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# Climate Change Impact Assessment and National Adaptation Planning in Japan

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## 1. Observed changes and its factors

- **Warming of the climate system is unequivocal.** The observed warming (Global Mean Surface Temperature) to the reference period 1986–2005 is 0.61 Celsius from 1850–1900.
- Human influence on the climate system is clear. **It is extremely likely that anthropogenic GHGs emissions have been the dominant cause of the observed warming since the mid-20th century.**

## 2. Climate change, risks, and impacts in future

- **Relative to current**, for temperature warming for the end of the 21st century is **2.6–4.8 °C in the case of not taken strict measures**, and is **0.3~1.7 °C** in the case of taken strict measures.

## 3. Adaptation and mitigation

- Both adaptation and mitigation are necessary. Implementation is more effective if both actions are integrated.

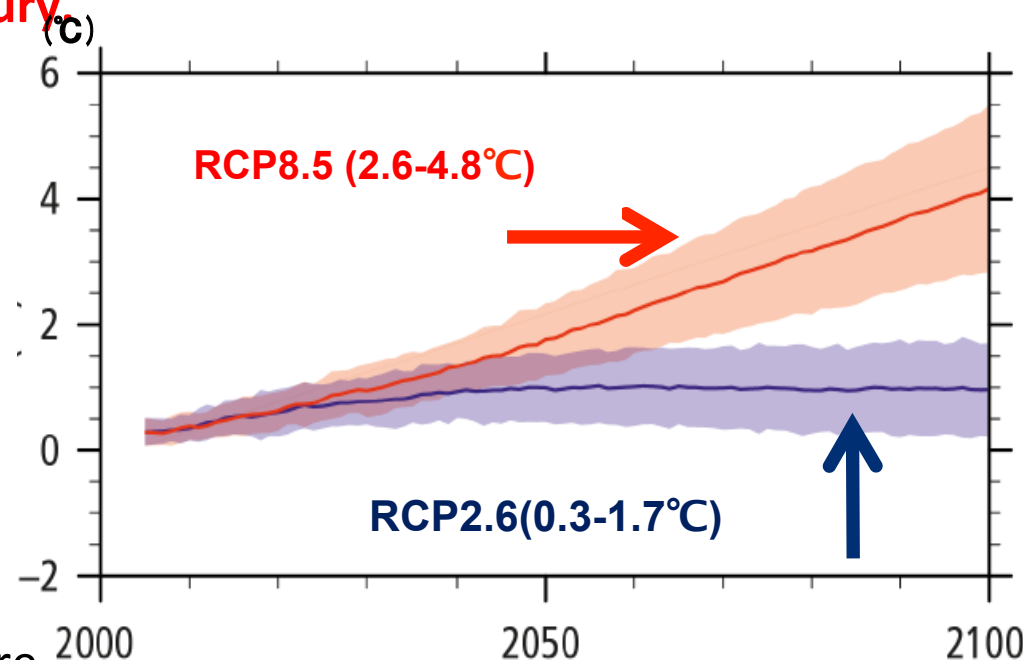


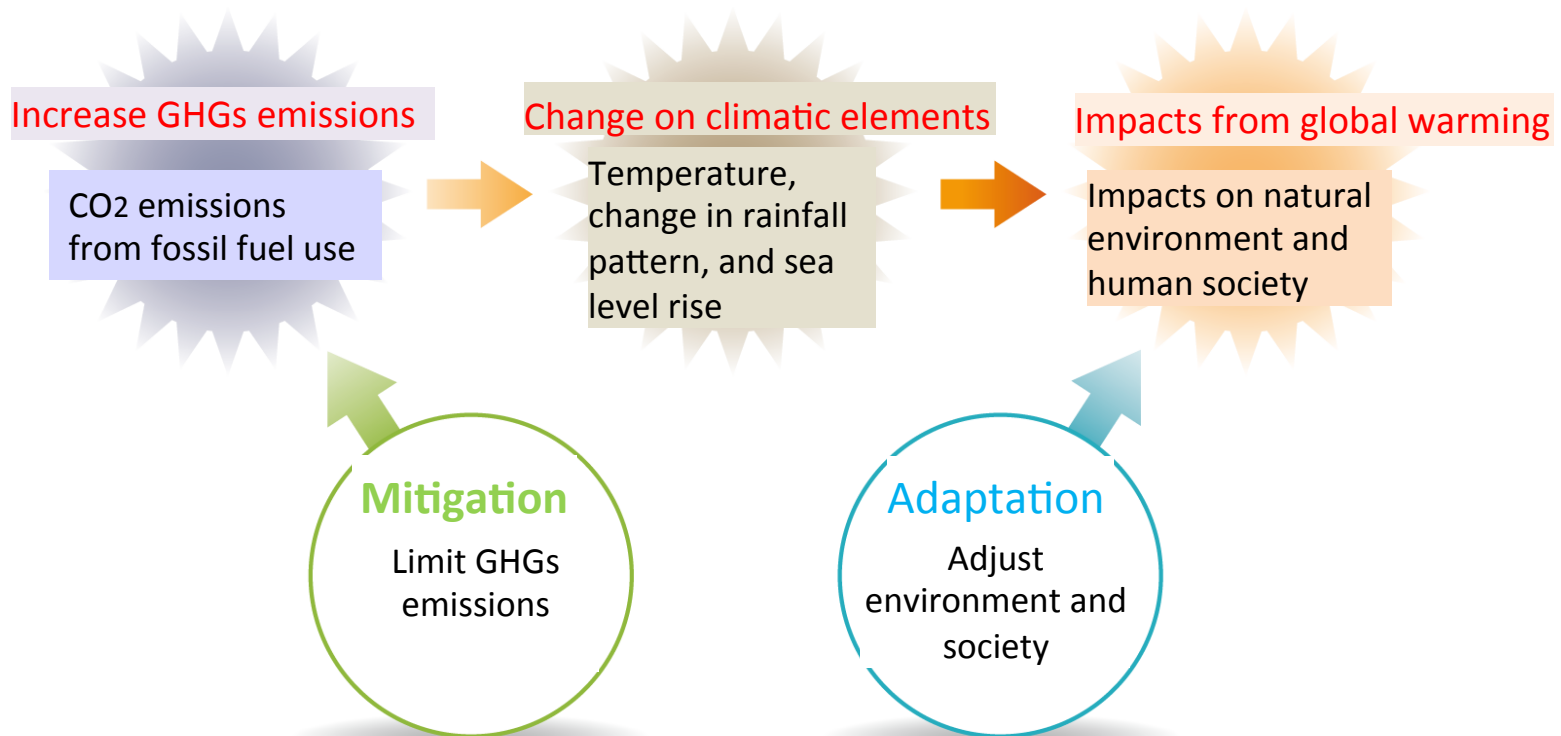
Figure: Global mean surface temperature change from 1986-2005

