Initiatives for Adapting to Climate Change in Japan

16th
Kawasaki International Eco-Business Forum
November 13, 2019

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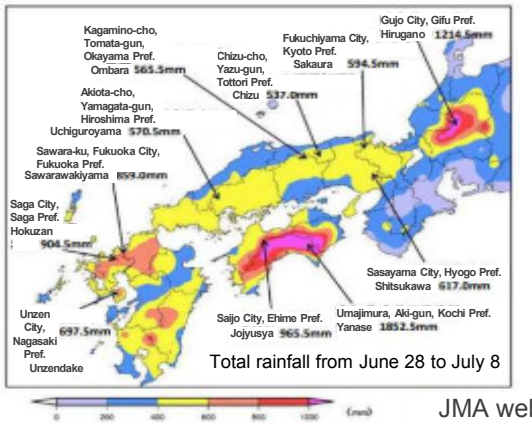
cCcA
Center for Climate Change Adaptation

July 2018 Torrential Rains

- A seasonal rain front that stalled near Honshu became increasingly active, and the **torrential rainfall broke records over a wide area of Western Japan**
- **Umajimura in Kochi Prefecture recorded total precipitation of more than 1,800mm** (higher than the average annual rainfall in Tokyo, which is 1,528.8mm)
- The Japan Meteorological Agency (JMA) stated that an increase in water vapor in connection with global warming also contributed to the downpours.



JMA website

[Damage to public infrastructure]

Category	Cost of damage (100 million yen)	
	Hiroshima Pref.	Okayama Pref.
Rivers	465.7	115.6
Roads	274.0	130.0
Sediment-control facilities	130.2	14.1
Other	108.2	41.4
Total	**978.0**	**302.1**

*Hiroshima Pref.: 15:00 on August 17, Okayama Pref.: 14:00 on August 23

[Damage to agriculture etc.]

Category	Cost of damage (billion yen)
Crops etc.	16
Agricultural land/facilities	140
Forests/plains	127
Fisheries	2
Total	**285**

*as of 13:00 on August 27; reports from 36 prefectures

[Damage to companies]

Hiroshima Pref.:

Suspension of operations

618 business sites

*total of direct and indirect damage
*as of 12:00 on August 17

Okayama Pref.:

Commercial / industrial damage

1,179 cases, 21 billion yen

*as of August 23

[Human casualties]

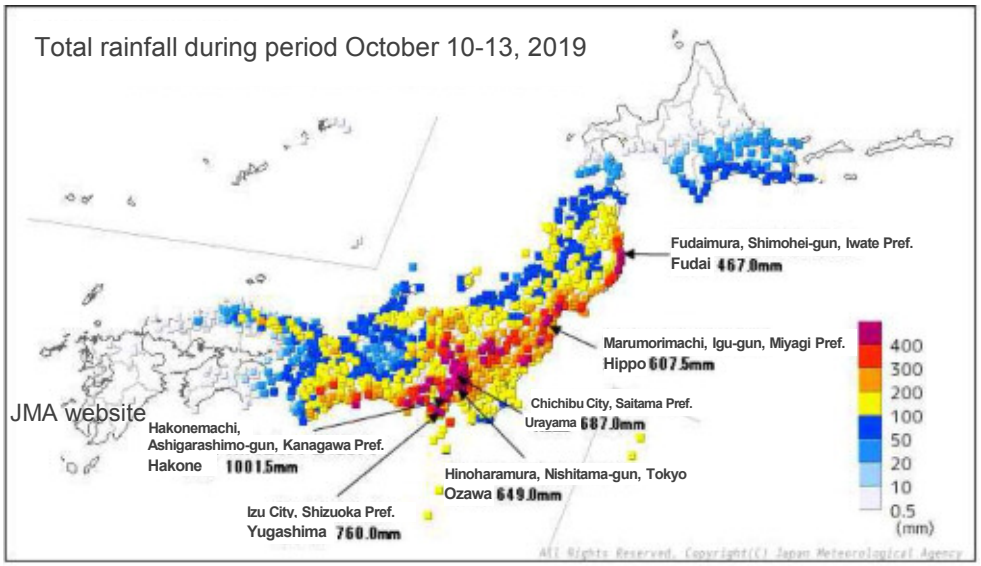
- **221 persons** nationwide (14 prefectures)
  (Hiroshima Pref.: 108, Okayama Pref.: 61, Ehime Pref.: 27)

*as of 13:00 on August 21

Sources: "Damage from July 2018 Torrential Rains" (Ministry of Agriculture, Forestry and Fisheries), "Recovery" and "Corporate Damage Survey" (Hiroshima Prefecture website), Damage from July 2018 Torrential Rains (Okayama Prefecture), "Damage from July 2018 Torrential Rains" (Cabinet Office), "Overview of Landslides due to July 2018 Torrential Rains" <Preliminary Version> (Vol.5) (Ministry of Land, Infrastructure and Transport), "July 2018 Torrential Rains" and "Characteristics and Causes of Record High Temperatures from mid-July" (JMA)

October 2019 Typhoon

- Typhoon Hagibis brought heavy rain, violent winds, high waves, and storm surges over a wide area
- Shizuoka Pref., Niigata Pref., the Kanto/Shinetsu region, and the Tohoku region, in particular, saw record rainfall in numerous locations
- As a result of the heavy rain, rivers burst their banks over a wide area, and there was also damage due to landslides and water inundation




