

# Expanding Environment-friendly Products and Services

The Kubota Group is contributing to protecting the global environment and solving social issues in the food, water and living environment fields through the provision of environment-friendly products and services. The Group conducts environmental assessment of products in the design and development stages, and promotes environment-friendliness over the entire product life cycle, from the procurement of raw materials to the disposal of products. The Group internally certifies exceptionally environment-friendly products as Eco-Products, and is working to expand its lineup of certified products.

## Environmental Considerations in the Product Life Cycle

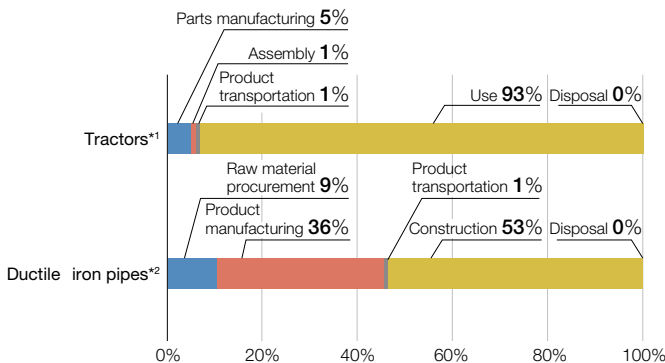
### Major Initiatives to Ensure Environment-friendliness



### Analysis of Greenhouse Gas Emissions Volume in the Product Life Cycle

The Kubota Group handles a diverse range of products, from agricultural and construction machinery to pipe systems and water treatment equipment. As part of its product environmental assessment, the Group conducts life cycle assessment (LCA) for its major products to determine the amount of greenhouse gas emissions over each product life cycle. The results of the LCA were subject to third-party review in 2014 by the Japan Environmental Management Association for Industry.

#### Results of LCA: Proportions of Greenhouse Gases



<sup>\*1</sup> LCA results for tractors were calculated based on the assumption of towing and transporting work for 5,000 hours by the M9540DTHQ-EC agricultural tractor in France.

<sup>\*2</sup> LCA results for ductile iron pipes were calculated based on the data reported in the "Study on Piping Technologies for Sustainable Water Supply Service" (Japan Water Research Center). The proportions of raw material procurement, manufacturing, and product transportation were determined according to Kubota's CO<sub>2</sub> emissions data.

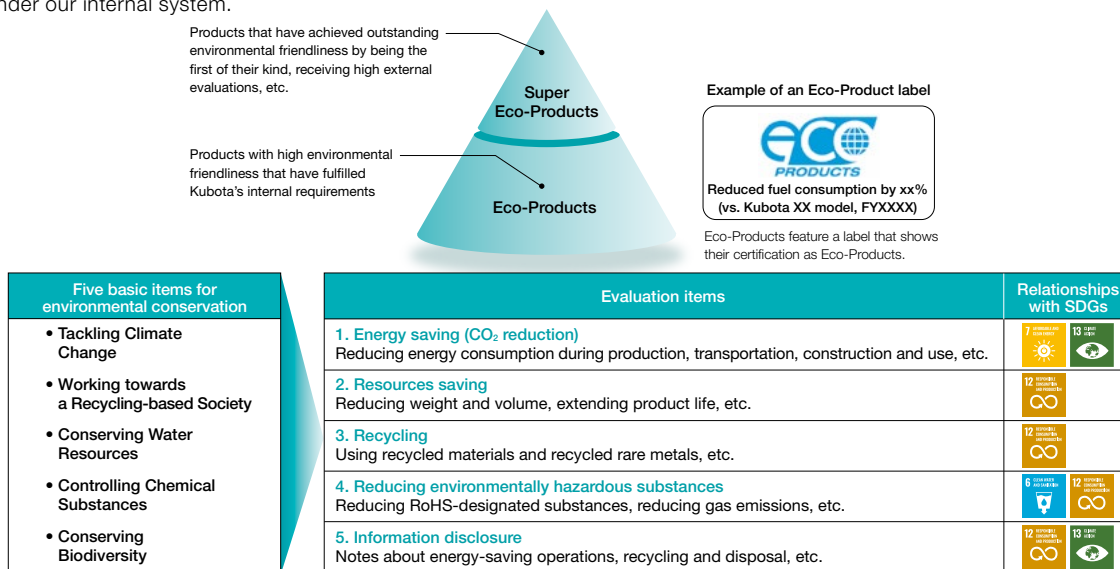
Greenhouse gases emitted in the use stage account for around 90% in the life cycle of agricultural tractors, while gases emitted in the manufacturing and construction stage account for around 90% in ductile iron pipes. Thus, the frequency and scale of environmental loads in the life cycle vary depending on the product type. The Kubota Group enhances its environment-friendly products and services by reflecting the results of the analysis of environmental loads in the product life cycle in its environment-friendly design development.

