

## Environmental Vision

In a situation with an increased uncertainty about the future due to social problems in a global scale, such as food issues and global warming, long-term, world-common goals have been set such as SDGs, the Paris Agreement, and others. For the climate change problem, the shift to a “decarbonized” society has been accelerated, with each country declaring substantially zero emissions of CO<sub>2</sub> and carbon neutrality. Also, the move from the conventional economy that has led to mass production, mass consumption, and mass waste disposal toward a circular economy has progressed, which aims for an economy with minimized waste generation by preserving and maintaining the values of products and resources as long as possible.

With “For Earth, For Life” as its concept for environmental management, the Kubota Group aims to contribute to the realization of a sustainable society, regarding environmental conservation, including climate change countermeasures, as a priority issue in its corporate activities. The Kubota Group formulated its “Environmental Vision,” which, together with our Long-term Vision “GMB2030,” shows the direction of our business activities toward 2050 from an environmental perspective and will promote initiatives to realize this vision.

### 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.”**

### Toward the Realization of the Environmental Vision

#### Challenge to Achieve Zero Environmental Impact

Procuring raw materials and components, and processing them into products, our company provides our customers with its various products. In this process, and in the use of the products by customers, a large volume of resources, including energy, is consumed. To continue our business globally, we need to use limited resources in an efficient and sustainable way.

Toward the realization of zero environmental impact, we will promote the reduction of greenhouse gas emissions in our business activities, a thorough reduction of waste or loss of energy based on the Kubota Production System (KPS), the expansion of the recovery and reuse of waste energy and of the use of renewable energy, water-saving in areas under high water stress, and maximizing the utilization efficiency of resources in the product lifecycle. In addition, we will develop our efforts toward zero environmental impact in our entire business value chain.

However, it is not easy to achieve zero environmental impact. To steadily approach zero environmental impact, we will systematically promote the reduction of greenhouse gases, implementation of energy-saving, reduction of waste, water-saving, and reduction of Volatile Organic Compounds (VOCs). We will also take up a challenge of sustainable business activities that can maintain the Earth’s self-purification capability and carrying capacity.

#### Toward the Realization of a Carbon Neutral and Resilient Society

In addition to the mitigation of climate change (controlling greenhouse gas emissions), Kubota also engages in environmental conservation activities and provides environmentally-friendly products and solutions to adapt to the effects of climate change (avoiding or minimizing damage brought about by climate change) and to address water and waste issues. In these ways, we are contributing to the realization of a sustainable, especially carbon neutral and resilient society.

Greenhouse gas emissions from the food sector, including land use in the agricultural field, are said to account for about 24% of the world’s total emissions. It is believed that without efficient food production, greenhouse gas emissions will increase. Also, climate change influences the reduction and relocation of arable land and agricultural style. With a decrease in the number of workers under the influence of urbanization in rural districts, efficient food production in limited cultivation areas will be sought in the future.

In the “food” sector, which is one of our business areas, we believe that our company can contribute to the reduction of greenhouse gas emissions and efficient food production in the agricultural field by further evolving smart agriculture, the automatic operation of farm machinery, and agricultural solutions. By increasing the productivity of agriculture we will help reduce greenhouse gas emissions in the agricultural sector by improving the efficiency of agriculture, reducing the energy used in food production, and curbing deforestation intended to expand agricultural land.

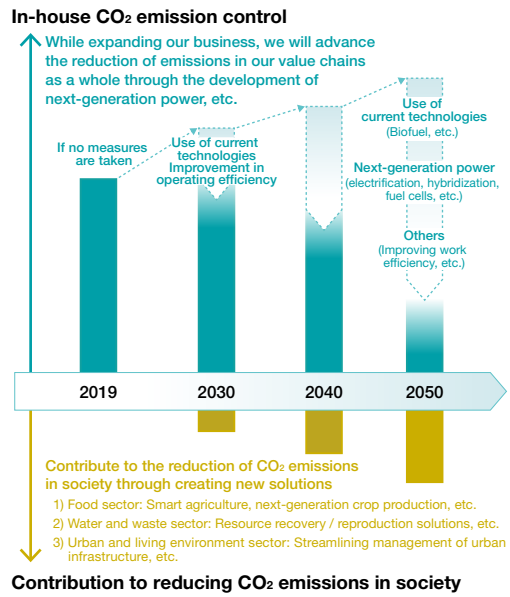
Under the influence of climate change, the frequent occurrence and intensified damage of weather disasters have become remarkable. In addition, with available water resources unevenly distributed depending on the regions, the population who cannot access safe water has risen to 1.6 billion people. Even if we succeed in controlling the global rise of temperature due to climate change to less than 2°C, the population who has to face water shortages is expected to increase. Also, population increase and improved living standards are assumed to further aggravate the resource and waste problems and agricultural water shortages due to mass production, mass consumption, and mass waste disposal.

