# For Earth, For Life

Special Feature

# The Route to Realizing Our Long-Term Vision "GMB2030"

To confront these increasingly serious social issues and to protect our sustainable everyday lives, Kubota established its Long-Term Vision "GMB2030," indicating the roles that Kubota should play and the guidelines for our group-wide efforts. By earning the trust of the greatest number of customers, we can make the greatest contribution to society. Here we introduce some of the value creation initiatives we are implementing to achieve that goal.



# Value creation systems to be an "Essentials Innovator for Supporting Life"

As part of the Long-Term Vision "GMB2030," we defined our future ideal roles as being an "Essentials Innovator for Supporting Life," committed to a prosperous society and cycle of nature. Over the more than 130 years since our company was founded, we have contributed to solving social issues through our business. Recognizing that fact anew, we are working hard to create value so that we are an indispensable company able to assist in people's daily lives, and contribute toward a prosperous society and cycle of nature.

We are applying the technologies and expertise that we have built up over the years to meet the needs of society and the market, and are steadily resolving current social issues. At the same time, we are forging ahead with the creation of new technologies and businesses that respond to future changes. The system behind our value creation processes is shown in the Three-Story House diagram below.



From upcoming product development to initiatives with long-term goals, we will balance our distribution of resources effectively. In this way, we aim to further develop as a sustainable company able to respond to change.

# 1F Core business

# Making the most of opportunities for growth for existing businesses

To achieve the Long-Term Vision "GMB2030," it is imperative that we steadily develop our existing businesses. To that end we will promote business strategies that allow us to fully utilize opportunities for growth for those existing businesses, and expand our businesses.

For instance, one issue is ways to reduce the total cost of replacement, maintenance, and operations for public infrastructure that is deteriorating. In answer to this, Kubota will promote its solutions business based on the technology and know-how it has cultivated as a world-class water treatment specialist. Such solutions does not just involve delivering products; we will provide integrated packages that involve the design, procurement, construction, and maintenance of water environment infrastructure. By doing so, we will support water in every region.



# Fusing with the latest technologies to open up next-generation products and solutions

To create new businesses, we will meld existing products and solutions with cutting-edge technologies to provide never-beforeseen added value.

One example in agriculture is the way in which new forms of value are being called for—whether it be ways of expanding production despite labor shortages, improving quality, or reducing environmental impact. To address these demands, we are combining cutting-edge technologies such as ICT and robotics technologies. Through this, we are developing next-generation products and services such as Smart Agri Solutions that can achieve labor savings as a result of automation, or support farm management through the use of data.



# 3F Innovation

#### Creating future value through open innovation

We will strengthen our ties to external partners in different fields and industries to create future value that can contribute to the resolution of advancing, diversifying social issues in the years to come.

For example, to resolve food issues, we cannot just provide solutions in our existing business fields that have focused on agricultural produce. We must consider the entire food system as a "food value chain"—it is vital that we provide total solutions that cover everything from production to consumption. To be able to do so, we are strengthening relationships with start-ups, academic and research institutions, and other organizations, and bolstering our research and development collaboration. We have established R&D bases around the world, to accurately identify the particulars of each region's needs, and our goal is to create new value that goes beyond our existing product fields.

Kubota has, since the time of its founding, contributed to society in fields that are indispensable for all human beings in the world: food, water, and the environment. Our duty has always been to support the future of the planet and its people. Looking forward, we have outlined our ideal for the future—earning the trust of the greatest number of customers to become a "Global Major Brand (GMB)" that can make the greatest contribution to society. To this end, we are working to realize our Long-Term Vision "GMB2030."

#### Front lines of core business

Many of Japan's local authorities, in order to keep up the maintenance of public infrastructure-which was built decades ago in a period of rapid economic growth-under strict budgetary limitations, need to reduce their total costs. Kubota offers water environment infrastructure support in the form of total solutions that incorporate facility design and construction, as well as managing operations. We are working in this way to help local authorities both lower costs and reduce their maintenance and management workload.

# Helping resolve complex issues with the Design & Build (DB) model, which integrates everything from design to construction

Updating urban water

environment infrastructure

The city of Osaka is a major city, home to around 2.7 million people. The public infrastructure has grown as the city has developed and now supports the daily lives of the city's residents.