## Internal Certification System for Eco-Products

### Regarding the Internal Certification System for Eco-Products

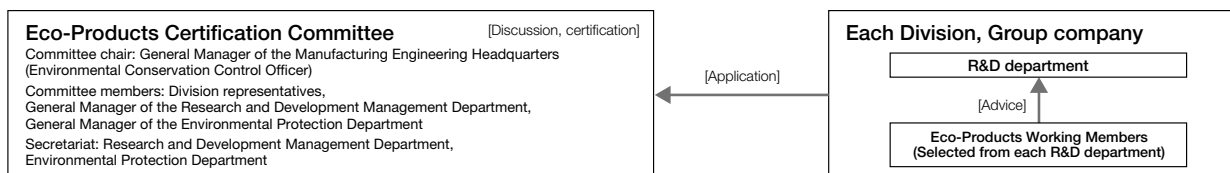
The Kubota Group's internal certification system for Eco-Products was introduced to internally certify products with exceptional environmental friendliness. We evaluate products in accordance with matters related to the five basic items for environmental conservation in the Kubota Group's environmental management, namely, "Tackling Climate Change," "Working towards a Recycling-based Society," "Conserving Water Resources," "Controlling Chemical Substances," and "Conserving Biodiversity," and certify those products that satisfy our internal standards as Eco-Products.

We have also received third-party assurance for our "Sales Ratio of Eco-Products," which is the ratio of sales generated by Eco-Products certified under our internal system.



### Eco-Products Certification Committee

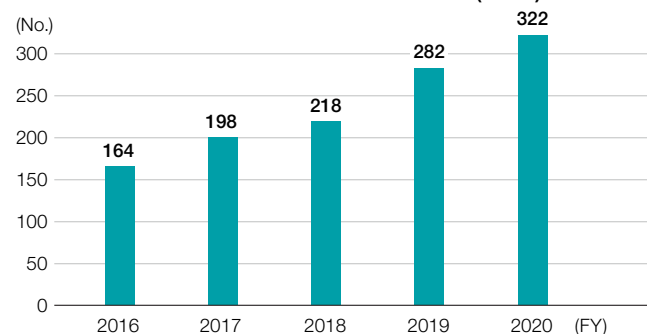
The Eco-Products Certification Committee, chaired by the General Manager of the Manufacturing Engineering Headquarters, consists of the committee members elected from each Division, as well as the Research and Development Management Department and the Environmental Protection Department. Upon receiving an application from each Division for the certification of a product, the Committee examines the product's adequacy as an Eco-Product and gives certification.



