

## Special feature 2

# Contributing to a sustainable and circulating forestry industry

As global warming accelerates, there is a need for sustainable use of forest resources, which are a source of CO<sub>2</sub> absorption. Komatsu contributes to creating decarbonized societies through sustainable and circulating forestry. To this end, we combine forest machine that improve safety and productivity, which are issues in the forestry industry, and solutions to improve efficiency in forest management through data visualization of machine operations and forest resources. At the same time, we will strengthen the forest machine business by positioning the business as the third pillar of the Komatsu Group's businesses, following the construction equipment and mining equipment businesses.



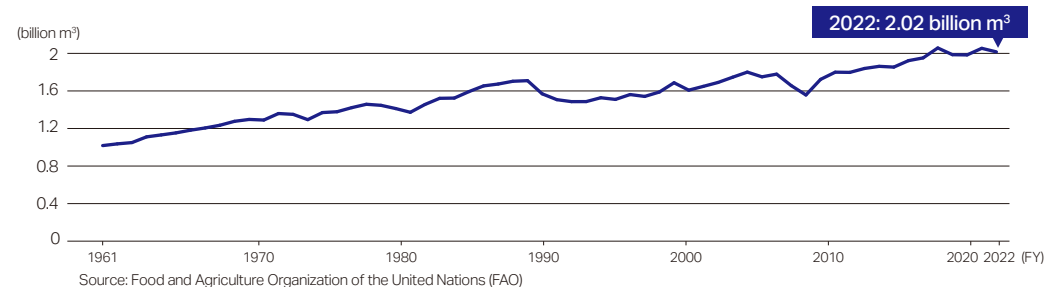
### ■ Growth potential of the forest machine business

Demand for wood continues to rise as the world population increases. Global roundwood production is increasing at an average annual rate of about 1% and expected to increase from 2.02 billion m<sup>3</sup> in 2022 to 2.12 billion m<sup>3</sup> in 2027 (Komatsu internal forecast). This increase is mainly due to the increasing demand for timber for construction in emerging countries, the spread of sanitary products (e.g., paper diapers), and rising environmental awareness, all of which drive the use of biomass materials and pulpwood as alternatives to plastics. In addition to conventional wood production, tree-planting projects are also growing worldwide, aiming for decarbonization, natural environment conservation, and wood utilization.

Certain regions are facing labor shortages and an aging forestry workforce on top of the increasing wood demand. These circumstances increased the demand for forest machine that ensures worker safety, reduces the burden on workers, improves work process efficiency, and increases productivity at job sites.

Furthermore, mechanization rates in the forest industry are increasing in emerging countries, which have conventionally relied on human labor. We expect demand for forest machine to grow at an average annual rate of 2% to 3% and market size to expand from approximately US\$7.5 billion in 2021 to US\$8 billion in 2024 (Komatsu internal forecast).

Figure: Industrial roundwood production volume



### ■ Necessity of forest resources and resolving issues with forest machine

Forest and timber resources contribute significantly to global warming prevention depending on how such resources are used. Trees grow and store CO<sub>2</sub> while absorbing CO<sub>2</sub> from the atmosphere, and they can continue to store CO<sub>2</sub> for a long time even after they are turned into wood products. Moreover, by using harvested wood as woody biomass fuel (carbon neutral fuel), it is possible to reduce fossil fuel usage and CO<sub>2</sub> emissions leveraging the effects of CO<sub>2</sub> absorption through trees. To maintain this cycle, it is necessary to promote a circulating forestry industry which involves managing forests appropriately, using appropriate methods to harvest grown trees, and planting and cultivating new trees.

However, the forestry industry has many sites with steep slopes and poor footholds, and is prone to serious accidents compared to other industries. In some countries and regions in particular, they still rely on human labor to fell trees using chainsaws and other processes. Therefore, the importance of safety and efficiency by means of mechanization and systemization of work processes is advocated. It is important to keep workers off the ground and out of direct contact with trees to ensure safe job sites with as few accidents as possible. Komatsu works continuously to improve the safety of customers' workplaces by providing forest machines for harvesting and extracting processes.