Incidentally, the city's sewage system can boast an impressive coverage of 99.9% of the population through its roughly 5.000 km of sewage pipelines and 12 sewage treatment facilities. One such facility, Nakahama Sewage Treatment Plant, was opened in 1960 and had been contributing to the preservation of the water environment for more than fifty years before deterioration necessitated a renewal and a shift to more advanced treatment to conserve the environment around receiving water areas



Nakahama Sewage Treatment Plant in Osaka

In March 2017, Kubota received an order to run a project under a Design & Build (DB) model-i.e., handling everything from the design of a facility to its construction. Working closely with the Osaka city government and other partner businesses, the facility was completed and began operation in October 2021.

The sewage treatment system is at the heart of the facility's operations, and here we introduced Kubota's smart Membrane Bioreactor (MBR) technology, which is an extremely effective treatment method yet requires little in the way of space or electricity.

This technology allows existing facilities to be used, while upgrading their capabilities, and are particularly useful in urban areas where available land is limited. In addition to MBR technology, we also introduced other systems, including a filtration system that makes use of difference in water levels. Compared to Kubota's conventional systems, this is predicted to achieve a roughly 50% cut in electricity usade



For the two years after the facility's completion, we are assessing its performance. By controlling it through AI that can collect operational data and achieve both more effective sewage treatment and energy savings, we are working to reduce total costs.

## Water environment solutions that continue to update the world's urban infrastructure

Kubota can trace its history back to the first mass production of cast iron water pipes in Japan. In the more than 130 years since then, we have made a great contribution to the development of water infrastructure. In recent years, we have provided more than just products-we have put the technologies and knowledge we have accrued over many years into action and been involved in every aspect of water environment infrastructure, from facility design to construction and management.

We have taken this expertise abroad with a project for sewerage system development in Phnom Penh, Cambodia, in April 2021 and a renewal and expansion project for the Big Creek Water Reclamation Facility in Georgia in the U.S. in July 2021, among others

# Front lines of incubation

Verifying next-generation 2 agricultural solutions

In agriculture, there is a need to resolve different issues than before: as well as raising productivity, we need to improve crop quality and reduce environmental impact. We are promoting labor savings through robotic technologies and Smart Agri Solutions that support high-quality production by utilizing data. Through products and services that use cutting-edge technologies, we will transform agriculture into a stronger, more appealing business and help support plentiful, stable food production.

# ICT systems that contribute to lesser workloads and more efficient production

In 2014, Kubota launched the Kubota Smart Agri System (KSAS) to support farm operations. Recording farm work or produce statuses on the cloud helps farmers to visualize how they manage their agricultural businesses. The system supports the creation of a farm management cycle, aiming for better yields and higher quality through data. As of April 2022, 18,260 farms had introduced the system, of which 3,856 had taken out the farm management support service.

We have also been actively pressing ahead with the development of automated and unmanned agricultural machinery; in 2018, we were the first company in Japan to successfully automate tractor, rice transplanter, and combine harvester operations. In particular, our rice transplanter with an automated steering function had sold more than 10,000 units by November 2021.



Agri Robo Rice Transplanter NW8SA, able to carry out unmanned transplanting

Another example is WATARAS, a farm water management system. The system allows water level management to be carried out remotely, massively reducing the workload involved in water management. It also ensures that water is used more effectively. In joint research with the National Agriculture and Food Research Organization, results from trials proved that the system reduced the workhours needed for water management by around 80%, and the amount of water used by about 50%.



# Taking on core responsibilities for leading the whole country toward smart agriculture

Since FY2019, smart agriculture verification projects, launched by the Ministry of Farming, Forestry and Fisheries, have been conducted in Japan. The latest technologies have been introduced at production sites across the country and trials have been run to demonstrate the capabilities of the technologies. The tests have also been assessing the level of contribution they make to agriculture management.

Over the two years since the projects began, Kubota has been at the heart of the project, introducing equipment at around 40% of the total 121 selected trial sites, including 70% of paddy field and dry-field sites, and is working to improve Smart Agri solutions.

# Smart Agri Solutions will support the future of the world's food

Kubota has developed products that closely meet farmer's needs in succession. In 1960, it established an integrated, mechanized system for growing rice using tractors, combine harvesters, and rice transplanters. Now, as a comprehensive agricultural machinery manufacturer that also caters to dry-field farming, we are utilizing cutting-edge technologies to develop products and services that meet the needs of local regions. In this way, we are supporting agriculture in every corner of the world.