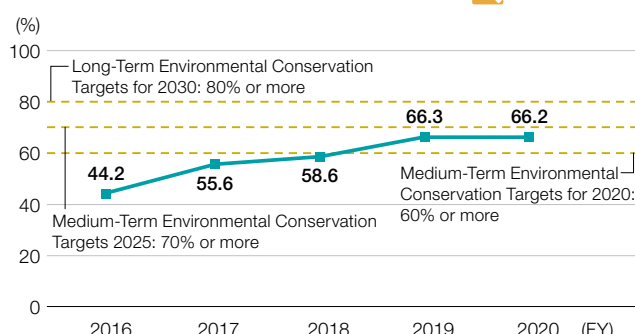
### The Pathway to Expanding Certified Eco-Products

Based on our internal certification system established for Eco-Products, the Kubota Group certified an additional 40 products in FY2020, including 2 Super Eco-Products, bringing the total number of certified Eco-Products to 322. The sales ratio of Eco-Products grew to 66.2% versus a target of 60%, achieving the Medium-Term Environmental Conservation Targets for 2020. Going forward, we will work towards achieving a sales ratio of Eco-products of 70% under Medium-Term Environmental Conservation Targets for 2025. We will expand our Eco-Products lineup by continuing to promote the development of environment-friendly products demanded by our customers and society, including products that are energy-saving, lightweight, miniaturized, long-lived, easy maintenance, and compliant with environmental regulations.

Trends in No. of Eco-Product Certifications (Total)

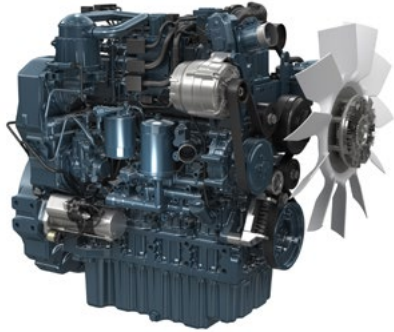


Trends in Sales Ratio of Eco-Products\*



\* The sales ratio of products that have fulfilled the internal requirements in our own Eco-Products Certification System  
 Sales ratio of Eco-Products (%) = Sales of Eco-Products / Sales of products (excluding construction work, services, software, parts and accessories) × 100

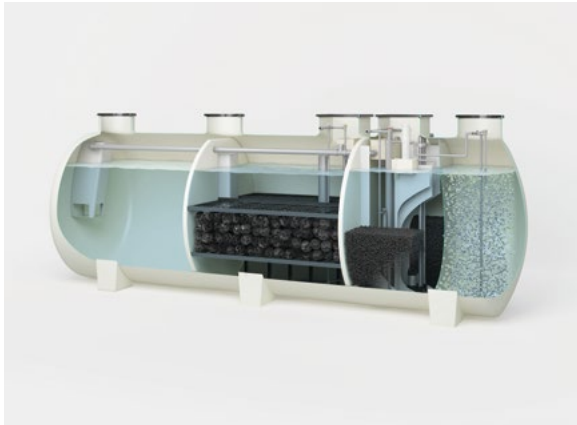
## Products Certified as Super Eco-Products in FY2020



### Diesel engine 09-E5 series V5009-TIE5-BB (Europe, North America)

This diesel engine was awarded “Diesel of the Year 2019\*” for contributing to resource conservation through achieving a more compact size (output power density) while meeting the world’s latest emissions standards (Tier 4, Stage V) and for being a product that can be used in a wide range of applications.

\* Held by the Italian industry journal Diesel International



### Large-size *Johkasou*, decentralized wastewater treatment plant KTZ type

This product received the Chairman’s Award of the Japan Society of Industrial Machinery Manufacturers for achieving a more compact size while boosting processing capacity per unit volume, and contributing to the conservation of resources and energy saving at each stage in its life cycle.