Inundation from flooding of Naka River (Mito City, Ibaraki Prefecture)
Asahi Shimbun Digital, October 14, 2019

[Human casualties]

*as of November 3, 2019 (Cabinet Office)

	Dead	Missing	Injured		
			Serious	Light	Degree unknown
Nationwide	95	5	40	432	0

*There are also people with whom contact cannot be made

[Damage to homes]

*as of November 3, 2019 (Cabinet Office)

	Destroyed	Partially destroyed	Damaged	Inundation above floor level	Inundation below floor level
Nationwide	1830	7338	9967	33180	37035

[Damage to basic infrastructure]

Without power: As many as approx. 520,000 homes

Without water: At least 134,935 homes

[Damage to agriculture etc]

254 billion yen

*as of November 12

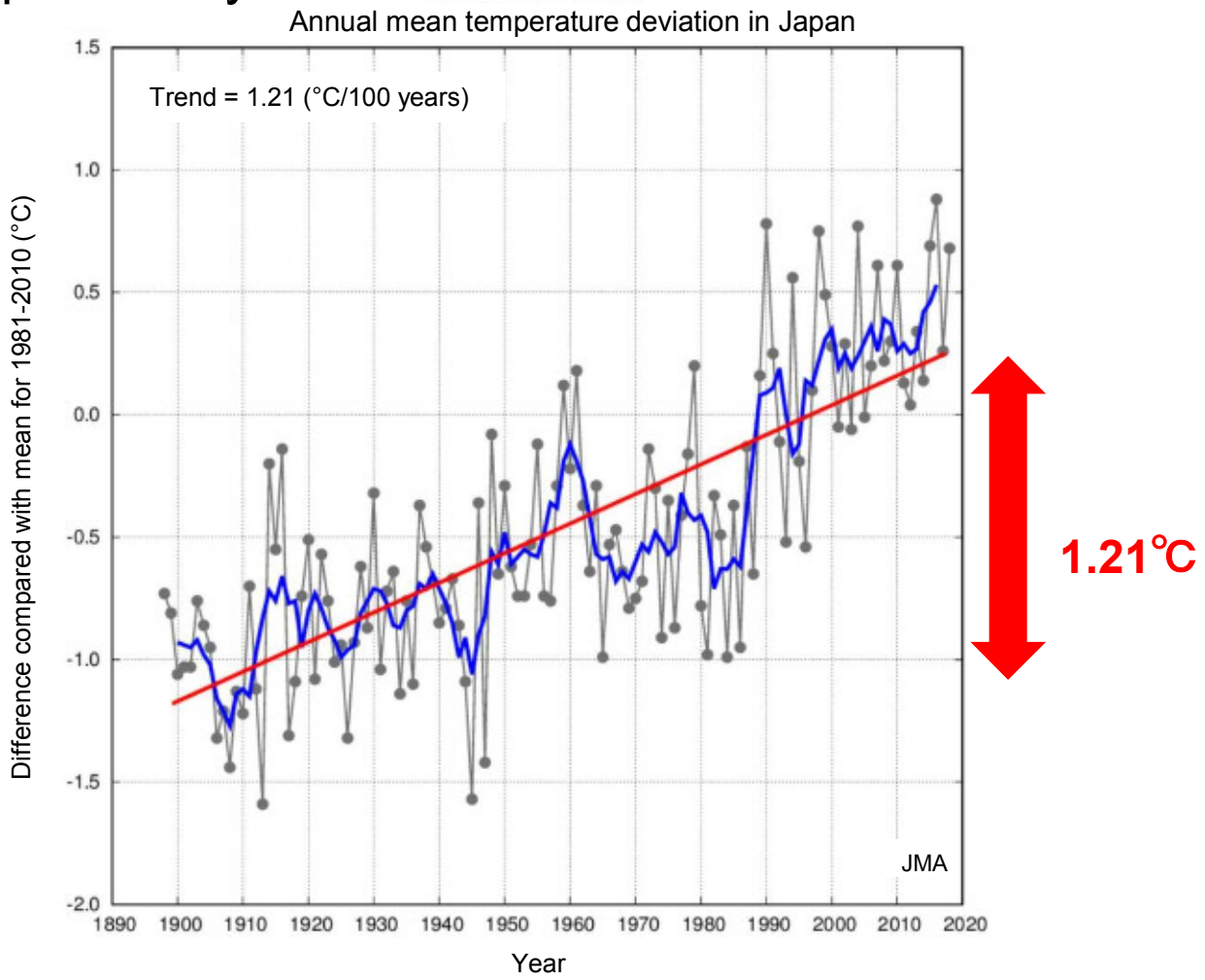
[Riverbank breaches]

298 rivers (total for nationally- and prefecturally-managed rivers)

Sources: "Heavy Rain, Violent Winds, etc. from Typhoon Hagibis (October 15, 2019, JMA), "Response to Power Outages due to Typhoon Hagibis (October 13, 2019, Ministry of Economy, Trade and Industry), "Damage due to Typhoon Hagibis" (No.11) (October 16, 2019, Ministry of Health, Labour and Welfare), "Damage due to Typhoon Hagibis" (6:00 on October 16, 2019, Cabinet Office)

