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Climate Change Impact Assessment and National Adaptation Planning Process 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.

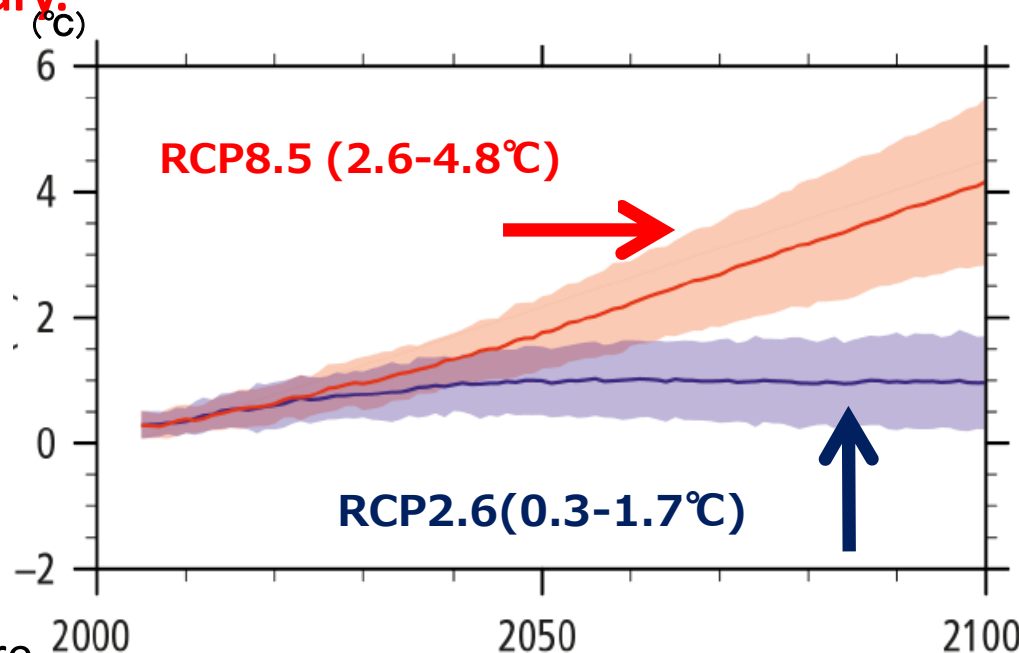


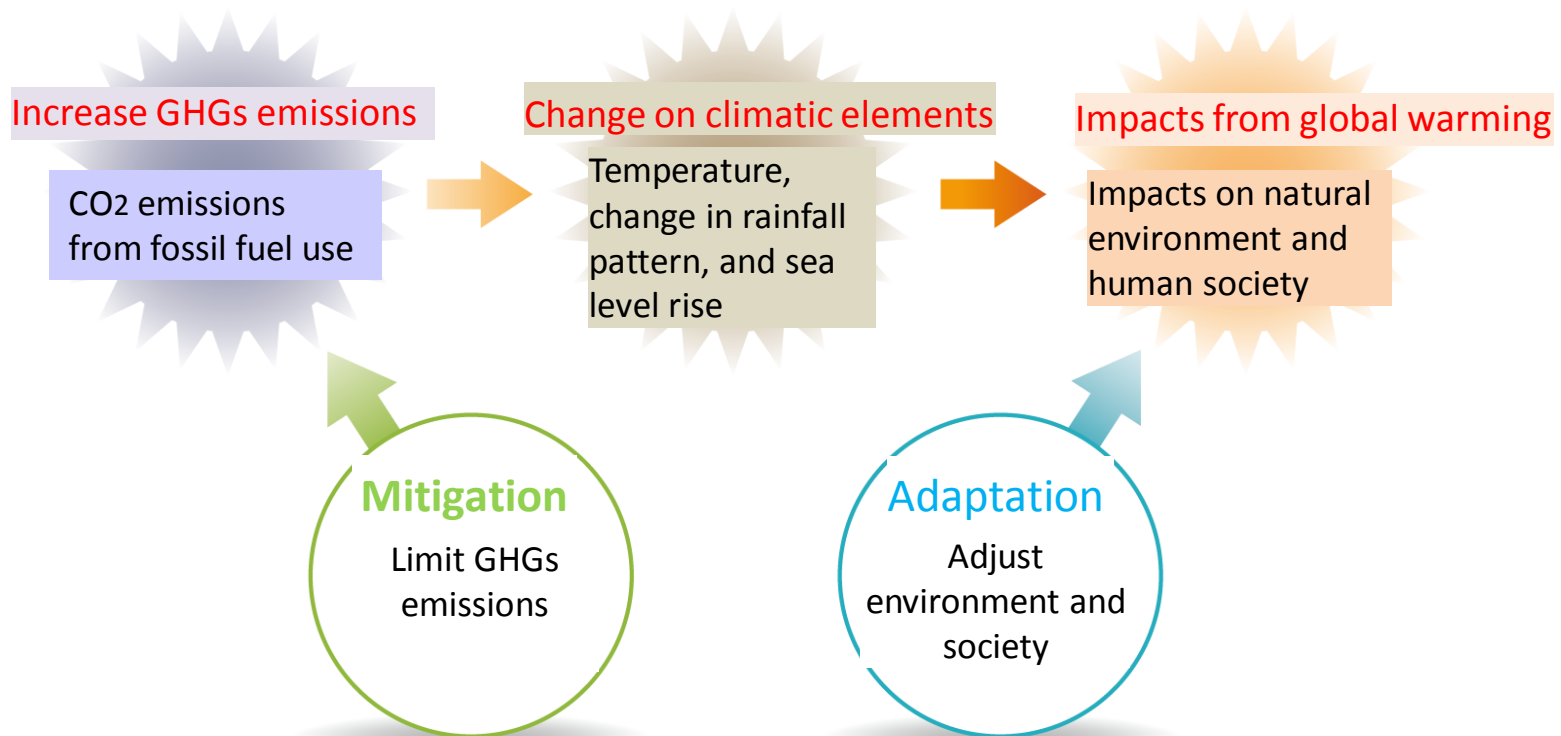
Figure: Global mean surface temperature change from 1986-2005

(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. (IPCC AR5 WG2 SPM, 2014)



Countermeasures for adaptation to climate change by MOEJ

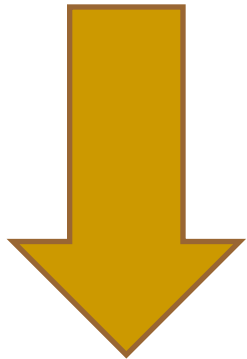
▪ Main approaches and achievements

	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 114th Global Environmental Subcommittee, Central Environment Council (2 July, 2013)



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

Climate Change Impacts Assessment in Japan 2015 (10 March, 2015)



Formulation of National Adaptation Plan (around summer, 2015)

*Periodical review (about every 5 years)

Table 1 Classification of Fields and Items

Categories	Sectors	Small Sectors	Relative Working Group
Agriculture, Forestry, Fisheries	Agriculture	Paddy rice	Agriculture, Forestry and Fisheries WG
		Vegetables	
		Fruits	
		Barley/Wheat, Soybean, Feed crop...	
		Livestock	
		Pests, Weeds	
		Agricultural production base	
	Forestry	Timber production (Plantation...)	
		Non-timber forest products (Mushrooms...)	
	Fisheries	Migratory fish stocks (Ecology of fishes...)	
Propagation and Aquaculture ...			
Water environment, Water resources	Water environment	Lakes / Marshes , Dams (Reservoir)	Water environment and Water resources WG Natural disasters and Coastal areas WG
		Rivers	
		Coastal areas & Closed sea areas	
	Water resources	Water supply (Surface water)	
		Water supply (Groundwater)	
		Water demand	