**Products Certified as Eco-Products in FY2020 (excerpt)**



Tractor  
M7003 series  
M7153 (Europe)

**[Key certification point]**  
Compliant with exhaust  
gas regulations



Garden tractor  
G series  
G261 (Europe)

**[Key certification point]**  
Compliant with exhaust  
gas regulations



Tractor  
Agri Robo tractor  
MR1000A (driverless specification)

**[Key certification point]**  
Compliant with exhaust  
gas regulations



Combine harvester  
DC series  
DC-93 (ASEAN)

**[Key certification point]**  
Conserving resources



Ride-on rice transplanter  
NAWIWEL special class  
NW10S

**[Key certification point]**  
Compliant with exhaust  
gas regulations



Construction  
machinery  
Excavator  
KX080-4s2 (North America)

**[Key certification point]**  
Compliant with exhaust  
gas regulations




Construction machinery  
Wheel loader  
R090 (Europe)

**[Key certification point]**  
Compliant with exhaust  
gas regulations



Earthquake-resistant ductile iron pipe  
Nominal diameter 1500 – 2600  
US type (R type)

**[Key certification point]**  
Conserving resources/  
Recycling

 Click here for details on products certified as Eco-Products.  
[www.kubota.com/sustainability/environment/ecopro/](http://www.kubota.com/sustainability/environment/ecopro/)

## Major Initiatives to Ensure Environment-friendliness by Product Group

C	Tackling Climate Change
R	Working towards a Recycling-based Society
W	Conserving Water Resources
Ch	Controlling Chemical Substances
B	Conserving Biodiversity, etc.

### Farm & Industrial Machinery

Product group	Major initiatives to ensure environment-friendliness	Life cycle				
		Procurement production	Distribution	Construction	Use	Disposal
Tractor	Reducing the number of parts	R				
	Reducing environmentally hazardous substances contained in paint	Ch				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing fuel consumption by introducing an energy-saving mode				C	
	Conforming to exhaust gas regulations				Ch	
	Reducing noise, vibration				B	
	Indicating parts materials, providing information on points to be noted for disposal					R
Rice transplanter	Reducing environmentally hazardous substances contained in paint	Ch				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing fuel consumption by introducing an energy-saving mode or a multiple-function capacity to simultaneously perform five farming operations				C	
	Reducing seedling cultivation-related materials by sparse planting or dense-sown seedling transplantation, and a straight-line maintenance function				R	
	Conforming to exhaust gas regulations				Ch	
	Indicating parts materials, providing information on points to be noted for disposal					R
Combine harvesters	Reducing the number of parts and weight	R				
	Reducing environmentally hazardous substances contained in paint	Ch				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing fuel consumption by introducing an energy-saving mode				C	
	Reducing fuel consumption with improved reaping accuracy by horizontal control of the vehicle body				C	
	Conforming to exhaust gas regulations				Ch	
	Reducing noise, vibration				B	
KSAS (Kubota Smart Agri System)	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing fuel consumption per unit yield of agricultural machinery by improving farm work efficiency and increasing yield				C	
	Proper fertilizer application to prevent excessive fertilizers from flowing downstream				W	
	Facilitating self-maintenance and reducing mechanical problems by monitoring the operation status of agricultural machinery				R	
	Reducing environmentally hazardous substances contained in paint	Ch				
Cultivators	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing CO <sub>2</sub> emissions by electrification				C	
	Achieving zero CO <sub>2</sub> emissions by electrification				Ch	
	Conforming to exhaust gas regulations				Ch	
	Reducing noise, vibration				B	
	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing environmentally hazardous substances contained in paint	Ch				
Riding mowers	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing fuel consumption by introducing a unique mowing method to alleviate power load				C	
	Conforming to exhaust gas regulations				Ch	
	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
Utility vehicles	Conforming to exhaust gas regulations				Ch	
	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing RoHS-designated substances					Ch
	Reducing the number of parts and weight		C			
Agriculture-related products (color sorter, rice-milling machine, etc.)	Reducing air consumption necessary for sorting of defective rice by improving the air injection accuracy of color sorters				C	
	Reducing power consumption of electronic circuits				C	
	Reducing power consumption of improved thermal insulation efficiency of low-temperature brown rice storage containers				C	
	Reducing electric power consumption during waiting time for fruit selector measurement				C	
	Reducing the noise of rice-milling machines				B	
	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing RoHS-designated substances					Ch
	Reducing fuel consumption by improving combustion efficiency and reducing losses				C	
Engines	Accepting bio diesel/gasoline				C	
	Conforming to exhaust gas regulations				Ch	
	Reducing noise, vibration				B	
	Reducing RoHS-designated substances					Ch
	Reducing environmentally hazardous substances contained in paint	Ch				
Construction machinery	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing fuel consumption by introducing an energy-saving mode				C	
	Conforming to exhaust gas regulations				Ch	
	Reducing noise, vibration				B	
	Indicating parts materials, providing information on points to be noted for disposal					R
	Reducing RoHS-designated substances					Ch
Precision machinery (Measuring instruments)	Reducing the number of parts and weight	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing power consumption of electronic circuits				C	
	Reducing electric power consumption of peripheral equipment during waiting time for truck scale measurement				C	
	Reducing the number of waste batteries by introducing energy-saving measuring instruments					R
Air-conditioning equipment	Reducing RoHS-designated substances					Ch
	Using recycled resin	R				
	Reducing power consumption by installing a heat pump and a highly efficient motor				C	
	Easier maintenance by reducing the number of parts and adopting designs that are easy to disassemble				R	
Air-conditioning equipment	Providing information on points to be noted for disposal					R
	Reducing RoHS-designated substances					Ch