Impending Impact of Climate Change (Japan)

- Annual mean temperatures have risen by approximately 1.21℃ over the past 100 years



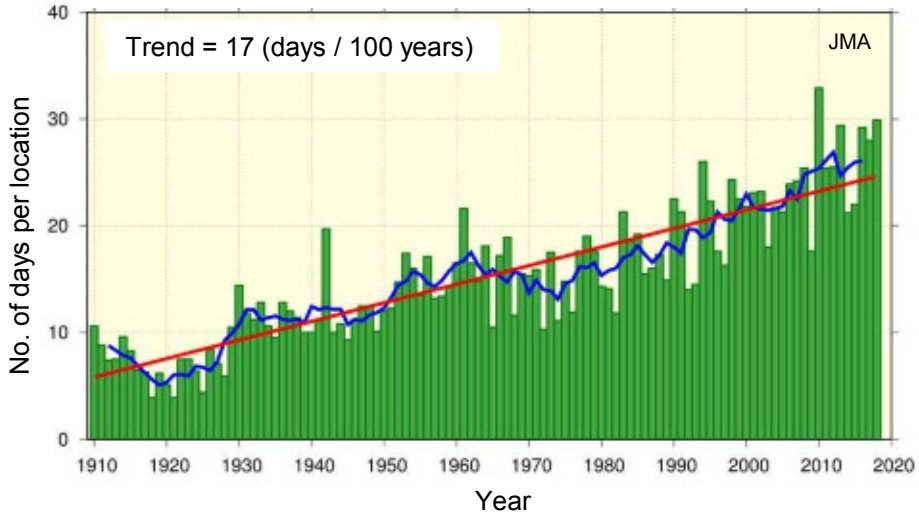
Source: Annual Mean Temperatures in Japan, JMA website: http://www.data.jma.go.jp/cpdinfo/temp/an_jpn.html

Impending Impact of Climate Change (Japan)

- The annual numbers of extremely hot days, sultry nights, and waterfall-like rainfall (50mm or more per hour) are increasing

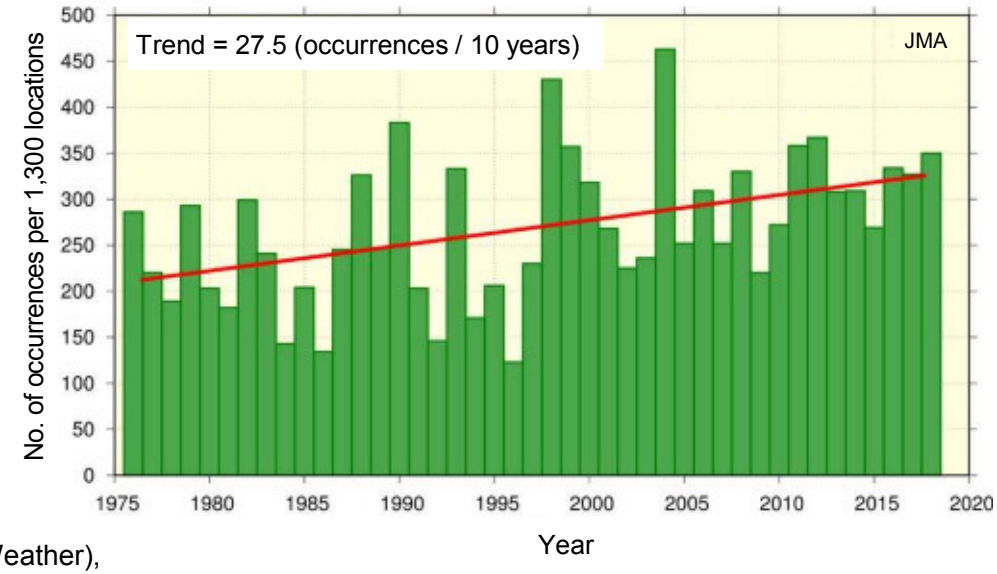
The number of sultry nights is rising by 1.7 days every 10 years

Annual no. of days on which minimum daily temperature was 25°C or higher (sultry nights) [average for 13 locations nationwide]



The incidence of waterfall-like rainfall is rising by 27.5 occurrences every 10 years

Annual no. of occurrences of rainfall of 50mm or more per hour nationwide [Amedas]



Source: Changes in Heavy Rain, Extremely Hot Days, etc.(Extreme Weather), JMA website, https://www.data.jma.go.jp/cpdinfo/extreme/extreme_p.html

Outline of the Climate Change Adaptation Act

[Act No.50 of 2018]
Promulgated on June 13, 2018
Enforced on December 1, 2018

1. Comprehensive promotion of adaptation

- Clarification of roles played by national and local public entities, business operators, and citizens in the promotion of climate change adaptation.
- The national government formulated a **Climate Change Adaptation Plan** (**approved by the Cabinet on November 27, 2018**) to promote adaptation in fields such as agriculture and disaster prevention, and monitoring and evaluation methods are being developed to gauge progress.
- The JMOE will perform **climate-change impact assessments** approximately once every five years, and the plan will be revised based on the results of these assessments.