In Asia, where the number of agricultural workers continues to decrease, we are contributing with automated products that lead to further improvements to productivity. Meanwhile, in Europe, where interest in food safety and reducing environmental impact is rising, we have developed solutions that enable highly advanced precision farming. Through our Smart Agri Solutions, we are contributing to the future of food and the farmers who support the world's food.

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## Front lines of innovation



To resolve issues facing us, society requires an approach that broadens the areas of value that Kubota has ever been providing. For us to continue to offer competitive value in the future, we must deepen our understanding of the increasingly advanced, diverse problems that affect society, and create technologies and businesses to help address them.

In 2019, we launched the Innovation Center as a department to drive forward the creation of new businesses, products, and services. We aim to both plan and design businesses, products, and services unrestricted by existing product fields, as well as to promote open innovation through joint research or investment in external partners. Through such means, we are working to create new value.

# Aiming to contribute to the food value chain

Envisioning our contribution

to the food value chain

In the field of food, Kubota has mainly contributed to the resolution of problems by providing solutions that raise productivity for agricultural produce. In recent years, however, as well as looking at issues from an economic standpoint, such as through productivity improvements, wide-ranging initiatives are needed, including ones from social perspectives that concern climate

change or human rights. Our goal is to look at issues through the lens of the entire food value chain, which includes not only food production, but distribution and consumption. By doing so, we aim to create value with our stakeholders to resolve issues.



The Kubota Innovation Center Europe (ICE) was established in the suburbs of Amsterdam, in the Netherlands, a country that is a world-leader in agriculture. The center conducts joint research with universities and invests in start-ups, actively promoting co-creation with external partners.



# Open innovation making progress in one of the world's best wine-growing regions

One of the remarkable initiatives underway at ICE is its participation in the INNO'VIN cluster, which brings together more than 170 start-ups, universities, research institutions, and other organizations to drive a technological revolution in the Nouvelle-Aquitaine wine-growing region of Europe. In the field of fruit growing, while there are labor shortages, mechanization has proven difficult. The burdens on producers are large, and so a technological revolution is cried out for.

Based in Bordeaux, France, in the heart of the world's winegrowing region, we are collaborating with a wide range of companies and research organizations and carrying out verification tests and joint research to acquire knowledge and technologies that can be applied to fruit farming in every part of the world. Also, by participating in this cluster of bodies connected to producing items processed from agricultural produce-and their distributionwe hope to gain the expertise needed to contribute to the entire food value chain.

Furthermore, we are working actively toward various surveys and technology investment and to meet Europe's high levels of

# Working to realize the Long-Term Vision "GMB2030"

Since the company was founded, we at Kubota have given back to society safety of food Many of the issues facing society are becoming more complex and more Total solutions across Putting our products and technologies to use, and through further all products, Solutions to technologies and promote the services circulation o · Enhancing the productivity and safety of food water resour · Promoting the circulation of water resources and waste and waste · Improving urban and living environments

in fields that are indispensable for all human beings-food, water, and the environment. It has always been our solemn mission to support the planet and the people who live on it. diverse on a global level. That is why we must have each business field work together and cooperate with each other to create solutions as a "One Kubota" and to create new value. collaboration with a variety of external partners, we are working hard to provide solutions in three key areas:

To provide solutions in areas like these requires the development and verification of new technologies and the opening up of new business fields. That is why we decided in Mid-term Business Plan 2025 to invest a total of 400 billion yen between 2021 and 2025. Later, to strengthen and accelerate development in important fields aimed at making society carbon neutral, we added an extra 100 billion ven to this budget, bringing our total investment in R&D to 500 billion yen. By combining our more than 130 years of knowledge with the cutting-edge technologies of our partners, we will create

environmental awareness and strict environmental regulations. In the future, we plan to surround ourselves with start-ups, universities, research institutions, and other organizations that have technologies connected to green energy generation, carbon isolation, greenhouse gas emission controls and recycling, and similar, and will work together to develop new technologies.



total solutions and tackle increasingly complex social issues.