C	Tackling Climate Change
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## Water &amp; Environment

Product group	Major initiatives to ensure environment-friendliness	Life cycle				
		Procurement production	Distribution	Construction	Use	Disposal
Ductile iron pipes	Reducing weight by thinning pipes or changing the structure of couplings	R				
	Reducing VOC by changing the paint for the inner surface	Ch				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing the width of the excavation groove by reducing the insertion force at the time of jointing couplings to decrease the number of items necessary for jointing			C		
	Reducing polyethylene sleeves by improving anti-corrosion performance			R		
	Improving maintenance performance by introducing a coupling structure with reduced insertion force or reducing the number of parts				R	
	Extending product life by improving anti-corrosion performance and introducing earthquake-resistant couplings				R	
Plastic pipes	Reducing chemical substances specified under the technical standards based on the Water Supply Act	Ch				
	Reducing power consumption when joining pipes by a fusing process			C		
	Indicating parts materials, providing information on points to be noted for disposal					R
Valves	Reducing RoHS-designated substances					Ch
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing the width of excavation grooves by reducing the insertion force at the time of jointing couplings to decrease the number of items necessary for jointing			C		
	Reducing polyethylene sleeves by improving anti-corrosion performance			R		
	Extending product life by improving anti-corrosion performance				R	
Pumps	Reducing the cut amount during processing by introducing compact casings	C				
	Reducing the weight and volume by introducing compact and thinner casings	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing power consumption by improving pump efficiency				C	
	Reducing RoHS-designated substances					Ch
Businesses related to water purification, sewage and wastewater treatment (Condensation, dehydration, agitator, etc.)	Reducing weight and the number of parts by eliminating frames or introducing multi-function parts	R				
	Reducing the power consumption of dehydrators by downsizing hydraulic units, etc.				C	
	Reducing the power consumption by introducing agitating blades capable of efficient agitation with low power				C	
	Reducing the power consumption of fans by introducing a low-pressure membrane-type air diffuser				C	
KSYS	Reducing dehydrated sludge volume				R	
	Saving energy by the efficient operation of equipment through remote monitoring/diagnosis using IoT				C	
	Extending equipment life by failure diagnosis using AI				R	
Submerged membranes	Reducing water consumption through field water management systems				W	
	Reducing weight and volume by reducing the weight per unit membrane area or the membrane filling rate	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
	Reducing power consumption per unit processing quantity by improving the membrane filtration performance and expanding the membrane-carrying area				C	
	Collecting/recycling of used membrane cartridges					R
Membrane-type methane fermentation units	Reducing RoHS-designated substances					Ch
	Generating biogases by the methane fermentation of food waste and palm oil mill effluent				C	
Decentralized wastewater treatment plant (Johkasou)	Reducing the volume of food waste				R	
	Using recycled resin	R				
	Reducing the weight and volume of <i>Johkasou</i> by improving the processing capacity per unit volume	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
Steel pipes	Reducing the amount of excavated soil at the time of burying by reducing volume			C		
	Reducing RoHS-designated substances					Ch
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
Ethylene thermal cracking pipes	Reducing energy during construction by mechanical couplings			C		
	Reducing RoHS-designated substances					Ch
	Reducing the use of rare metals, using recycled rare metals	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
Rolls	Reducing fuel consumption necessary for decoking (maintenance) by changing the internal structure of pipes				C	
	Reducing RoHS-designated substances					Ch
	Using recycled rare metals	R				
	Reducing fuel consumption by improving loading efficiency in product transportation		C			
Rolls	Extending product life by improving the roll surface strength				R	
	Reducing RoHS-designated substances					Ch

