



# Kawasaki Environment Research Institute

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# The Aims of Kawasaki Environment Research Institute

- Kawasaki City's strengths lie in the accumulated experience and outstanding environmental technology both gained through the process of improving the environment.
- To pass on a better environment to the next generation, it is necessary to further decrease burdens on the environment. Also required is to grapple with global environmental issues which will become more diverse and complicated, including climate change.
- The Environment Research Institute is advancing initiatives based on the three functions of research, survey, and networking to solve these environmental issues in Japan and abroad.

## Environmental Issues Tackled by the Research Institute

### ◇ Climate change

The effects of climate changes, such as rising temperatures and increasing frequency of heavy rains, have become apparent in recent years, making it indispensable to work out measures against these changes, including the heat island effect in urban areas.

### ◇ Air/water environment

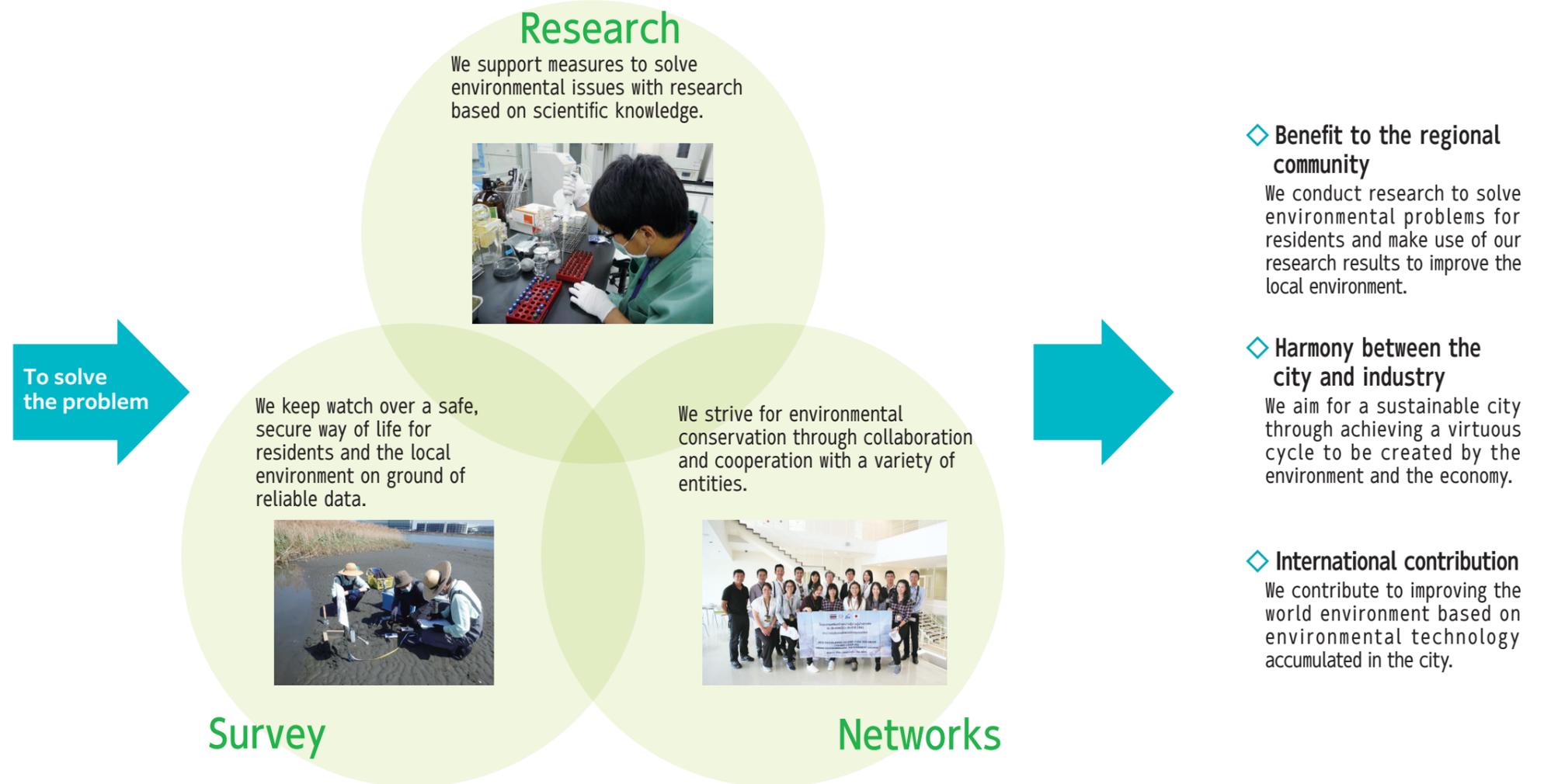
Although the air and water environments have improved significantly, a complete solution is still a step away while the public cannot actually feel the environmental improvement in such broad-based issues as photochemical smog and water quality in Tokyo Bay.

