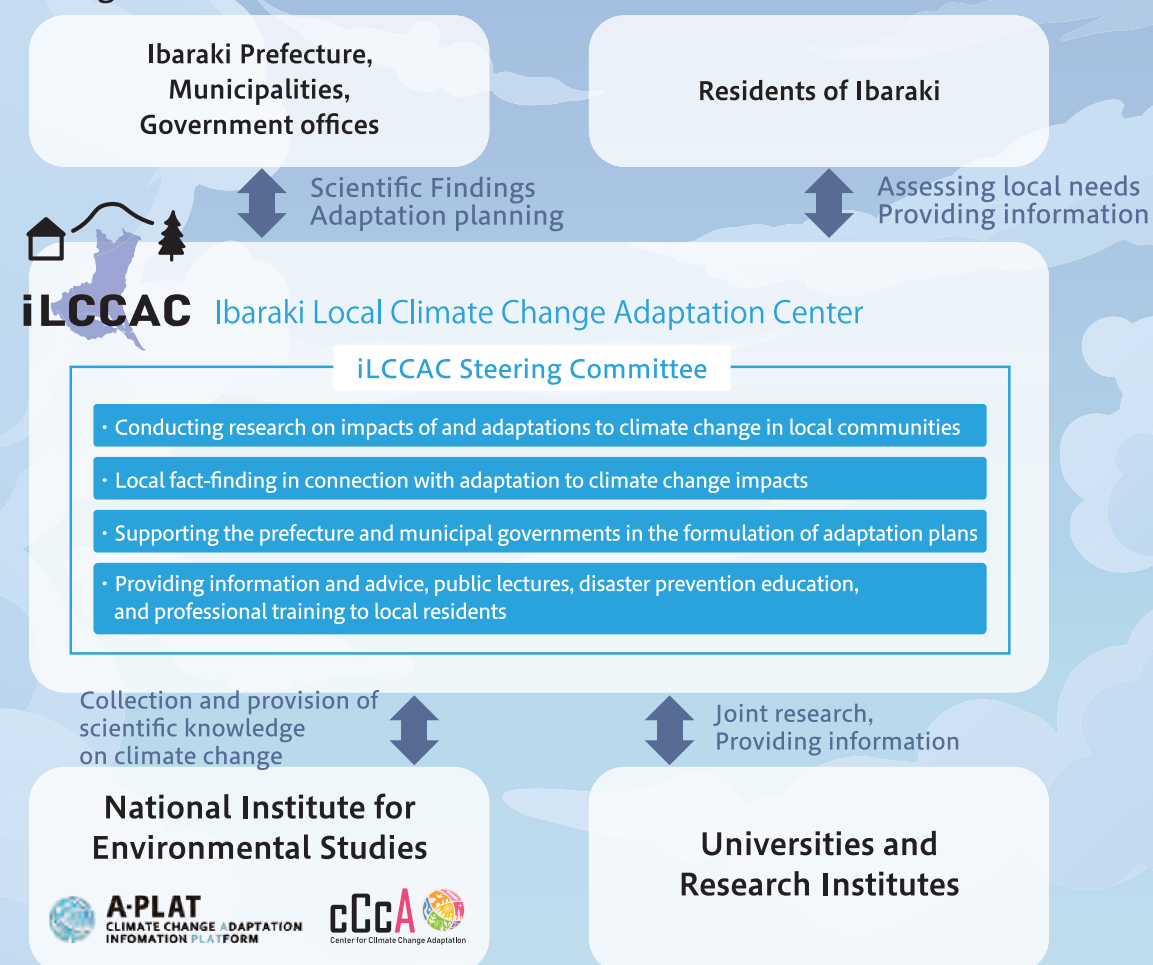


■Ibaraki Local Climate Change Adaptation Center (iLCCAC)

In cooperation with Ibaraki Prefecture and other local authorities, as well as various organizations, schools, and local residents, the iLCCAC collects and analyzes a variety of information on the impacts of and adaptations to climate change and global warming for dissemination to a broad audience. Ibaraki University has been conducting research on climate change adaptation for more than a decade in partnership with concerned investigative agencies and research institutions both inside and outside the prefecture. Our aim is to effectively combine the most up-to-date information with the real voice on a day-to-day basis of local residents for public dissemination.

Thank you in advance for your cooperation.