**Introduction of Examples of Initiatives to Ensure Environment-friendliness**

**Mini cultivator**

**Environmental performance through electrification**

- Zero exhaust emissions
- Reduced CO<sub>2</sub> emissions
- Reduced noise



[www.kubota.com/sustainability/environment/ecopro/data/Mini\\_Cultivator.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/Mini_Cultivator.pdf)

**Riding diesel mower**

**Environmental performance through operational improvement**

- Using a proprietary cutting method that reduces the load on the motor achieves a reduction in fuel consumption during operation.



[www.kubota.com/sustainability/environment/ecopro/data/Zero\\_Turn\\_Mower.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/Zero_Turn_Mower.pdf)

**Humidity control outdoor-air processing unit**

**Environmental performance through more compact size**

- Achieves a more compact size compared with a desiccant air-conditioning unit by removing the need for a machine room.
- Reduction of electric power consumption needed for cooling.
- Also enables use of renewable energy.



[www.kubota.com/sustainability/environment/ecopro/data/Air-conditioning\\_Equipment.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/Air-conditioning_Equipment.pdf)

**Plastic ribbed pipe**

**Environmental performance through change in shape**

- Ribbed construction allows thinner walls, reducing weight.
- Increased flattening strength and ribbed shape enable selection of installation methods and base materials with low environmental impact.



[www.kubota.com/sustainability/environment/ecopro/data/Plastic\\_Pipes.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/Plastic_Pipes.pdf)

**Combine harvester**

**Environmental performance through resource conservation**

- Increased durability of major replacement parts and increased efficiency of harvesting operations achieve resource conservation throughout the product lifecycle.



[www.kubota.com/sustainability/environment/ecopro/data/Combine\\_Harvesters.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/Combine_Harvesters.pdf)

**Johkasou, Decentralized wastewater treatment plant**

**Environmental performance through achieving a more compact size**

- Use of sponge-type carriers to increase processing capacity and achieve a more compact size.
- Reduction in energy consumption during installation and use.



[www.kubota.com/sustainability/environment/ecopro/data/jokaso.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/jokaso.pdf)

## Evolution and History of Environmentally Friendly Products and Services

### Evolution and History of Iron Pipe



In almost 120 years of history since becoming the first company in Japan to successfully manufacture cast-iron pipe in 1893, the Kubota Group has succeeded at developing several technologies, including manufacturing technologies for ductile cast-iron pipe with durability equivalent to that of steel, earthquake-resistant technology for pipelines, and long-life external surface corrosion-resistant technology. Our efforts have contributed to resource conservation by reducing pipe weight, reducing the percentage of water leaked by minimizing the number of pipeline breakages, and further resource conservation through making pipelines with a long service life.