(0.61°C should be added if compared to pre-industrial era)

(editing from AR5 SYR Fig.6)

# What is adaptation ?

**Adaptation is:** the process of adjustment to actual or expected climate and its effects. In human systems, adaptation seeks to mandate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects.



# Countermeasures for adaptation to climate change by MOEJ

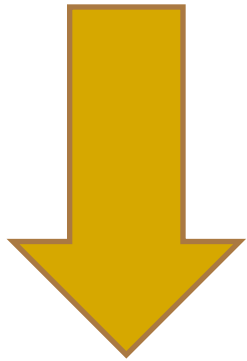
## ▪ Main approaches and achievements

	Approach	Achievement (Report)
2005	Environment Research and Technology Development Fund	
2008	Comprehensive Research on Climate Change impact (S-4) (2005-2009)	Wise adaptation to climate change
2009		Comprehensive report on observation and prediction of climate change
2010	Committee on the direction of climate change adaptation	Approaches to climate change adaptation
2011	Climate change impacts statistics maintenance	Statistic report and portal site for climate change impact
2011-	Environment Research and Technology Development Fund  Comprehensive Research on Climate Change impact and Adaptation Policies (S8) (2010-2014)	New comprehensive report on observation, prediction, impact of climate change (2012) (MEXT, Meteorological Agency, MOEJ)

\*Implementation through collaboration between the relevant ministries.

# Steps towards National Adaptation Plan

Establish “Expert Committee on Climate Change Impact Assessment” at 114<sup>th</sup> Global Environmental Subcommittee, Central Environmental Council (2 July, 2013)



- Further detailed projection of climate change in Japan for extreme events
- To classify 7 areas, 30 large and 56 small categories
- Deliberation on current situation, future predicted impacts in each sectors
- Assessment based on significance, urgency, confidence, etc.

Release climate change impacts, risk assessment and future issues (around March, 2015)



**Develop National Adaptation Plan as a government-wide integrated plan (around summer, 2015)**

\*Periodical review (about every 5 years)

# Draft of Assessment of Climate Change Impact of Japan (excerpt) 1

Categories	Sectors	Small sectors	Prediction	Significance	Urgency	Confidence
Agriculture Forestry Fishery	Agriculture	Rice	<ul style="list-style-type: none"> <li>The rice yield will increase below 3°C, but it will decrease more than 3°C except Northern Japan.</li> <li>Rising temperature in duration of grain filling decreases the ratio of first class rice. The ratio of first class rice in Kyushu area will be about 30% less in the middle of this century, about 40% reduction at the end of the century under A1B(2.8C) or A2(3.4) scenario.</li> </ul>	Very high	High	High
		Fruit	<ul style="list-style-type: none"> <li>Suitable temperature zone for cultivation is moving to north every year.</li> <li>Current major product areas of mandarin orange become difficult for the cultivation in 2060's under IS92a (2C) scenario, while current unsuitable areas become possible</li> <li>As for apple, the cultivation becomes difficult in the plains of northeast central Tohoku in 2060's under IS92a(2C) scenario.</li> </ul>	Very high	High	High
	Fishery	Migratory fish/shellfish	<ul style="list-style-type: none"> <li>Sardine moves north ocean area suitable for survival of their young fish.</li> </ul>	Very high	High	Medium
Water environment/ Water resources	Water environment	Rivers	<ul style="list-style-type: none"> <li>There is no prediction data of each river temperature</li> <li>Decrease of dissolved oxygen, enhanced organics destruction and nitrification reaction by microorganisms, increase of nasty smell by alga.</li> </ul>	Not very high	Low	Low
	Water resources	Water supply (Surface water)	<ul style="list-style-type: none"> <li>Serious drought is predicted from the near future (2015-2039) under A1B(2.8C) scenario except in the northern Japan and central mountain area</li> <li>The decrease in river flow rate by early snow melting time makes mismatch of supply and demand</li> </ul>	Very high	High	Medium