### ◇ Resource circulation

Plastic waste has become a worldwide problem, and realization of a recycling-oriented society, by such measures as reducing and reusing trash, is necessary to lessen burdens on the environment.

### ◇ Harmony between people and nature

In order to conserve biodiversity, there is a need to increase interest in nature and living creatures, and to collect and disseminate relevant information.



## Contributions to the Sustainable Development Goals (SDGs)

Each of our employees fully understands the intent of the SDGs and, based on those principles and objectives, is advancing efforts to realize a sustainable society.



Kawasaki Environment Research Institute

- Project promotion  
Accepting research/observation teams, collecting/sharing environmental technology information, etc.
- International cooperation/research promotion  
Research related to international cooperation
- Urban environment (Kawasaki Local Climate Change Information Center)  
Research on changes in climate; collaborative research between industry, academia, and the public; and so forth
- Environmental research  
Research on air, environmental survey on chemical substances, environmental risk assessment, etc.
- Regional environment & pollution monitoring  
Measurement operations related to constant monitoring, water quality/biological research, etc.

## Contributions to the decarbonization strategy Kawasaki Carbon Zero Challenge 2050

Kawasaki City is carrying out efforts with the goal of reducing greenhouse gas emissions substantially to zero by 2050 as a countermeasure against pressing climate change issues. Kawasaki Environment Research Institute will also carry out research from a new perspective based on the impact of climate change.



# The Environment of Kawasaki City and the History of the Research Institute

1970

1980

1990

2000

2010

2020

## Industrial pollution worsens

Kawasaki City drove the Japanese economy as a center of the Keihin industrial district. However, pollution spread into the river, sea, and air due to drainage and soot from factories.



1960s  
Smoke emitted from factories concealed the town.



1970s  
Tama River with bubbles spreading

## Pollution arises from city life

The population rose drastically due to rapid economic growth, and people experienced convenience and affluence in their daily lives. However, contamination of the river and the sea from domestic wastewater and air pollution from car exhaust gas became problems.



Pollution monitoring meetings with citizen participation



Equipment eliminates pollutants in factory exhaust gas.

Cooperative efforts were made to overcome pollution, such as residents speaking up about environmental improvement, Kawasaki City strengthening anti-pollution measures, and companies developing pollution-control technology.

## New environmental issues become apparent and worldwide

Environmental pollution from new chemical substances began to arise. Environmental issues such as global warming also became problems on a worldwide scale.



Mt. Fuji soars against a clear sky.



Diverse living creatures inhabit the waterfront.

The air and water environment improved significantly as a result of the measures taken by the city and companies as well as residents.

## Toward realization of a decarbonized society

The average temperature of the Earth continues to rise even now, and efforts are needed to curb the emission of the greenhouse gases causing global warming. There are also new environmental issues on a global scale, such as waste problems and conservation of biodiversity.



MIRAI, a fuel cell vehicle that runs on hydrogen



Kawasaki's large solar power plants (Ogishima)



An electric garbage truck (with a replaceable battery) introduced

## The history of the Research Institute



1971 Kawasaki Pollution Research Institute opens  
Researched air pollution, water pollution, and noise pollution



1972 Kawasaki Pollution Monitoring Center opens  
Constantly monitored air pollution and gas emitted by factories



2008 Kawasaki Environmental Technology Information Center opens  
Shared environmental information and knowledge throughout Japan and abroad



2013 Kawasaki Environment Research Institute opens  
The three facilities joined to research environmental issues comprehensively, becoming a new research institute.