In the “water and the environmental” fields, we will provide products, services, and solutions, such as products to contribute to disaster prevention and disaster recovery, and efficient water monitoring and management systems that utilize AI / IoT, which are designed to avoid and mitigate damage due to the influences of climate change, including frequent occurrence of climate disasters, changes in agricultural styles, and increase in the frequency of work-related heatstroke. We will further expand our products, services, and solutions intended to realize advanced recycling of water resources and waste and control water pollution and air pollution, contributing to natural disaster-resistant community-building and the realization of a resilient society.

**Taking on the Challenge of Carbon Neutrality**

Based on the situation of CO<sub>2</sub> emissions in the product life cycle as a whole, we believe that it is important to tackle reducing CO<sub>2</sub> emissions when manufacturing and using products.

Toward the realization of a carbon neutral society, we will promote reduction of greenhouse gas emissions and energy-saving, improvement of fuel consumption of products, motorized products, and reduction of CO<sub>2</sub> emissions in the products' life cycles as a whole. At the same time, through the provision of products and solutions, we will help reduce CO<sub>2</sub> emissions generated from social activities and join forces to take on the challenge of realizing substantially zero CO<sub>2</sub> emissions by the year 2050.



**Kubota's Initiatives**

Future projections for population increase and economic development represent a significant opportunity for our business. However, if the world continues with the same kinds of economic activities as now, they could place a burden on the Earth that exceeds its capability for self-purification and its carrying capacity. This is a risk for the continuity of business activities. We will contribute to the realization of a sustainable society through our business activities and the provision of products and service solutions.

**In-house CO<sub>2</sub> Emission Control**

**Reducing Scope 1 and 2\*1 Emissions**

The Kubota Group is continuing to implement energy-saving countermeasures and productivity improvement activities to reduce CO<sub>2</sub> emissions from its own sites, with a focus on production sites. While we continue to focus on these efforts, going forward we will proceed with changes to fuels that have low CO<sub>2</sub> emissions, such as discontinuing the use of coking coal in the melting process at our casting plants and switching to electric furnaces. In addition, we will expand our use of renewable energy by installing solar power generation systems and purchasing green power and so forth. At the same time, as we reorganize and transfer our production sites, we will adopt production methods that have a low environmental impact and make other efforts to save energy and resources through production innovation. We will also explore ways of reducing logistics-related CO<sub>2</sub> emissions, such as shortening product transportation distances by reorganizing production sites and promoting the shift to new modes of transportation.



Solar power generation system installed on the rooftop of a plant in China



Full-scale model of the 130th anniversary concept tractor

**Controlling Scope 3\*2 Emissions**

Over 80% of the Kubota Group's Scope 3 emissions are generated during the use of sold products. Therefore, our efforts to develop products that can perform more work more precisely using less energy by improving the operational fuel consumption of our agricultural and construction machinery tie-in directly to emissions reductions.

Moreover, through the robotization of agricultural machinery and the use of ICT, we are promoting smart agriculture. This is not only saving labor in agricultural operations; it is also contributing to energy- and resource-saving. Currently, fossil fuels such as diesel and gasoline are the main sources of energy, but we are striving to utilize fuels that have lower CO<sub>2</sub> emissions, such as biofuels (e-fuel) and synthetic fuels. Going forward, we will actively pursue R&D aimed at the decarbonization of motive power, such as electrification, hybrid systems, and fuel cells.



Electric construction machinery and tractor

\*1 Scope 1: Direct emissions by the Company itself

Scope 2: Indirect emissions from purchased electricity, etc.

\*2 Scope 3: Other indirect emissions (Emissions by others or at customers' sites related to the Company's activities)

## Contribution to CO<sub>2</sub> Reduction in Society and the Realization of a Resilient Society

### Environmental Contribution in the Field of Food

In the field of food, including agriculture, the Kubota Group is working to increase harvest yields per area and the quality of crops by further promoting smart agriculture. The goal is to increase crop yields to meet rising food demand without increasing cultivated area. On the environmental front we will help to save energy and resources by improving operational efficiency, while controlling deforestation and environmental destruction for the expansion of farming land, and so forth.