Promotion of effective adaptation measures based on reliable, detailed information in each field

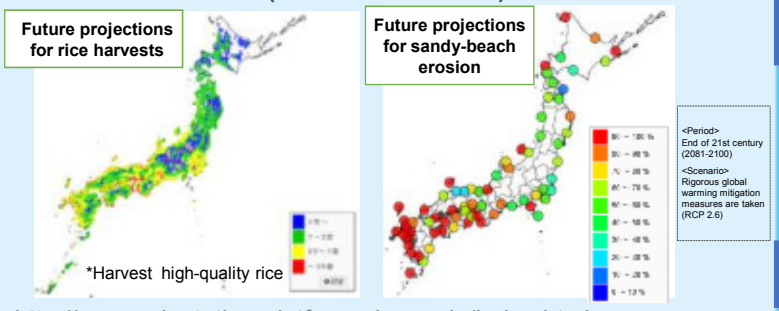
- Agriculture, forestry, and fisheries
- Water, environment, and resources
- Natural ecosystems
- Natural disasters
- Health
- Industrial and economic activities
- Lifestyles of citizens

Based on scientific insights concerning future impact:
- Develop/popularize heat-resilient crop varieties
- Establish fishing zones that reflect changes in the geographical distribution of fish species
- Steadily construct physical infrastructure such as levees and flood-control facilities
- Promote the production of hazard maps
- Promote measures to tackle heatstroke

2. Development of information platforms

- **Position NIES at heart of information platform for adaptation.**

Key information from the Climate Change Adaptation Platform (from NIES website)



http://www.adaptation-platform.nies.go.jp/index.html

3. Strengthening adaptation at the regional level

- Prefectures and municipalities are requested to develop **Local Climate Change Adaptation Plans**.
- Regions should establish structures for the collection and provision of adaptation information (**Centers for Climate Change Adaptation**).
- Establish **Regional Councils**, and implement adaptation measures in cooperation with the national and local public entities.

4. International expansion of adaptation measure, etc.

- Promote international cooperation.
- Encourage action by business operators and the establishment of adaptation businesses.

Establishment of CCCA

(Established on December 1, 2018)