■Organizational Structure



Office and Contact:

Ibaraki Local Climate Change Adaptation Center (iLCCAC)

2-1-1 Bunkyo Mito, Ibaraki, Japan, 310-8512
 Global and Local Environment Co-creation Institute (GLEC), Ibaraki University
 TEL +81-29-228-8800 FAX +81-29-228-8584
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 URL <https://www.ilccac.ibaraki.ac.jp>



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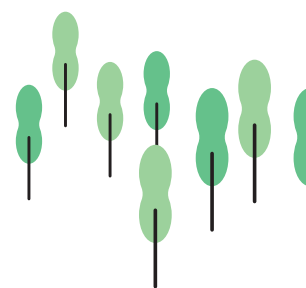
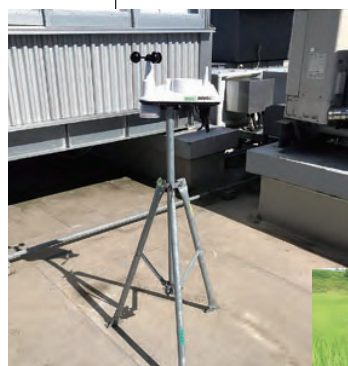
To address the impacts of global warming and climate change, the Ibaraki Local Climate Change Adaptation Center was established at Ibaraki University on April 1, 2019 “as a center to collect, organize, analyze, and provide information regarding Climate Change Impact and Climate Change Adaptation, and also to give technical advice” (Article 13 of the Climate Change Adaptation Act). The iLCCAC liaises with concerned institutions in Ibaraki Prefecture to promote efforts to adapt to climate change in local communities.

Our Mission

01

Conducting research on impacts of and adaptations to climate change in local communities.

- Downscaling climate change models for Ibaraki Prefecture
- Developing climate change impact forecasting and adaptation support tools tailored to regional characteristics for agricultural and disaster trends
 - ・ Paddy rice farming, vegetable farming, wind and flood damage, coastal impact forecasting, etc.
 - ・ Adaptation assessments and presentation of options
- Developing adaptation techniques and conducting field demonstration experiments in agriculture and other areas



What is Climate Change Adaptation?

Measures to respond to the various impacts of global warming and climate change, such as higher average temperatures, increases in concentrated bursts of torrential rainfall, and rising sea levels, can broadly be divided into two main categories. The first of these consists of measures aimed at mitigation, which endeavor to stop the advance of global warming. Such measures might include reducing carbon dioxide emissions and the consumption of energy derived from fossil fuels. The other category consists of adaptation measures, which seek to address the impacts of global warming. Examples of such measures include building dikes or elevating land to prevent flood damage in low-lying areas and changing or improving crop varieties that have ceased to produce sufficient yields. Most future climate projections foresee some degree of warming as being inevitable, and it is therefore important to know how to deal with warming and its anticipated impacts.

02

Local fact-finding in connection with adaptation to climate change impacts

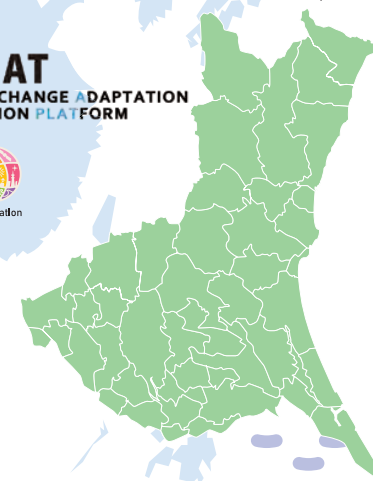
- Establishing climate monitoring networks for municipalities and farming areas
- Conducting interviews and questionnaire surveys with stakeholders in agriculture, fisheries, and disaster prevention



03

Supporting the prefecture and municipal governments in the formulation of adaptation plans

- Supporting the development of a climate change adaptation plan for Ibaraki Prefecture
- Supporting the development of municipal adaptation plans in Ibaraki Prefecture
- Participating in regional councils and workshops for local government officials on torrential rainfall disasters and similar matters
- Liaising and information sharing with the Climate Change Adaptation Information Platform (A-PLAT) and Center for Climate Change Adaptation (CCCA), the National Institute for Environmental Studies (NIES), etc.