2020 Kawasaki Local Climate Change Information Center  
Established inside the Research Institute

## Environmental regulations (Kawasaki City)

1960	Kawasaki City Pollution Prevention Ordinance (former Pollution-control Ordinance)	1970	Agreements signed by 39 factories within Kawasaki City regarding air pollution	1984	Guidelines for the Promotion of Countermeasures against Domestic Wastewater in Kawasaki City	1992	Kawasaki City Environmental Basic Ordinance	2005	Kawasaki City Basic Plan for Processing of Domestic Waste (Kawasaki Challenge/3 Rs)	2012	Kawasaki City Water Environment Conservation Plan	2020	Kawasaki Carbon Zero Challenge 2050
1969	Regulations Concerning Relief Measures for Persons Affected by Air Pollution	1972	Kawasaki City Ordinance for Pollution Prevention	1982	Kawasaki Pollution Lawsuit takes place	1994	Kawasaki City Environmental Basic Plan	2008	Carbon Challenge Kawasaki Eco Strategy (CC Kawasaki)	2014	Biodiversity Kawasaki Strategy	2022	Kawasaki City Air and Water Environmental Plan
1968	Establishment of a constant monitoring system for sulfur dioxide, etc.	1979	Sulfur dioxide concentrations meet environmental standards throughout the city	1990	Declaration of waste state of emergency	2000	Kawasaki City Ordinance for Conservation of the Living Environment, Including Pollution Prevention	2009	Kawasaki City Ordinance for Promotion of Countermeasures Against Global Warming	2015	Kawasaki Hydrogen Strategy to Achieve a Hydrogen Society		
1970	Photochemical smog first occurs in the city	1972	Kawasaki becomes an ordinance-designated city	1982	Kawasaki Pollution Lawsuit takes place	1995	Rail transport of waste begins	2010	Kawasaki City Basic Plan for Promotion of Countermeasures Against Global Warming	2016	Kawasaki City Basic Plan for Processing of Domestic Waste (Eco-Living Plan Leading to a Future with Less Waste)		
Around 1960	Petrochemical complex formed on the waterfront	1972	Kawasaki becomes an ordinance-designated city	1982	Kawasaki Pollution Lawsuit takes place	1995	Rail transport of waste begins	2010	Kawasaki City Basic Plan for Promotion of Countermeasures Against Global Warming	2016	Kawasaki City Basic Plan for Processing of Domestic Waste (Eco-Living Plan Leading to a Future with Less Waste)		
1968	Establishment of a constant monitoring system for sulfur dioxide, etc.	1979	Sulfur dioxide concentrations meet environmental standards throughout the city	1990	Declaration of waste state of emergency	1997	The whole of Kawasaki's waterfront is recognized as Japan's first eco-town area	2003	Restrictions on operation of diesel vehicles begin by ordinance of the national capital region	2013	Nitrogen dioxide meets environmental standards throughout the city		
1970	Photochemical smog first occurs in the city	1972	Kawasaki becomes an ordinance-designated city	1982	Kawasaki Pollution Lawsuit takes place	1999	Reconciliation against Kawasaki pollution lawsuit	2004	Particulates meet environmental standards throughout the city	2016	PM 2.5 meets environmental standards throughout the city		
										2017	City population: 1.5 million		

## Environmental laws (Japan)

1967	Basic Act for Environmental Pollution Control	1970	Water Pollution Prevention Act	1972	Offensive Odor Control Act	1991	Act on Promotion of Effective Utilization of Resources	1998	Act on Promotion of Global Warming Countermeasures	2001	Automobile NOx PM Control Act	2014	Water Cycle Basic Act	2022	Plastic Resource Circulation Act
1968	Air Pollution Control Act	1973	Health Damage Compensation Act	1976	Noise Regulation Act	1992	Automobile NOx Control Act	1999	Act on Special Measures against Dioxins	2003	Soil Contamination Countermeasures Act	2018	Climate Change Adaptation Act		
1968	Noise Regulation Act	1976	Noise Regulation Act			1993	Basic Act on the Environment	1999	PRTR Act	2008	Basic Act on Biodiversity				