[www.kubota.com/sustainability/environment/ecopro/data/The\\_Evolution\\_of\\_Iron\\_Pipes.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/The_Evolution_of_Iron_Pipes.pdf)

### Evolution and History of Engines



Since it started production of the water-cooled horizontal-type oil engine Type A for agriculture and industry in 1922, the Kubota Group has thoroughly pursued basic performance of industrial engines. Responding also to the increasingly tightened exhaust gas regulations of many countries in the world, Kubota engines have constantly satisfied the needs of the customers worldwide as the power source of various types of industrial machinery, and will continue contributing to reduced environmental impacts.

[www.kubota.com/sustainability/environment/ecopro/data/The\\_Evolution\\_of\\_Engines.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/The_Evolution_of_Engines.pdf)

### Evolution and History of Scales



Since its foundation, the Kubota Group has manufactured cast metal parts for scales. After starting manufacturing mechanical platform scales in 1924, the Group has produced various industrial scales, contributing to the improved efficiency of manufacturing by companies. At manufacturing sites today, technological innovations using huge data, such as IoT and AI, have been rapidly advancing. We will continue to support the manufacturing sites by further sophisticating their measuring and weighing technologies to obtain accurate data.

[www.kubota.com/sustainability/environment/ecopro/data/The\\_Evolution\\_of\\_Scales.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/The_Evolution_of_Scales.pdf)

### Evolution and History of Tractors



Since creating the walk-behind cultivator in 1947, the Kubota Group has launched various compact, lightweight, high-powered tractors designed for upland or rice farming in Japan. Over time, we played a key role in the shift to mechanized, efficient farming methods by developing a wide range of new capabilities that reduced the burden of agricultural work. Looking ahead, we aim to help reduce the impact of farming on the environment through smart agriculture, which brings together high-precision farming methods based on ICT and IoT, and ultra-labor-saving farming using automated tractors.

[www.kubota.com/sustainability/environment/ecopro/data/The\\_Evolution\\_of\\_Tractors.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/The_Evolution_of_Tractors.pdf)

### Evolution and History of Rice Transplanters



The Kubota Group developed the world's first walk-behind rice transplanter using seedling mats in 1968 with the aim of reducing the burden of planting rice. In order to meet demand for labor-saving measures precipitated by the subsequent decline in the number of farmers and the aging of Japan's population, we continued to develop our lineup of rice transplanters—we made them rideable, bigger, and equipped them with more functions. We will continue to implement labor-saving efforts and reduce our impact on the environment by proposing efficient cultivation methods and refining agricultural practices with the use of ICT and automation.

[www.kubota.com/sustainability/environment/ecopro/data/The\\_Evolution\\_of\\_planter.pdf](http://www.kubota.com/sustainability/environment/ecopro/data/The_Evolution_of_planter.pdf)



Practice  
Report**Contributing to Zero Burning through  
the Development of a Sugarcane Leaf Remover**

Thailand is the fourth-largest sugar producer in the world and sugarcane production is widespread there. Because most sugarcane farmers are small-scale farmers who harvest by hand, as it reaches harvest time, the sugarcane produces a large quantity of covering leaves that obstruct the harvesting operation. To increase the efficiency of this operation, in Thailand, the sugarcane leaves are burned in approximately 65% of operations. The Thai government has cooperated with private sector companies and others since 2019 on a campaign to reduce field burning to zero, aimed at controlling atmospheric pollution by PM 2.5.

A research and development site in Thailand, Kubota Research and Development Asia (KRDA), has developed the SLR110H, an implement for removing sugarcane leaves, as a solution to eliminate leaf burning. SLR110H is an implement that can be used with small tractors that are already widely used by sugarcane farmers. It can efficiently remove leaves between sugarcane inter-row by rotating a roller with a string-type trimmer attached. The trimmer removes leaves that it contacts. Its simple structure results in a highly cost-efficient implement with a low price.

This method increases both the quality and volume of the harvest compared with harvesting sugar cane by leaf burning, and also contributes to the resolution of environmental issues in Thailand. Since launching in the market in December 2018, unit sales have been steadily increasing and we are also focusing on exports to surrounding Asian countries.



SLR110H mounted on a small tractor



Leaf removal using SLR110H