In addition, we are investing in a start-up that operates artificially lighted plant factories with the goal of increasing the efficiency of food production through next-generation crop production. Because such facilities make plant cultivation possible in urban areas close to where many consumers live, they are expected to help reduce logistics-related energy consumption by means of shorter transportation distances and contribute to the reduction of food loss by means of demand-based production planning.

In other initiatives, we provide the WATARAS farm water management system, which allows users to remotely and automatically control water flowing in and out of rice paddies while monitoring the water level of the paddies themselves. We are conducting trials of a "smart rice paddy dam" that temporarily retains rainwater in a rice paddy by enabling users to remotely increase the water level setting for draining water from the rice paddy when there is a danger of river flooding due to heavy rain. This is expected to serve as a way of preventing flooding and increasing the resilience of local areas to water damage.

For the future, we are looking at building a food value chain data linking platform from crop production, food distribution to consumption and supplying an automatic management system that uses AI. This would show a visual representation of demand trends, promoting a shift to "market-in" agriculture where production and sales are conducted in response to demand. At the same time, it would deliver safe, secure crops with a high level of freshness to consumers, thereby helping to reduce food losses.

### Environmental Contribution in the Field of Water and Waste

The Kubota Group supports water infrastructure as a comprehensive manufacturer of water-related items from pipe materials used for water supply and sewage to engineering of water treatment plants. We use these technologies to provide resource recovery solutions, such as fermenting sewage sludge generated in sewage treatment plants and waste such as food residue generated by agriculture and food plants to extract biogas for reuse as an energy resource, generating electricity using the recovered biogas. We also contribute to the building of a circular economy by providing equipment for crushing and sorting to recover resources such as metal and plastics from waste products in a process known as urban mining.

### Environmental Contribution in the Field of Urban and Living Environments

The Kubota Group is saving energy and improving operational efficiency on construction sites by leveraging our strengths in the water environment infrastructure business and construction machinery business. One way we do this is by supplying a smart water pipe installation system, that conducts optimal installation based on pipeline information.

In the area of construction machinery, we use a fault diagnosis app to reduce downtime of machinery that has a fault, helping to increase the efficiency of maintenance work.

Going forward, we will look at building a platform that aggregates underground pipe data to help in reducing construction time and labor for urban construction projects and so forth and providing a solution for extending the life and renewing underground infrastructure. These initiatives will also help to save energy in the construction field.

We will enhance the disaster resilience of urban infrastructure such as water supply and sewage systems by upgrading water supply and sewage facilities and river flooding monitoring and management platforms using plant information and sensors. Moreover, by appropriately operating these plants and facilities under optimal conditions, we will also contribute to energy saving.