## 世界の動き

1962	Silent Spring published	1972	The Club of Rome publishes the report <i>The Limits to Growth</i>	1972	UN Environment Programme (UNEP) launches	1992	Earth Summit Convention on Biological Diversity	1994	United Nations Framework Convention on Climate Change	2010	COP 10: Nagoya Protocol	2015	2015 UN Summit	2019	UN Climate Action Summit	2021	Climate Change Conference
		1972	UN Conference on the Human Environment (Stockholm Conference)			1993	Convention on Biological Diversity	1997	COP 3: Kyoto Protocol			2015	COP 21: Paris Agreement				

# Survey

We survey the air and water environments in the city to protect residents' safe, secure living situation.

## Air surveys

### ● Constant air monitoring

We measure pollutant concentration in the air seven days a week, 365 days a year at 18 measuring stations in the city. Measurement data is shared via the Internet and data broadcasting on Television Kanagawa.



A measuring station



Air-measurement equipment in a measuring station



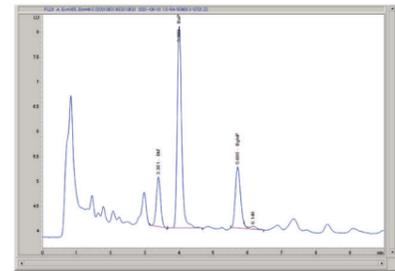
Data broadcasting on Television Kanagawa

### ● Monitoring surveys of hazardous air pollutants

We regularly measure environmental concentration of hazardous air pollutants such as benzene and toluene to assess air conditions.



Collecting dust in the air



Analysis of dust composition

### ● Environmental radioactivity surveys

We conduct surveys of radioactivity in the environment based on Kawasaki City's local disaster preparedness plan.



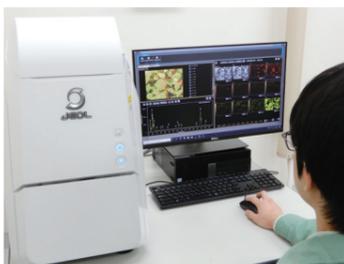
Measuring environmental radioactivity with an instrument

### ● Asbestos surveys

We survey asbestos concentration in the environment.



Collecting asbestos in the air



Measuring asbestos with an electron microscope

## Accident response

We investigate the cause if foul odors or abnormalities are confirmed in the water of the river or sea.



Collecting water at the scene of an accident

## Water surveys

### ● Surveys of the river and ocean, etc.

We conduct water quality surveys to check that water quality in the river and sea meets environmental standards. We also survey chemical substances in mud on the seabed and inside the bodies of fish.



Water quality surveys at water-related amenities



Collecting sea mud in the ocean



Sea bass harvested from the ocean

### ● Biological surveys

We survey water quality in the river and ocean, mud properties, and types and numbers of organisms to check the habitats of living things.



Collecting organisms in the river



### The relationship between water quality and living things

The status of organisms living in rivers and the ocean (particularly small insects, etc.) is closely related to water cleanliness. Therefore, we research types and numbers of living things to monitor water quality, which is reflected in such changes.



Observing collected organisms

### ● Inspections of factory and facility drainage

We regularly perform inspections to confirm that drainage from factories and other facilities is processed appropriately in conformity with standards for draining into rivers and the ocean.



Sampling drainage at an operational facility



Processing to remove impurities



Measuring heavy metals such as zinc and chromium

# Research

We engage in research to determine causes of environmental pollution and handle new risks to the environment.

## Investigating the causes of environmental pollution

### ● Research on air environment

#### 【Photochemical oxidants】

Air pollution in Kawasaki City has greatly improved, but photochemical smog alerts are issued every year. We are still studying the causes of photochemical oxidants and trying to work out effective countermeasures in order to prevent health hazards due to photochemical smog.



Collecting air samples



Measuring VOCs in the air

#### Photochemical oxidants

Source substances such as nitrogen oxide (NO<sub>x</sub>) from the exhaust gas of factories and vehicles and volatile organic compounds (VOCs) undergo a chemical reaction when they come into contact with strong ultraviolet rays to form photochemical oxidants. A photochemical smog alert is issued when these values are too high.