04

Providing information and advice, public lectures, disaster prevention education, and professional training to local residents

- Issuing booklets, such as “Climate Change Impacts and Adaptation in Ibaraki”
- Holding disaster preparedness workshops in municipalities and at elementary, junior high, and high schools
- Offering local professional training through the Ibaraki Eco-College and public lectures, etc.



The iLCCAC's Publications — A series of booklets on “Climate Change Impacts and Adaptation in Ibaraki”

Intended for the general reader, these booklets are based on the most up-to-date forecast data and research findings, and highlight local climate change impacts and adaptation measures in Ibaraki Prefecture.

“Paddy Rice Impacts” (published March 2020; in Japanese)
<https://www.ilccac.ibaraki.ac.jp/action/si-cat2020march>

“Flood Disaster Impacts” (published March 2021; in Japanese)
<https://www.ilccac.ibaraki.ac.jp/action/waterdisasters2021>



Paddy Rice Impacts



Flood Disaster Impacts

Climate Change in Ibaraki Prefecture: Impacts and Adaptation



Ibaraki Prefecture in the Late 21st Century (2076–2095)

Without progress in efforts to contain global warming

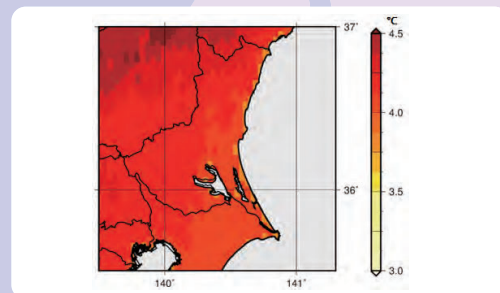
These data are the results of a computer simulation predicting the climate in Ibaraki Prefecture at the end of the 21st century (2076–2095), assuming that efforts to reduce emissions of greenhouse gases such as CO₂ will have progressed very little leading to maximal advances in global warming (the RCP8.5 scenario).

Source: "Ibaraki Prefecture's Climate at the End of the 21st Century: Temperature and Precipitation Projections for Maximal Global Warming," Mito Meteorological Office, May 2018.

A rise in average
annual temperature by about 4°C

The number of extremely hot days will increase/
by about 30 days per year

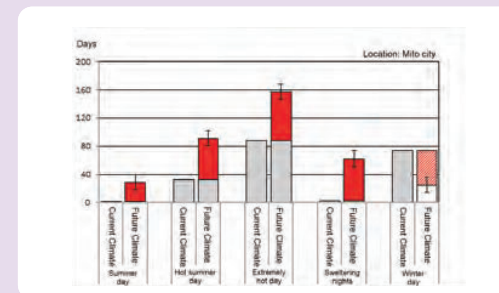
While the current average annual temperature in Mito City is 13.6°C, this is projected to rise in the future to the same level as now experienced on Hachijō Island.



Distribution map of future changes in average annual temperature
(difference between the future climate and present climate)

The number of extremely hot days, which occur only rarely at present, will increase by about 30 days per year. The number of summer days, hot summer days, and sweltering nights will also increase, while there will be fewer winter days.

(*Extremely hot days" are defined as days with a daily maximum temperature of 35°C or more)

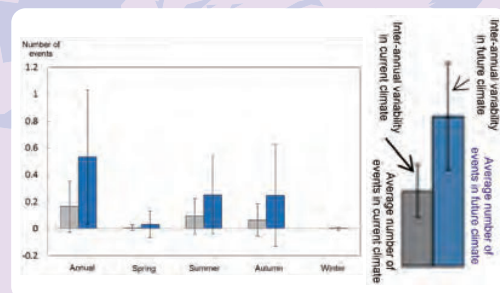


Future change in the annual number of days
by weather class (Mito City)

Occurrences of cascading rainfall
will more than double.

The frequency of heavy rainfall events, which currently average once every five years, is expected to increase in the future to about once every two years, to a maximum of once per year.

(*Cascading rainfall is defined as ≥ 50 mm of precipitation per hour)

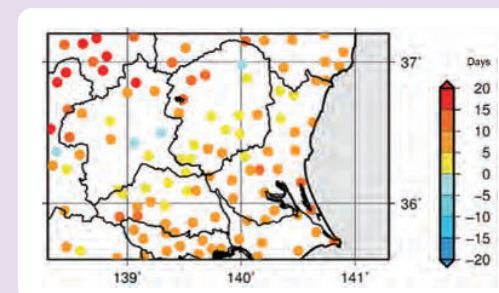


Future change in the annual number of cascading rainfall events
(difference between the future climate and present climate).