# Draft of Assessment of Climate Change Impact of Japan (excerpt) 2

Categories	Sectors	Small sectors	Prediction	Significance	Urgency	Confidence
Natural ecosystem	Coastal ecosystem	Sub tropics	<ul style="list-style-type: none"> <li>● Suitable areas for the growth of reef-building coral will reduce by half in 2030 and disappear until 2040 under A2 scenario.</li> </ul>	Very high	High	Medium
Natural disasters / coastal areas	Rivers	Flood	<ul style="list-style-type: none"> <li>● In typical river basin heavy rain events which may cause flooding will increase significantly in the 21C</li> <li>● Rainfall in heavy rain increases in 10-30% under A1B (2.8C) scenario etc.</li> </ul>	Very high	High	High
	Coasts	Storm surge/ high waves	<ul style="list-style-type: none"> <li>● Possibility of sea level rise is very high and rises the risk of high waves.</li> <li>● Increases risks of high waves in the Pacific Ocean coastal areas by strong typhoon increase etc.</li> <li>● Predicted damages to harbor and fishing port breakwaters due to increase of tidal waves and high tide water.</li> </ul>	Very high	High	High
Health	Heat	Mortality risk	<ul style="list-style-type: none"> <li>● Increase of generation of heat stress related to mortality and morbidity caused by possible more frequent heat waves in big cities.</li> </ul>	Very high	High	High
Indust/ economic activities	Tourism	Leisure	<ul style="list-style-type: none"> <li>● Snow depth is reduced in most ski resorts except in part of inland Hokkaido and Honshu in 2031-2050.</li> </ul>	Very high	Medium	High
Life / urban life	Urban infrastr./ life line	Water/ traffic	<ul style="list-style-type: none"> <li>● Increased short period of heavy rain, drought, strong typhoon create the impact on infrastructure and lifeline</li> </ul>	Very high	High	Low

# Japan's Adaptation Initiatives to Support Adaptation Action

- Climate change has caused impacts on natural and human systems on all continents and across the oceans. There are risks resulting from sea level rise, storm surge in coastal areas, and inland flooding in urban regions.
- Japan will bring together the knowledge of the private sector, government and academia, and consistently assist developing countries' adaptation actions both in terms of their plans and implementation.

## Assistance to Developing Countries in the field of Adaptation

(Approx. 2.3billion USD from Jan. 2013 to Jun. 2014)

### Adaptation Policy Planning

Assist the mainstreaming of adaptation through formulation of national/local adaptation plans in developing countries vulnerable to climate change, based on Japan's experience in formulating its National Adaptation Plan to be published in the summer of 2015.

### Implementing Adaptation Measures

Assist various adaptation measures against climate change risks from extreme weather events and slow onset events.

e.g.

- ✓ Water Resource/Disaster Risk Reduction
- ✓ Natural Environment/Biodiversity etc.

### Vulnerabilities particular to small island states

Provide comprehensive assistance by sharing Japan's experience and knowledge and providing necessary equipments.

- Wide-area capacity development for climate change and natural disaster

### Disaster Risk Reduction

Host the Third World Conference on Disaster Risk Reduction in Sendai, Japan in March 2015 and contribute to the formulation of the post-Hyogo Framework for Action (HFA2)

- Capacity development for DRR through both structural and non-structural measures
- Provision of swift assistance for recovery

### Applying Japan's Technology for Adaptation Measures

- Data, technologies, and knowledge related to climate change

Human resources development of 5000\* people in the field of adaptation in the next 3 years

Sharing experience and knowledge through international networks

(\*as part of the pledge made by PM Abe for human resources development of 14,000 people in the next 3 years to address climate change)



# MOEJ's New Initiative to support NAP Formulation

- MOEJ in cooperation with relevant Ministries and Agencies is willing to support developing countries to conduct climate change impact assessment, as the 1<sup>st</sup> phase of our new programme to support formulation of NAP.
- Under the PM's Adaptation Initiative, climate projection will be conducted with regional climate models. Downscaling, calibration and validation of data, projection of impacts through impact assessment models can also be conducted supported by expert both from Japan and host countries .
- MOEJ plans to establish a consortium on impact assessment. This will support formulating NAP by sending Japanese experts and/or inviting training programme in Japan.

# Case of Japan

## How to better formulate NAP?

- What is additional values of national adaptation plan, comparing to existing national plans?
- How to take secured actions under uncertainty of climate risk?
- How to mainstream adaptation into existing policies?
- How to handle PDCA cycle?
- How to communicate ? (with stakeholders, within government, etc.)
- Many other questions..