cCcA

Center for Climate Change Adaptation

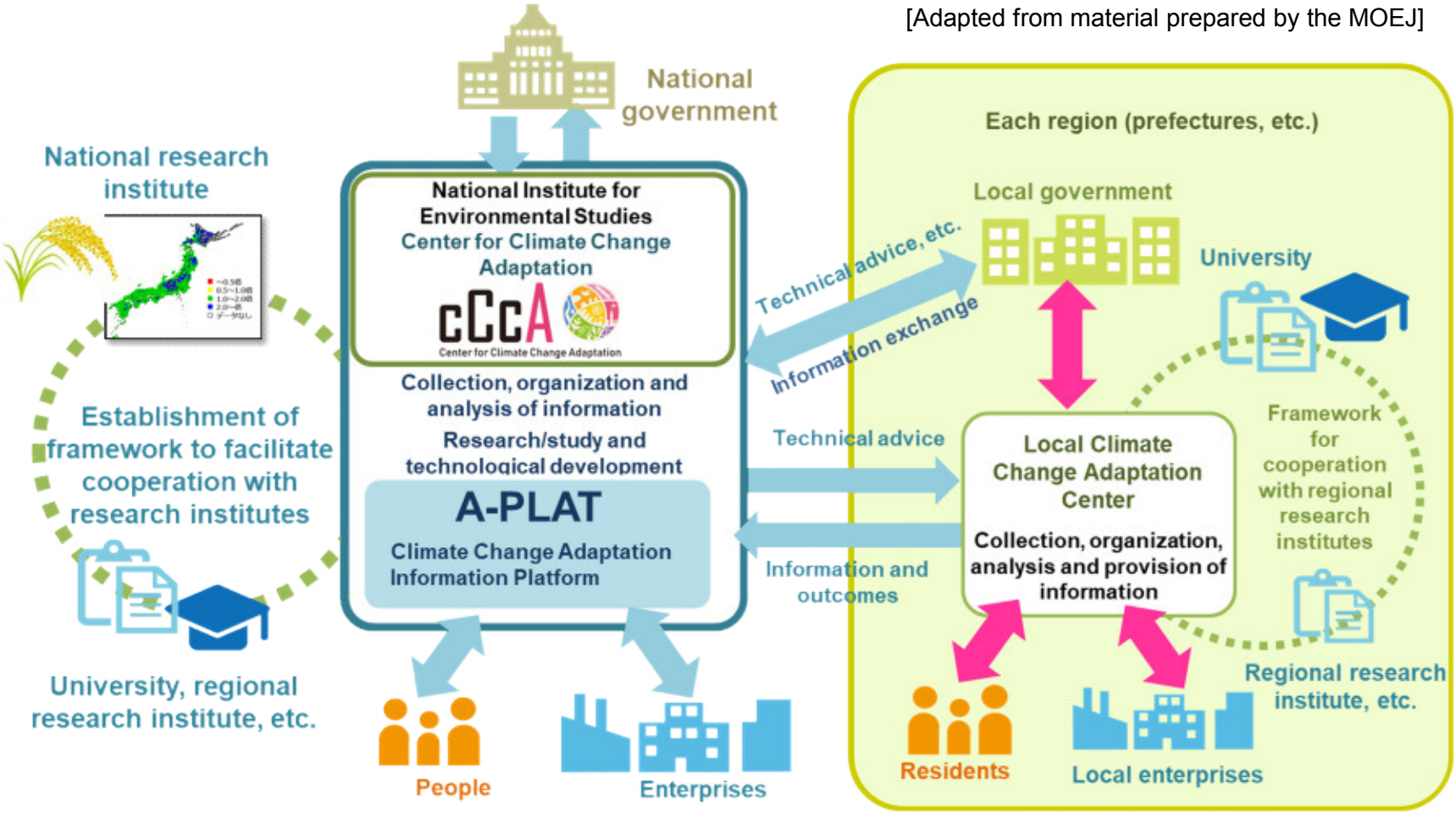
Functions of CCCA

- Promotion of adaptation research activities and projects through cooperation with domestic research institutes
- Collection, analysis, and provision of information on impact/adaptation with relevant organizations, businesses, and individuals (information platform: Climate Change Adaptation Platform (A-PLAT))
- Cooperation with projects administer by local Climate Change Centers
- Provision of technical advice and assistance for the promotion of adaptation by local governments
- Support with adaptation measures through HR development and outreach programs
- Contribution to international initiatives in Asia and elsewhere (Asia-Pacific Climate Change Adaptation Platform (AP-PLAT))

Initiatives of the National Institute for Environmental Studies towards Climate Change Adaptation

- The Center for Climate Change Adaptation (CCCA) plays a key role in the collection, organization and analysis of information and the promotion of related research.
- The CCCA contributes to the promotion of measures for climate change adaptation through the provision of results and technical advice.

[Adapted from material prepared by the MOEJ]



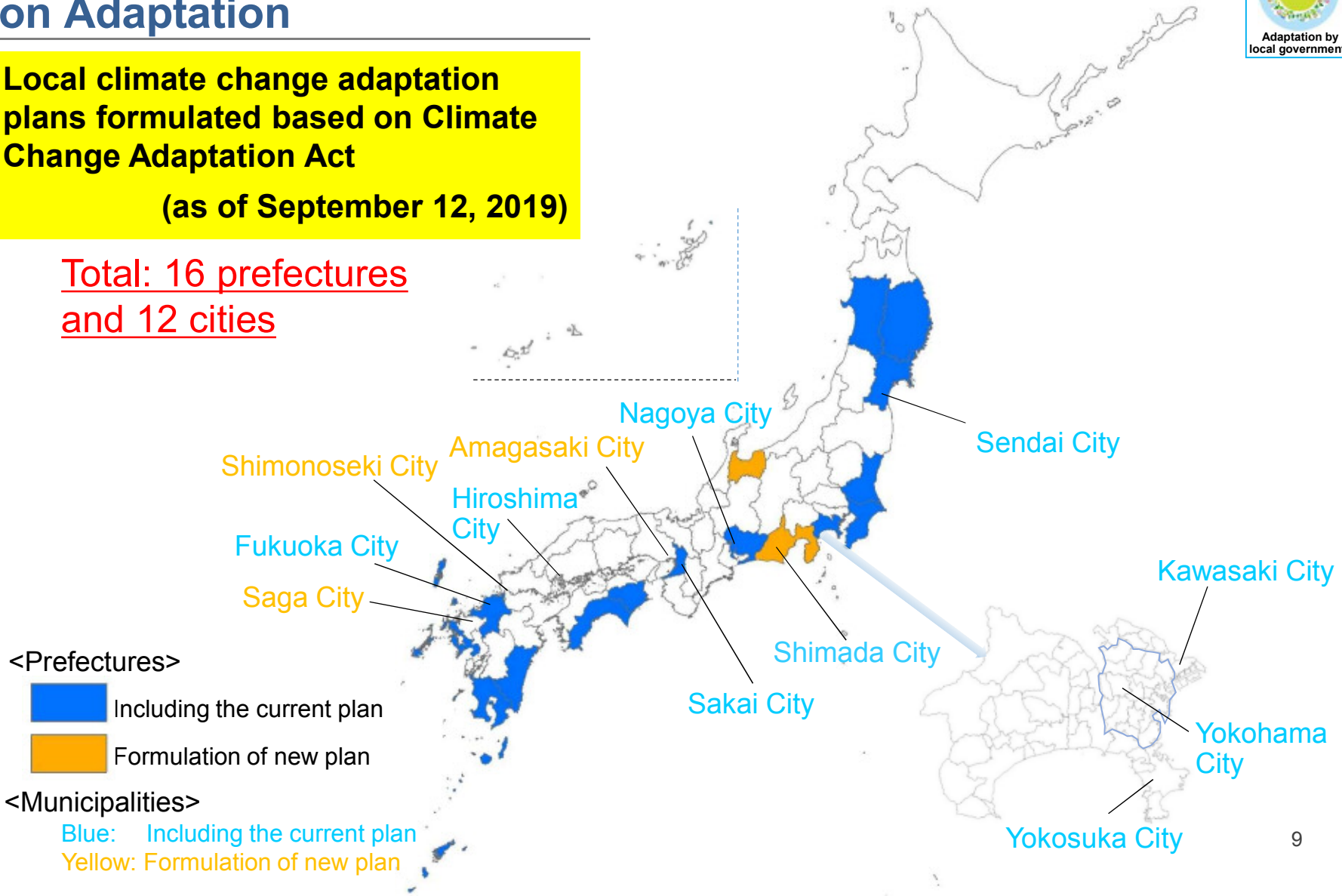
Local Government Activities on Adaptation