More days without precipitation/

In future, days without precipitation are predicted to increase by around 8 days per year and up to 15 days or more relative to current conditions, particularly in the summer.

(*Days without precipitation are defined as days with total precipitation of < 1 mm)



Distribution map of future changes in annual number of days
without precipitation (difference between the future climate and present climate).

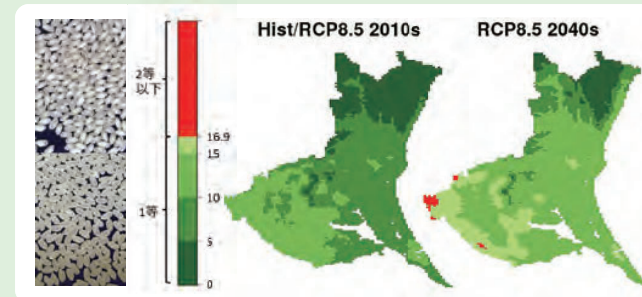


Agricultural Impacts and Adaptations

Ibaraki Prefecture is one of Japan's leading agricultural producers, ranking second or third in terms of agricultural output by prefecture. With its vast plains and mild average annual temperatures (13 – 14.5°C), Ibaraki has ideal conditions for agriculture, with a large number of crops at both the southern and northern limits of their hardiness zones. However, climate change is predicted to impact the production and quality of paddy rice and vegetable crops. Beyond forecasting impacts on paddy rice (for example in terms of yield and quality), iLCCAC is also involved in adaptation measures being implemented by local farmers and the development of cultivars that are resistant to higher temperatures.



For more detailed
information, see
iLCCAC's publication:
"Climate Change
Impacts and
Adaptation in
Ibaraki"



Predicted incidence of immature white grains in Koshihikari rice (RCP 8.5/5GCM average)

Development of crops that are tolerant to high and low
temperatures using symbiotic fungi (endophytes)



100% survival (right picture) under conditions that kill about 40% of
the control plot (left picture)



Disaster Impacts and Adaptations

Although Ibaraki once enjoyed the reputation of being a relatively disaster-free prefecture, a variety of catastrophes including flooding and earthquakes have hit the prefecture in recent years. Torrential rainfall disasters, such as the September 2015 Kanto-Tohoku Torrential Rain event and Typhoon Hagibis (No. 19) in October 2019, also struck Ibaraki and have been linked to climate change.

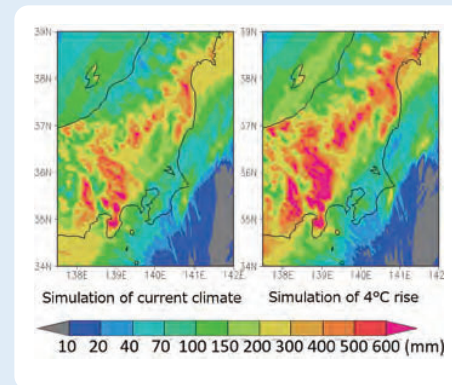


At iLCCAC, we are working to promote adaptations in the field of disaster preparedness by forecasting temperatures and precipitation associated with climate change, conducting surveys on heat stroke and disaster prevention measures at elementary and junior high schools, and cooperating with typhoon disaster survey teams.

Extracted word	Number of Appearances	Extracted word	Number of Appearances	Extracted word	Number of Appearances	Extracted word	Number of Appearances
Heat stroke	174	Activity	48	Use	35	Practice	31
Counter-measure	147	Installation	46	Index	35	Physical training	29
Sports events	106	Time	42	Coping	34	Supply	28
Leaving school	70	Schedule	42	Water bottle	32	Temperature	25
Lightning Strike	55	Pool	41	May	31	Monitoring	25
Implementation	54	Water	36	WBG	31	Parents	25

School responses to recent weather conditions: Incidence of extracted words
(Top 24 words)

Questionnaire survey of 240/713 elementary and junior high schools
in Ibaraki Prefecture (January 2020).



Accumulated rainfall from Typhoon Hagibis 2019

Under climatic conditions 4°C higher than the present, Typhoon Hagibis 2019
would increase rainfall by about 30% (right figure).