In our Long-Term Vision, we speak of the idea of a "Global Major Brand (GMB)." By this, we mean a company that can make the greatest contribution to society by earning the trust of the greatest number of customers. We will both take on the social issues currently in front of us, and create new technologies and businesses focused on society five or ten years from now. By doing so, we aim to keep creating value and to contribute toward a sustainable society

Starting Point for Value Cre

# **Special** Kubota's Goal of a Sustainable Society Feature

Under our brand statement-For Earth, For Life-we regard environmental management as a priority issue in our business activities. Therefore, to fit alongside our Long-Term Vision "GMB2030," we have formulated an environmental vision that looks to the year 2050. To make this vision a reality, we will work throughout our entire value chain to contribute toward the development of a sustainable society.

**Environmental Vision** - Target Situation toward 2050 from an Environmental Perspective

While challenging to achieve zero environmental impact, we will contribute to realizing a carbon neutral and resilient society in the fields of "food, water, and the environment."

# Realizing carbon neutrality

#### Working toward 2050

We are taking on the challenge of realizing carbon neutrality on two fronts-reducing our CO2 emissions throughout the lifecycle of our products and minimizing greenhouse gases (GHG) generated by society by creating new solutions. Aiming for net zero emissions by 2050, we started full-scale efforts in 2021.

#### In-house CO<sub>2</sub> emission control



Contribution to reducing GHG emissions in society

## CO<sub>2</sub> emissions reductions at business sites

In order to reduce the CO<sub>2</sub> emissions from our sites, particularly at our production sites, we are systematically pushing forward with the following measures.

- Measures against equipment such as improving efficiency, etc.
- Energy-saving activities such as improving productivity, reducing
- wasteful use, enhancing operations, etc. Fuel shifts such as electrification. etc.
- · Recovery and use of energy from waste heat and waste power, etc. Improvement of thermal insulation for buildings and equipment
- Incorporating energy-saving specifications when transferring or reorganizing production sites
- Introduction of solar power systems
- Purchase of green electricity

#### Switch at our Hanshin Plant from cupola furnaces to electric furnaces

Hanshin Plant which manufactures cast iron pipes for water supplies, is proceeding with its switch from its cupola furnaces, which use coke, to electric furnaces. The switch is scheduled to be completed by the end of 2023, a move that is predicted to reduce the plant's CO<sub>2</sub> emissions by 15 kilotons per annum.



## Upward revision of Long-Term **Environmental Conservation Targets 2030**

Taking on board the raising of targets by Japan and other countries, we revised the boundary and numerical targets for our CO<sub>2</sub> reductions for 2030.

Pre-revision CO2 emissions for 2030 from sites in Japan, compared to FY2014 30% reduction



# Reducing CO<sub>2</sub> emissions generated during product use

To reduce the CO<sub>2</sub> emissions generated during product use, we are promoting research and development in the following areas.

- Improvements to operational fuel consumption for agricultural and construction machinery
- Electrification of agricultural and construction machinery
- Hydrogen fuel cells and hydrogen engines
- Application of biofuels and synthetic fuels

Furthermore, the spread of smart agriculture, which uses automated operation, ICT, etc., will lead to less waste in terms of work and resources and improved energy efficiency.



The 130th anniversary concept tractor

#### Micro Hybrid Engine

Industrial engines are required to have high outputs and loads and with these hybridization is one effective means of reducing CO2 emissions. Our first step in this direction is our Micro Hybrid Engine. While it depends on the type of engine-fitted machinery, generally only a small fraction of total work time actually requires high output. With the Micro Hybrid Engine, a motor provides temporary assistance only during

those times where large output is needed. By increasing the amount of work that effectively utilizes the power of the motor, fuel consumption can be reduced. Plus, as the engine's simple design ensures it can be kept small, making it easy to fit into existing chassis, which minimizes the burden of designing chassis.





# Controlling society's greenhouse gas emissions through our business activities

Greenhouse gas (GHG) emissions from the food field, including land usage, account for 24% of total global emissions. According to the IPCC's Sixth Assessment Report, the atmospheric density of two GHGs that are more damaging than CO<sub>2</sub>-methane and nitrous oxide-is rising and therefore there is also a need to mitigate non-CO2 gases and slow global warming as soon as possible.