Adaptation by local governments

Local climate change adaptation plans formulated based on Climate Change Adaptation Act

(as of September 12, 2019)

Total: 16 prefectures and 12 cities



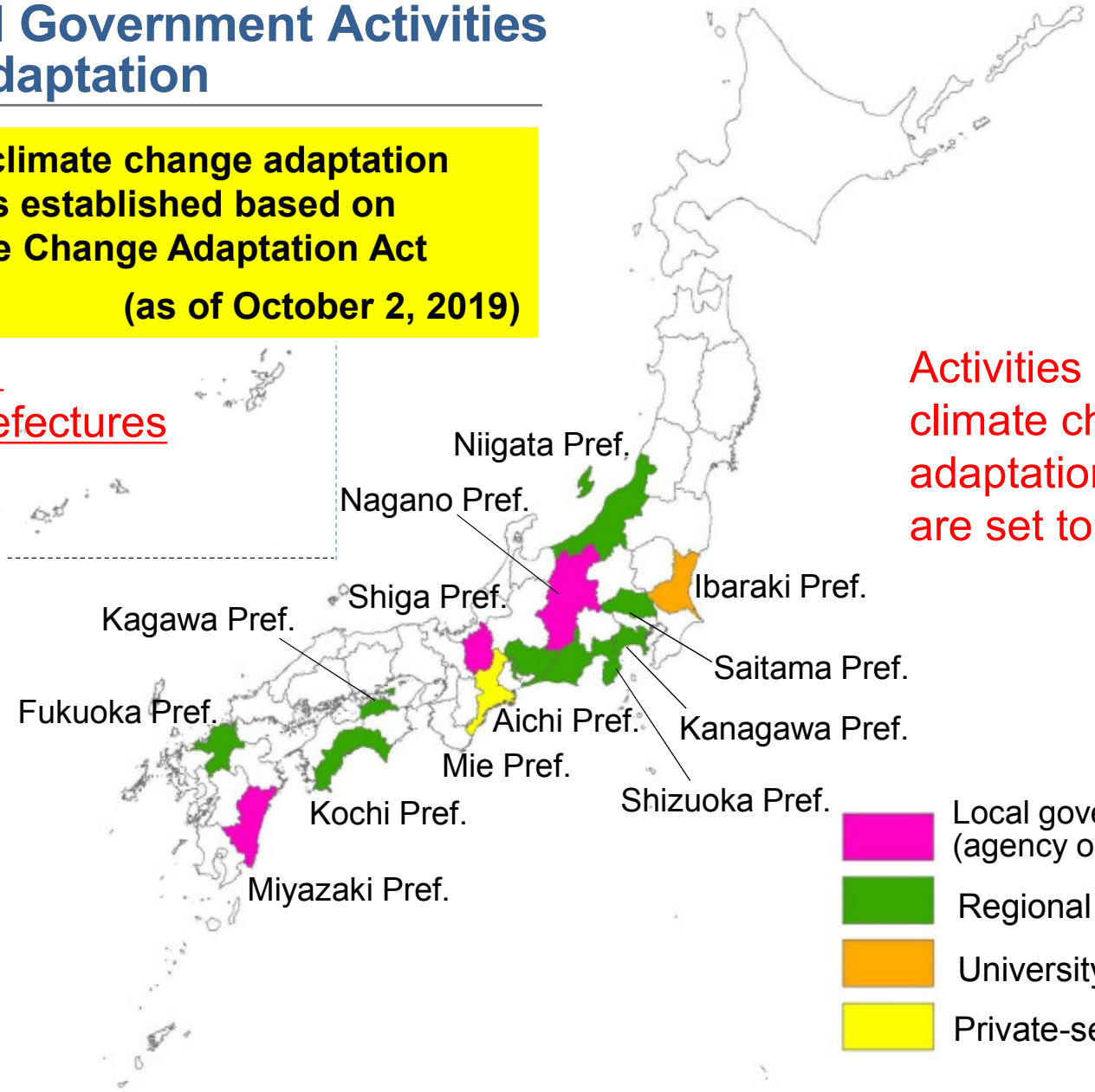
Local Government Activities on Adaptation

Adaptation by local governments

Local climate change adaptation centers established based on Climate Change Adaptation Act

(as of October 2, 2019)

Total:
13 prefectures



Activities by local climate change adaptation centers are set to increase

- Local government (agency organization etc.)
- Regional research institute
- University
- Private-sector body

Support Menu to Local Governments

- Participation as advisors and provision of explanations of initiatives/support at Regional Council meetings organized by the MOEJ (seven locations nationwide)
- Dispatch of lecturers to regional seminars and provision of members for committees
- Hosting of training sessions, discussion meetings, and interviews for local governments
- Provision of advice on plans and pamphlets produced by local governments

Dispatch of lecturers

- Since September last year, we have dispatched lecturers to 33 events with a total of more than 2,000 participants
- Examples: Fukuoka Prefecture, Hokkaido, Chiba City, Nagano Prefecture, Niigata City, Koriyama City, etc.