Tractors hard at work in global markets



Control screen of Kubota Smart Agri System



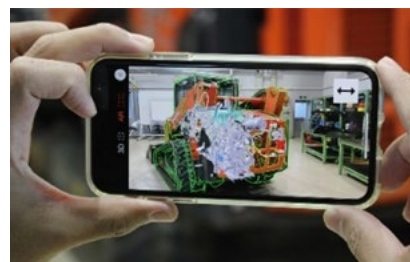
Artificial light plant factory



Farm Water Management System WATARAS

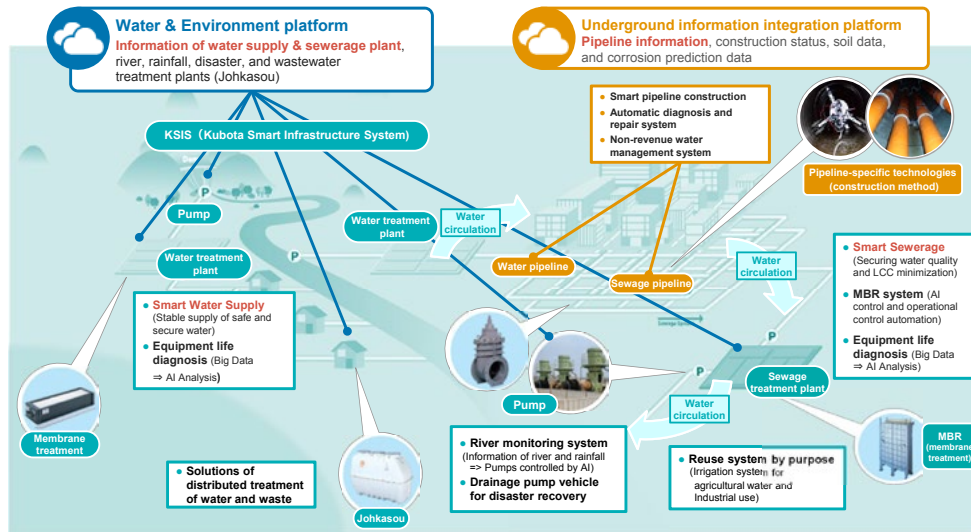


Plastic crushing and sorting facility



Construction machinery fault diagnosis app





## Background in establishing the Environmental Vision

### World Around Kubota's Business in 2050

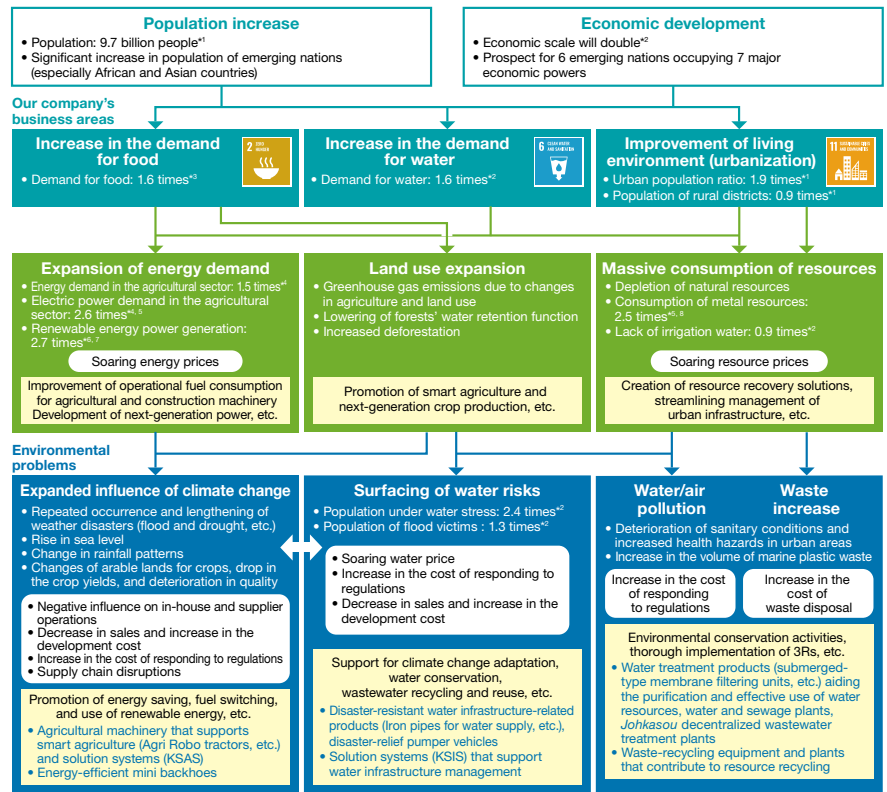
Based on the scenarios of the Intergovernmental Panel on Climate Change (IPCC) and the World Resources Institute (WRI), we analyzed a social image in 2050 when the temperature rises by 2°C and 4°C. Global environmental problems, including climate change and water risks, may not only have negative effects on our company's operation in the future, such as soaring energy and water prices and frequent occurrence of natural disasters, but also further aggravate social problems in the "food, water and the environment" fields, which are part of our company's business areas. Also, the delayed responses to these environmental problems may pose a risk to our company's business activities. To continue our global business, we believe it is essential to strike a balance between business development that can contribute to solving social problems toward the achievement of SDGs and ESG management that includes responses to the environmental problems.

#### World in 2050

The world population is expected to approach 10 billion people by 2050, mainly in emerging countries such as Africa and Asia, and the food demand along with the population increase is also expected to increase about 1.6 times. Also, economic development can enhance the need to improve people's living environment, and can result in an increase in global demand for energy and consumption of many resources. The same will be applied to water demand. Water demand will increase, especially in the manufacturing industry and for the use for power generation and for domestic use, and is expected to be about 1.6 times the current demand by 2050.

Increase in food demand and water demand, expansion of energy demand due to urbanization, etc., and cultivation of new land for food production may aggravate the climate change problem. Climate change can have a huge negative impact on people's lives. If rainfall patterns are altered, conventional crop production may become impossible as arid or high-precipitation belts shift geographically. Weather anomalies may also cause populations to be affected by more frequent flooding and other water damage.