Agriculture is cited as an example of a major source of these, and within that it is livestock and paddies that generate most of the methane. In Japan and the rest of Asia, rice cultivation in paddy fields is commonplace and they generate a great deal of methane because the farming method disturbs methanogens (methane producing microorganisms) in the soil. Nitrous oxide, meanwhile, is generated by chemical fertilizers left in the soil.

Kubota, though, is helping to control emissions of these GHGs by utilizing smart agriculture and other farming management technologies, as well as water environment solution technologies. In the case of dealing with methane, when water is removed from paddy fields during mid-

summer drainage, adding oxygen Greenhouse gas emissions to the soil has proven effective. by economic sectors We also provide effective water management systems for cultivated land. In the future, we will create a mechanism whereby we can recover cut straw from paddy fields and produce biofuels and fertilizers. We also provide ways of tackling nitrous oxide, including precision fertilization solutions, such as the Kubota Smart Agri System (KSAS), and devices, like drones, that prevent the overuse of fertilizers or agricultural chemicals. In such ways, we are not only controlling GHG emissions, but also helping to prevent environmental pollution.





# Making society more resilient

# Solutions for sustainable agriculture

Global average temperatures are rising. In 2020, most regions of the world were warmer than long-term averages, equaling the record highs of 2016. The effects of these record-breaking temperatures can be seen in forest wildfires, droughts, and negative effects on farming and the guality of agricultural produce. In the future, the risk of such consequences is predicted to grow.

To adjust to these severe weather conditions, and minimize the amount of damage they can cause, Kubota offers smart agriculture technologies and helps to create food production systems able to withstand abnormal weather and its effects.

#### Data usage

Our agricultural management support system KSAS is at the heart of the data-driven services we offer. Our systems collate information on workloads, cultivation techniques, taste, yields and other factors; they also utilize AI technologies to analyze data points such as weather information and farming data. By doing so, our services aim to help our customers to adapt to changing weather conditions such as rising temperatures.

#### Use of automation and robots for agricultural machinerv

Utilizing agricultural machinery and drones that can operate autonomously using positioning satellites, we can improve farming efficiency dramatically. As well as helping to combat labor shortages, it also alleviates risks posed by severe weather conditions-such as the risk of heatstroke from working under the hot sun. In these ways we are contributing to making farming more sustainable



-10 -5 -3 -2 -1 -0.5 0 0.5 1 2 3 5 10 Temperature difference between 2020 and 1981-2010



Agricultural drone



continue to be supplied.

Agri Robo tractor manned specification)

# Constructing water infrastructure that can withstand disasters and creating products that can assist post-disaster recovery

Almost every year, there is some kind of large-scale flooding or damage caused by water resulting from climate change. In Japan, we also need to be ready for earthquakes, a frequent occurrence here. That is why we are focusing our energies on developing products that can help prevent disasters, or aid with recovery when they do occur.

One such product is our hazard resilient ductile iron pipe. These pipes can withstand not only earthquakes but also typhoons, heavy rain, and other adverse conditions, to ensure water can



water infrastructure

Hazard resilient ductile iron pipes supporting Highly maneuverable drainage pump vehicle



Furthermore, when heavy rainfall does cause problems, the

drainage pump vehicles or the handy mobile pump package that

we offer can make recovery possible by quickly removing water. In

addition, other items-such as our rainwater storage and

permeation products, piping systems for manhole toilets, and

diesel engines for use as generators for emergency power supply

during power outages-contribute to reduced damage during

Piping system for manhole toilets for use during disasters

# Executive officer message

# **Realizing our Environmental** Vision

Koichi Yamamoto Managing Executive Officer General Manager of Manufacturing

Engineering Headquarters

(Environmental Conservation Control Officer)

## Why we formulated the Environmental Vision

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Of late, we are seeing global-scale environmental issues, such as climate change, becoming even more urgent. With initiatives like the SDGs and the Paris Agreement that provide long-term targets for the entire world, efforts to resolve these issues are gaining pace. The Japanese government, along with those in Europe and North America, has declared its intent to achieve carbon neutrality by 2050. Another pressing issue is raising resilience against frequently occurring disasters such as weatherrelated catastrophes and earthquakes.

Therefore, the Kubota Group formulated its Environmental Vision to quantify its target situation for 2050. To bring that vision to life, we must continue to develop technologies so that we can support people's lives through products and services, and play our part in delivering reduced environmental impact and a society that is resilient and carbon neutral.