Participation in committees

- CCCA staff serve as members of committees, study groups, etc. for Kyoto Prefecture/City, Kanagawa Prefecture, Nagasaki Prefecture, Niigata Prefecture, Kawasaki City, etc. as well as members of the selection committee for recruitment for the Ibaraki Prefecture regional climate change adaptation center

December 5, 2018
Discussion meeting on local governments' adaptation promotion (98 participants)

December 6, 2018
Discussion meeting/interviews on local governments' adaptation promotion (37 participants)

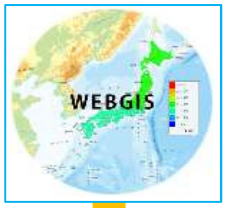
August 29/30, 2019
Climate Change Adaptation training (80 participants)

Climate Change Adaptation Platform (A-PLAT) Homepage

http://www.adaptation-platform.nies.go.jp/index.html

National and Prefectural Information (WebGIS)

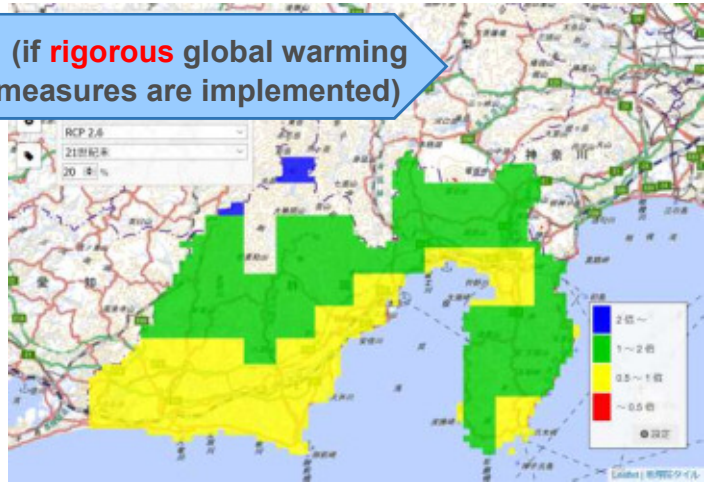
Predictions of climate change and impacts in each prefecture



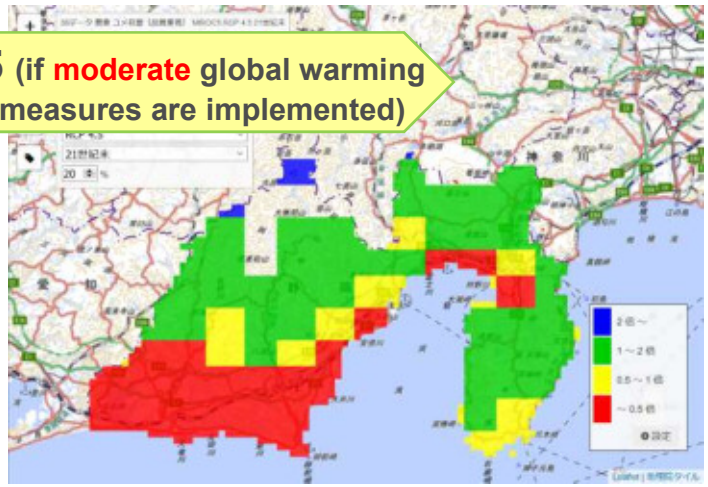
Shizuoka Prefecture selected

- "Rice yield (focus on quality)"
- MIROC5
- RCP 2.6 and RCP 4.5
- End of the 21st century

RCP 2.6 (if **rigorous** global warming mitigation measures are implemented)



RCP 4.5 (if **moderate** global warming mitigation measures are implemented)



Fields: climate, agriculture, water environment, natural ecosystems, natural disasters, health