If we continue our current economic activities and social activities without efficiently utilizing our limited resources, such as energy, people's current lifestyles themselves may no longer be feasible.



Major risks of impacts on our company

Examples of our company's initiatives  
Examples of Kubota products that help solve social issues

\*1 "World Urbanization Prospects 2018" (United Nations)  
\*2 "Environmental Outlook to 2050" (OECD)  
\*3 "CREATING A SUSTAINABLE FOOD FUTURE" (WRI)  
\*4 "Energy Technology Perspectives 2017" (IEA)

\*5 Forecast around 2060  
\*6 "World Energy Outlook 2018" (IEA)  
\*7 Forecast around 2040  
\*8 "Global Material Resources Outlook to 2060" (OECD)

### ► A World Where Temperature Rise Is Less Than 2°C

We believe that to achieve the goals stipulated in the Paris Agreement, each country will accelerate their moves for energy-saving and the reduction of CO<sub>2</sub> emissions, and strengthen related laws and regulations, which should result in a growing concern about climate change among markets and customers. This is why we have assumed that the needs for energy-saving, decarbonization, and electrification will be enhanced.

For example, tractors, combine harvesters, rice-transplanters, construction machinery, and diesel engines, which are our company's major products, are under application of the exhaust gas regulations of Japan, European countries, and the U.S., etc. Our diesel engines are also used for construction machinery, which plays an active role in the development of urban areas. In the future, since regulations for each country's engines may be tightened, we believe that we need to invest in the development of diesel engines that conform to new exhaust gas regulations. Also, if each country's efforts toward the mitigation of climate change are advanced, while the ratio of fossil-fuel power generation decreases due to strengthened carbon taxes, energy prices are expected to soar with an increase in the ratio of renewable energy power generation.

As calls for the environmentally sound performance of products grow around the world in connection with climate change, the needs for high-energy-efficiency products and solutions that enable the same effects should be enhanced also in the fields related to water treatment as well as the agricultural machinery and construction machinery that Kubota offers. In our business activities, we also believe that with a risk of increase in the energy procurement cost, energy-saving and expansion of the use of renewable energy will become important issues.

### ► A World Where the Temperature Has Risen by 4°C

If the world's average temperature rises by 4°C, with the changes in the rainfall and climate patterns, weather disasters are expected to further increase, such as with the typhoons and torrential rains that have been observed around the world recently. Depending on the areas, it may be difficult for people to access the safe water required for business activities and livelihood due to drought. These weather disasters may cause a suspension of business activities, affect agricultural produce, and increase damage on the basic needs of people's livelihood such as water infrastructure.

For instance, in coastal regions and rainy regions, heavy rain or flooding may cause inundation of plants, blackouts, logistic suspension, and delayed shipping. Also, with increased frequency and length of these weather disasters, there are concerns over further expansion of damage. Even in the production of farm products, climate change is expected to have negative influences such as causing changes of arable land and a reduction in the amount of harvested crops, and may further affect the sales of agricultural machinery. Climate change may cause the occurrence of drought, which may cause the occurrence of risks for business activities, such as water shortages and restrictions on the amount of water in the relevant regions.

While climate change is expected to affect the changes of arable land and crop production, we believe that the necessity of agricultural solutions for continuing farming even under a range of climate conditions, and of smart agriculture capable of realizing efficient production in limited land, will increase. Likewise, we believe that contributing to the building of a natural disaster-ready city that can maintain people's living environment even after the occurrence of a natural disaster will be our important task.

The above statements are the outline of the results of scenario analysis based on the proposals of TCFD for the examination of the Kubota Group's Environmental Vision. The world in 2050 may be different from each scenario. We will continue to improve our information disclosure based on the proposals of TCFD.

## Expected Image of Society

As people's lives become more and more enriched, new environmental problems to be solved will occur in the future. However, we do not wish to have a new society at the price of the global environment. As a result of analyzing a future society image based on the impact of climate change, the Kubota Group believes that what society expects for us in order to make the world sustainable in or after 2050 is as follows:

- ◇ Realization of carbon neutral society aimed at mitigating climate change by curbing greenhouse gas emissions from the agricultural sector
- ◇ Realization of resilient society capable of adapting to climate change, such as by preparing for natural disasters and dealing with water / air pollution and waste issues