## Efforts aimed at realizing the vision

#### 1 In the agricultural field:

We aim to research, develop, and apply agricultural machinery fitted with power trains such as engines that consume less fuel, or decarbonization technologies such as electric motors, fuel cells, and hydrogen engines.

We are also working to further advance smart agriculture, which not only reduces agricultural workloads, but also expands harvest yields per area and improves the quality of crops. The aim is to raise yields without increasing the amount of cultivated land even if demand for food rises, as we believe that deforestation or natural damage incurred in expanding agricultural land is a serious problem. Furthermore, we strive to minimize greenhouse gas emissions produced on cultivated land by improving how water is managed on paddy fields and bettering how agricultural chemicals and fertilizer are distributed.

As an industry, agriculture is particularly susceptible to the physical effects of climate change. Drought, high temperatures, flooding, cold snaps-these and other examples of abnormal weather seen in recent years largely determine harvest yields. Even so, Kubota's farming management technologies-first and foremost in smart agriculture-support farm workers and will raise resilience toward climate change.

#### 2 In the water infrastructure field:

We provide, among other things: hazard resilient, long-lasting cast iron pipes for water supplies; drainage pumps that minimize water flood damage during heavy rain; energy- and space-saving water-processing facilities; and solutions that enable operation of these items to be managed efficiently. By applying technologies that recover resources or energy from sewage or waste, we are taking on a challenge with three goals: decarbonization, greater resilience against natural disasters, and the achievement of a circular economy.

#### 3 In the field of living environments:

We are contributing to future urban development by providing such advances as low-noise-output construction machinery with minimal turning circles, highly efficient air conditioners for zero net energy buildings (ZEB), and steel pipe piles that can help reduce construction times.

#### 4 In manufacturing:

Even in our manufacturing, we are making progress with decarbonization, to the point where we have revised our 2030 target for CO<sub>2</sub> emissions in Scopes 1 and 2 to a 50% reduction from 2014 levels. We have also expanded the boundary of our target from purely sites in Japan to all sites worldwide, making this a Group-wide initiative.

We firmly believe that our initiatives to realize our Environmental Vision will lead to the resolution of social issues and a more sustainable world. By making full use of the technologies in our possession, we will continue to move forward-never backwardthroughout our business' entire value chain.

# The Kubota Group in Numbers

The global scale of the Kubota Group's development is the very footprint that Kubota has built over its history. The products developed, manufactured and sold by our global bases are in active use in countries and regions across the world.



Total tractor production volume More than 5.1 million units worldwide (cumulative)

Kubota tractors are used in agricultural settings throughout the world, where they contribute to food production

Share of Thailand Tractor Market / Share of Asian Combine Harvester Market

No.1

Refined on the front lines of Japanese rice cultivation, Kubota agricultural machinery has an excellent reputation in Asia's leading rice producing countries



Total engine production volume More than **30** million

units worldwide (cumulative) Kubota engines support global industry

with characteristic high-efficiency, energy- and labor-saving performanc





Kubota produces an abundant lineup of engines to meet every kind of customer need.





Kubota has made engines that meet emissions regulations in countries around the world, including the most stringent-Europe's Stage V regulations. We support local industry while considering the environment

Sales Volume of Mini Excavators Global No.1

for 20 consecutive years

Kubota pioneered the mini excavator, and has been quick to expand into overseas markets. These machines have earned high praise on building sites around the world. \* Since 2002, from "Off-highway research 2021."

Submerged membrane unit deliveries More than



Kubota's submerged membrane unitswhich decontaminate sewage and industrial wastewater-help solve wastewater treatment issues worldwide





198

140

43,293

120+ countries

Group Companies

Group Employees

396

12 companies

Group companies

Overseas group companies

Consolidated employees

Business footprint

Global Supply Record of Ductile Iron Pipes Over

70 countries

Kubota water pipes are world renowned for durability and performance. They are currently used in the water infrastructure of over 70 countries.



(As of December 31, 2021)

Adoption Rate of Kubota Facilities for High-purity Water Treatment Facilities in Japan

Approximately more than



Based on activated charcoal-treated wat volume

Products supported by Kubota's advanced water treatment technologi are used in many water purification facilities in Japan.