#### 【PM 2.5 (fine particulate matter)】

We conduct research to analyze sources of PM 2.5 and develop countermeasures, with the aim of a cleaner air environment.



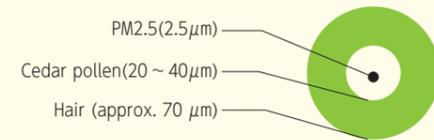
Collecting PM 2.5 in the air



Weighing PM 2.5 on a scale

#### PM2.5

"PM 2.5" indicates granular substances of a size of 2.5 μm (micrometers) or less. Because it is very small, it is said to enter deep inside the lungs and negatively impact health.



### ● Research on water environment

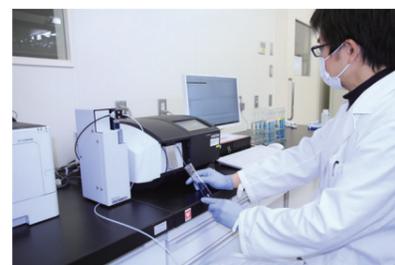
Water quality in the river and ocean has improved considerably thanks to proper treatment processes of industrial wastewater and extensively developed sewerage, but water contamination in the sea is somewhat on the rise in recent years. We further study to determine its causes in order to protect the environment.



Conducting research at Kawasaki Beach in Higashi-Ogishima East Park



Analyzing the quality of seawater



Measuring nitrogen in seawater

## Stopping harm before it happens

### ● Research on the environmental risk of chemical substances

There are numerous chemical substances around us in daily life, and many new chemical substances are created each year. They allow us to live conveniently and in abundance; however, if used incorrectly, there is a risk that some of them will negatively affect people, animals, and plants. We conduct surveys and studies on chemical substances in the environment to prevent effects on health and daily life before they happen.



Isolating chemical substances



Condensing chemical substances



Component analysis of chemical substances



An environmental concentration simulation

#### Environmental risk

Not only toxicity but also the amount of physical intake is an important factor in whether chemical substances negatively impact plants and animals. The likelihood of negative impact is called "environmental risk."



### ● Development of analysis methods

To assess environmental risk, first we research how much of a given substance exists in the environment. However, research methods (analysis methods) have still not been established for many substances. That is why we develop new analysis methods.

Research findings and developed analysis methods are made available through presentations at academic conferences as well as in annual and other reports.



Chemicals in the Environment Research Report on Development of Analytical Methods for Chemical Substances



Annual Report of Kawasaki Environment Research Institute

Annual reports are available for download here. (Japanese only)



# Networks

We carry out initiatives to protect the environment in collaboration and coordination with other countries, cities, and companies.

## ● Collaborative research projects in cooperation with industry, academia, and the public

Industry (companies), academia (universities and research institutions), the government (Kawasaki City), and the public (civic groups) work together to move forward with studies and technology developments. Each organization contributing its property, people, technology, and information jointly in collaborative research leads to solving environmental issues in Kawasaki City.



Heat shield / light shielding performance experiment of EC dimming glass



Hydroponic display installation in Kawasui Kawasaki Aquarium, part of collaborative research with Tierraponica Inc.

## ● Collaborative research with other regions

Participation in nationwide and broad-based regional surveys and studies conducted jointly by research institutions and companies in other cities throughout Japan helps improve Kawasaki City's environment.



Comprehensive environmental investigation of Tokyo Bay

## ● International contribution efforts

We convey the expertise of environmental authorities and environmental technology of private companies in Kawasaki City through cooperative projects with foreign cities as well as observation and training teams from abroad. We also collaborate with the United Nations Environmental Programme (UNEP) to gather the latest information on foreign environmental initiatives and exchange information with foreign countries.