Categories	Sectors	Small Sectors	Relative WG
Natural ecosystem	Terrestrial ecosystem	Alpine / Subalpine zone	Natural ecosystem WG
		Natural forest / Secondary forest	
		Countryside-landscape (Satochi-Satoyama)	
		Artificial Plantation	
		Impact on Fauna (wild animals and birds)	
		Material Balance	
	Freshwater ecosystem	Lakes / Marshes	
		Rivers	
		Marshlands	
	Coastal ecosystem	Subtropics	
		Temperate / Subarctic	
	Marine ecosystem		
	Phenology		
Distribution, Species shift			
Natural disasters, Coastal areas	Rivers	Flood	Water environment and Water resources WG Natural disasters and Coastal areas WG
		Landside water	
	Coasts	Sea-level rising	
		Storm surge , Tidal wave	
		Coastal Erosion	
	Mountains	Sediment, Landslide...	
	Others	Strong wind...	

Categories	Sectors	Small Sectors	Relative WG
Health	Winter Warming	Mortality in Winter season	Health WG
	Heat stress	Risk of Mortality	
		Heat stroke	
	Infection	Water- and food-borne diseases	
		Vectorborne diseases	
		Other infectious diseases	
	Others		
Industrial / Economic activities	Manufacture		Industrial / Economic Activities WG Life of Citizenry and Urban Life WG
	Energy	Energy Demand and Supply	
	Commerce		
	Finance, Insurance		
	Tourism	Leisure	
	Construction		
	Medical		
	Others	Others (Overseas impact...)	
Life of Citizenry, Urban Life	Urban Infrastructure, Lifeline...	Water supply, Transportation...	
	Life with sense of culture & history	Phenology, Traditional events / Local industry...	
	Others	Impact on life due to Heat stress...	

Result of Assessment on 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"> The rice yield will increase below 3°C, but it will decrease more than 3 °C except Northern Japan. Rising temperature in duration of grain filling decreases the ratio of first class rice. <u>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.</u> 	Very high	High	High
		Fruit	<ul style="list-style-type: none"> Suitable temperature zone for cultivation is moving to north every year. <u>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</u> As for apple, the cultivation becomes difficult in the plains of northeast central Tohoku in 2060's under IS92a(2C) scenario. 	Very high	High	High
	Fishery	Migratory fish/shellfish	<ul style="list-style-type: none"> Sardine moves north ocean area suitable for survival of their young fish. 	Very high	High	Medium
Water environment/ Water resources	Water environment	Rivers	<ul style="list-style-type: none"> There is no prediction data of each river temperature Decrease of dissolved oxygen, enhanced organics destruction and nitrification reaction by microorganisms, increase of nasty smell by alga. 	Not very high	Low	Low
	Water resources	Water supply (Surface water)	<ul style="list-style-type: none"> Serious drought is predicted from the near future (2015-2039) under A1B(2.8C) scenario except in the northern Japan and central mountain area <u>The decrease in river flow rate by early snow melting time makes mismatch of supply and demand</u> 	Very high	High	Medium

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

Possible element for Japanese National Adaptation Plan

(from Report on study to formulate national adaptation plan in japan, January 2015, MOEJ)

Background

Framework

- ✓ Goals

- ✓ Role of National and Local governments, industries and public

- ✓ Term

- ✓ Geological coverage

- ✓ Thematic areas

Strategy

Results of assessment on climate change impacts

List of adaptation measures

Monitoring and reviews

Possible Element for Japanese National Adaptation Plan

(from Report on study to formulate national adaptation plan in japan, January 2015, MOEJ)

❑ Basic Strategy

- 1) Observation on climate change and its impacts
- 2) Assessment on climate change impacts
- 3) Promotion of adaptation measures based on climate impact assessment
- 4) Monitoring, review
- 5) Actions by Local government

❑ Other important elements to implement adaptation

- 1) Collaboration with other national plans relevant to climate change adaptation
- 2) Synergies with climate change mitigation
- 3) Synergies with other measures
- 4) Consideration of uncertainty
- 5) Promotion of Research
- 6) Outreach and communication
- 7) Consideration on cost effectiveness
- 8) Encouragement of private investment
- 9) Promotion of international cooperation

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..

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 1st 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.