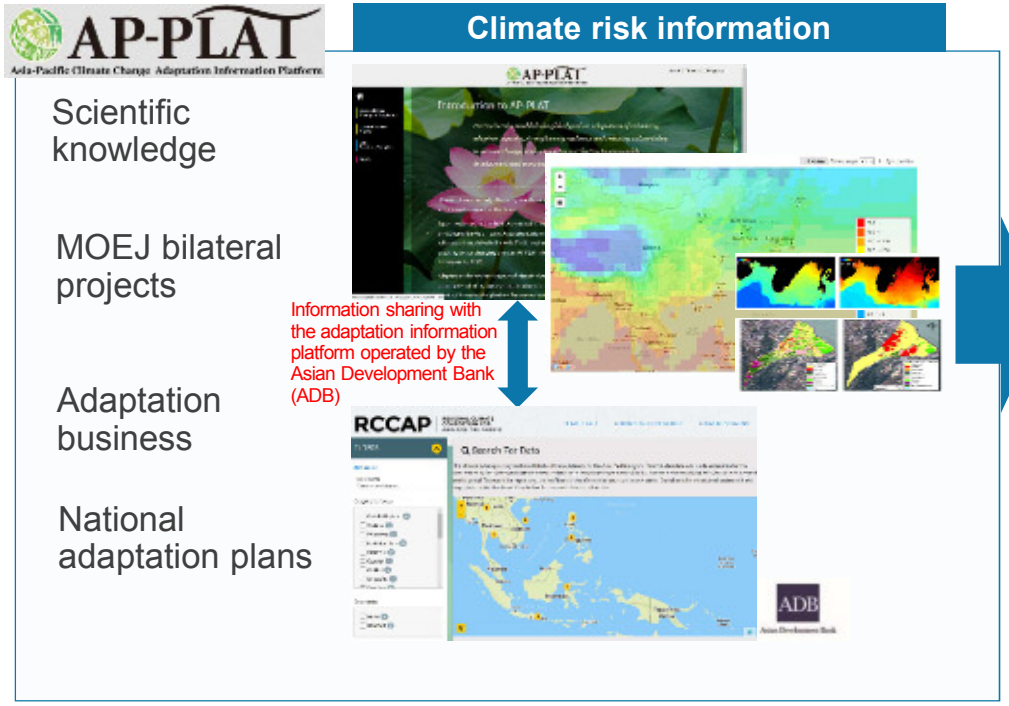
S-8
環境省環境研究総合推進費S-8

Source: results of "Funds for the Comprehensive Promotion of Environmental Research S-8, the Ministry of the Environment: Comprehensive Research into the Assessment of the impact of Global Warming and Adaptation Policies"

Establishing an Information Platform for the Asia-Pacific Region

- **AP-PLAT**: Information platform for supporting adaptation planning and implementation in developing countries in the Asia-Pacific region (**officially announced on June 16, 2019** to coincide with the G20 ministers' meeting)

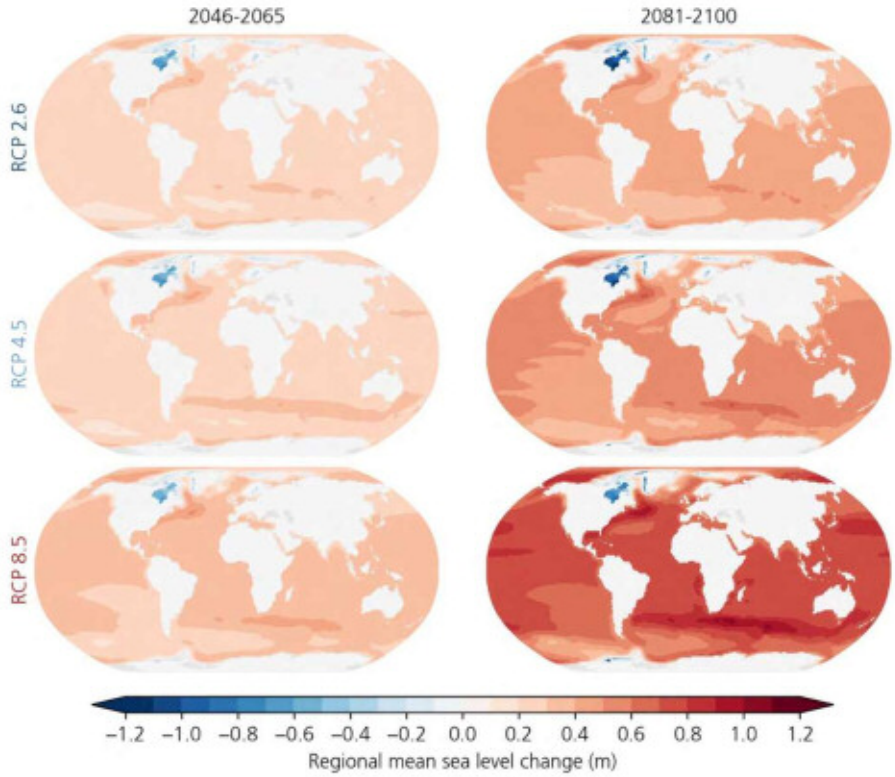
- **AP-PLAT's three main functions**
  1. **Information platform provision**: Provision of scientific data on climate change and impact prediction
  2. **Support tools**: Adaptation support through simple modeling, risk mapping, and best-practice case studies
  3. **HR development**: Development of data sets and dispatch of experts in cooperation with stakeholders



AP-PLAT launch ceremony
(June 16, 2019, Nagano Prefecture)

IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (SROCC)

- Risks to coastal areas will increase substantially throughout the 21st century due to rising sea levels (extremely high degree of certainty). For example, the annual cost of flood damage will be two or three digits higher than now in percentage terms (high degree of certainty).
- Measures to improve coastal facilities, such as deploying early-warning systems and increasing resilience to flooding, are often highly cost effective at present (high degree of certainty), but under future conditions, they will be less effective unless combined with other measures (high degree of confidence).



Projected impact of rising sea levels in the middle of the 21st century and at the end of the 21st century (m/RCP2.6, 4.5, 8.5)

Source: IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (2019)

Summary

It is important that adaptation measures are implemented in accordance with local conditions and that are continuously reviewed.

NIES plays an integral role as a research information platform relating to the impact of and adaptation to climate change, and contributes to initiatives aimed at climate change adaptation:

(1) through the collection, organization, analysis, and provision of information

(2) and the provision of technical advice to local governments and Local Climate Change Adaptation Centers (LCCACs).

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