The Kawasaki International Eco-Business Forum (cosponsored by UNEP)



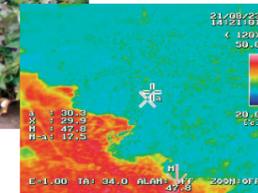
Accepting research/ observation teams from abroad

## ● Kawasaki Local Climate Change Information Center

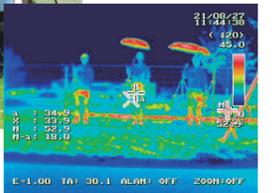
The Kawasaki Local Climate Change Information Center carries out research on causes of and measures against heat islands, heatstroke, and more. It also collects and organizes information on the effects of and adaptation to climate change due to global warming through collaboration with national research institutions, sharing accurate information and efforts we can make in a way that is easy to understand.



Environmental research on heat on urban farmland



Verifying the heat-inhibiting effect of parasols



## ● Countermeasures in response to the effects of climate change

Heat has become more severe than in the past, and the way snow and rain falls has altered because of climate change. These changes have various effects on our food and health.



Two types of initiatives—mitigation and adaptation—are therefore necessary against climate change.

**緩和** とは? 原因を少なく  
**適応** とは? 影響に備える

**緩和策の例**  
 節電・省エネ、エコカーの普及、再生可能エネルギーの活用、森林を増やす

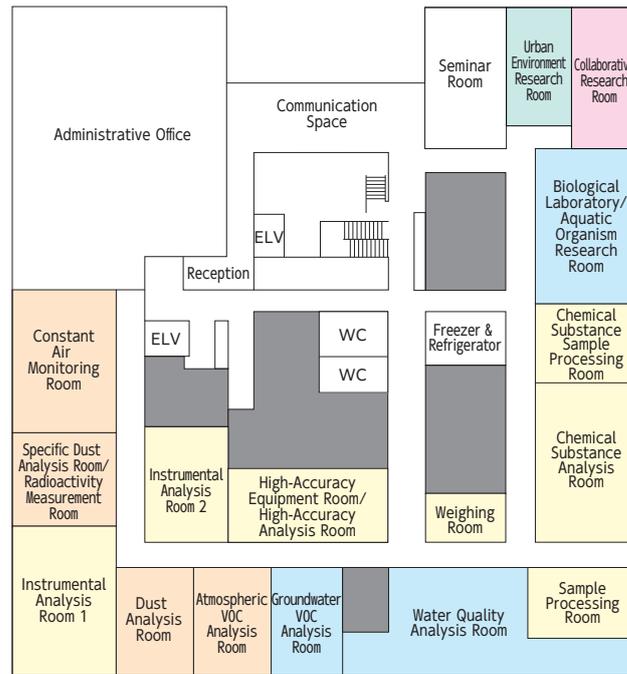
**適応策の例**  
 熱中症予防、災害に備える、高温でも育つ農作物の品種開発や栽培

"Mitigation" means reducing the greenhouse gas emissions to diminish changes in the climate to the best of our ability.  
 "Adaptation" means making it so we can lead better lives in response to changes in the climate.

It is very important not only for the future of Japan but for the world's future that we individually deepen our understanding of "mitigation" and "adaptation" and act accordingly.

Source: Climate Change Adaptation Information Platform

# Floor Plan



# Information Dissemination

The research institute's initiatives are widely made available to the general public.

## ◆ Environmental seminars

We offer the latest topics on the environment.



## ◆ Archive space

(1F, Kawasaki Life Science & Environment Research Center)

Kawasaki City's environmental efforts and the newest environmental technology are introduced.



## ◆ Twitter

@kawasaki\_keri1



## ◆ YouTube

Kawasaki Environment Research Institute Channel



## Bus

From JR Kawasaki Station East Exit bus terminal

- Take Rinko Bus Kawa-03 bound for Ukishima Bus Terminal. Get off at "King Skyfront Entrance" and walk for 4 minutes.
- Take the Rinko Bus Rapid Express bound for Ukishima Bridge. Get off at "King Skyfront Entrance" and walk for 4 minutes.
- Take Rinko Bus Kawa-02 bound for King Skyfront East. Get off at "King Skyfront West" and walk for 1 minute.

## Train

Get off at Kojima-shinden Station on the Keikyu Daishi Line and walk for 15 minutes.



**Kawasaki Environment Research Institute**

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Kawasaki City Home Page



Published March 2022