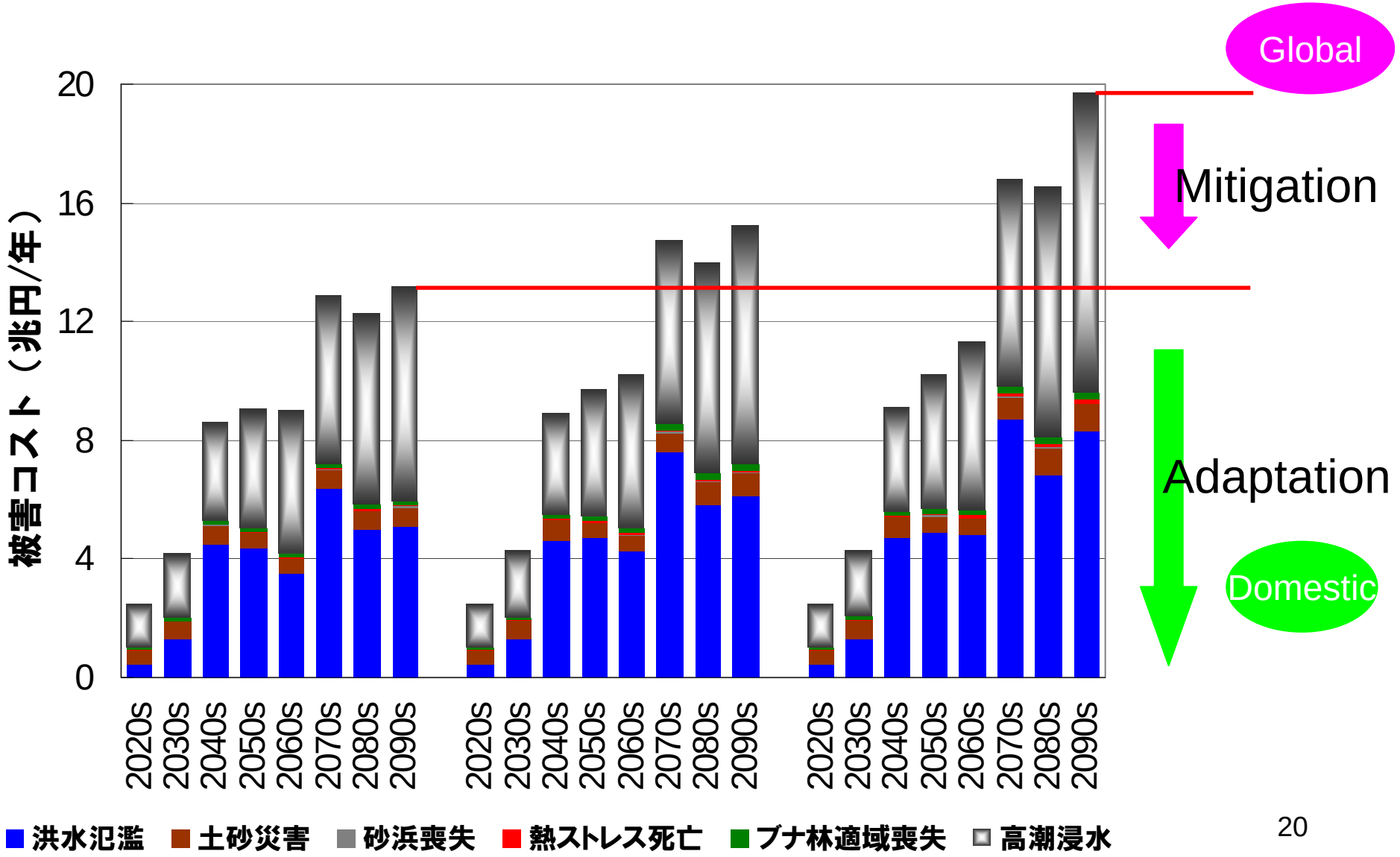
Average Temperature Rise (1990年=0℃)

Rice Yield



（温暖化影響総合予測プロジェクト報告書, 2008）

Comparison of Damage Costs



Responses to Climate Change

Mitigation : Reduce GHGs emission

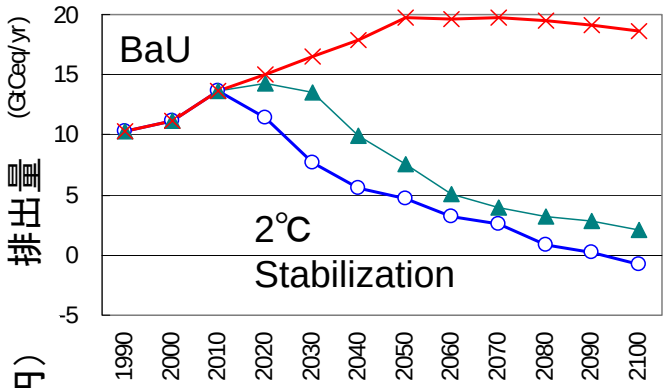
Adaptation: Adjustment of natural and human systems to cope with warmer world

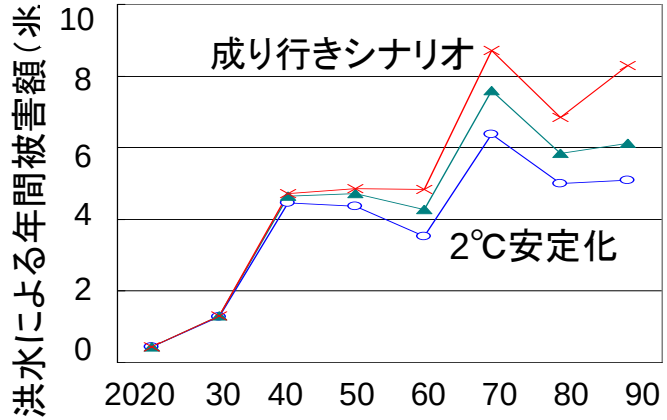
Role of adaptation

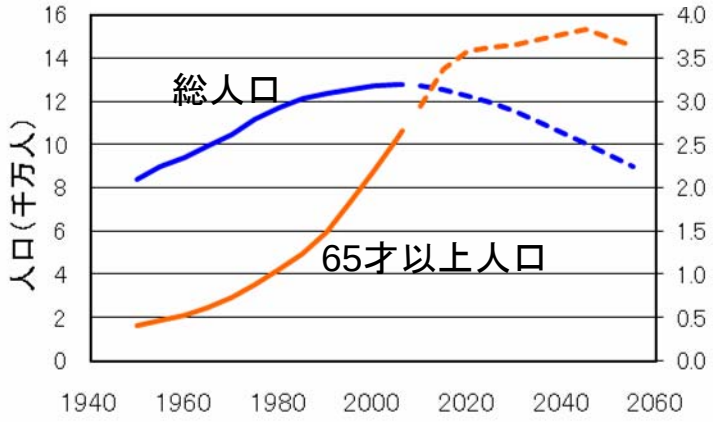
A portfolio of adaptation and mitigation is the only way to address the risks caused by climate change.

→ Low-Carbon Society + Society Adapted to CC

Integrated Solution for Multiple Problems







Low Carbon Society

Adaptation to Climate Change

Decreasing Population and Aging

Integration of problems

Global sustainability
Solution of domestic Issues

Thank you very much!