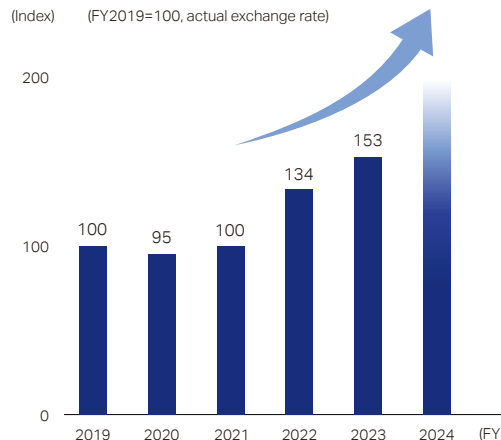
Komatsu Forest AB head office. The timber used in wooden buildings and other structures stores carbon for long periods of time

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**■ Cultivating the forest machine business as the third pillar of our businesses**

Komatsu contributes to solving customer safety, production, and environmental issues globally by providing forest machines. We believe that the forest machine business is an area where Komatsu contributes to solving the major social issue of decarbonization through our business activities, and we have been conducting focused activities to create a positive cycle of solving ESG issues and improving profitability. We also defined the forest machine business as one of the growth areas in the mid-term management plan (FY2022-FY2024), under which we set KPIs for the business and monitor our progress. We provide total support for our customers' sustainable and circulating forestry management by mechanizing processes and providing solutions, while growing this business as the third pillar of our business, following the construction equipment and mining equipment businesses.

**Figure: Komatsu forest machine business sales and forecasts**



**Figure: Circulating forestry management conceptual image**



**■ Global forest machine business structure**

Komatsu has expanded our forest machine business by introducing construction equipment-based machines with forestry specifications, as well as purpose-built forest machines and related technologies acquired through M&A. In 2004, we established Komatsu Forest AB through the acquisition of Partek Forest AB (Sweden) and launched a full-scale forest machine business with a product lineup for the CTL method (Figure), which is the dominant method in Europe.

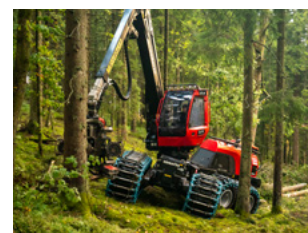
On the other hand, the dominant method in North America is the FTL method. In 2018, Komatsu acquired Quadco Inc.(Canada), a manufacturer of FTL attachments. In addition, in 2019, we acquired TimberPro Inc. (U.S.A.), a manufacturer of forest machine to expand our product range by adding crawler-type feller bunchers and other products for the FTL method. In particular, North America, which is the world's largest producer of lumber, is the world's largest market for forest machines. We believe there is considerable potential for growth in North America by reinforcing our product lineup.

Komatsu has been working to expand our product lineup to provide total support for the circulating forestry industry. For example, in response to a request from the Brazilian pulp and paper industry, we have developed and introduced a planter equipped with a tree-planting attachment from Bracke Forest AB (Sweden), which we acquired in 2022. As tree planting is one of the most labor-intensive processes in afforestation, we will continue to solve customers' issues more by advancing mechanization.

**Figure: CTL and FTL processes**

Logging methods	Details
CTL (Cut to length) method	A method in which trees felled in forests are cut into logs of a certain length before extracting
FTL (Full tree length) method	A method in which felled trees are extracted at their original length and processed into logs of a certain length at another location

**Forest machine lineup**



Harvesters [CTL]



Forwarders [CTL]



Feller bunchers [FTL]



Bulldozer-based planters



## Special feature 2 Contributing to a sustainable and circulating forestry industry

### ■ Creating sustainable, circulating forestry with our products and solutions

As in our construction and mining equipment businesses, Komatsu strives to create new customer value in the forest machine business through both products and solutions.

In terms of products, we work to develop technologies for future products that support sustainable forestry management and enhance the automation of machine operations. We will also develop electrified equipment as low-carbon technology products. The biggest barrier to electrifying machines in forests is the power supply infrastructure. Operating sites in forests are vast and machines are operated in various locations, making it difficult to install infrastructure facilities. We will conduct development while aiming to charge such machines on-site using portable power supply equipment, which has already begun to be introduced in the construction equipment business. We will also create synergies by leveraging assets of the Group including technologies such as diesel electrics, hybrids, hydrogenated vegetable oil (HVO fuel), and the knowledge gained from American Battery Solutions Inc. ("ABS"; U.S.A.), a manufacturer of batteries acquired last year.

In terms of solutions, we have addressed evolving our solutions to visualize information on the forest machine used in logging and extracting. Specifically, our system visualizes information including machine conditions, work orders from operation administrators, logged volumes, and work site management (sharing the log collection locations with the operators of extracting machines).

In the tree-planting process, we began recording data on the location and time stamps from planters and verifying the technology that uses remote sensing to monitor sapling growth after planting. Conventional survey methods of seedling survival rates require surveyors to walk long hours to take measurements. This method will be replaced by drone or satellite data analysis, which will not only improve efficiency, but also enable us to use the data for replanting. In addition to our conventional harvesting and extracting solutions, Komatsu promotes Smart Forestry, which offers added services such as forest monitoring, biodiversity conservation and fire prevention using remote sensing and AI technology. Through these efforts, we aim to help our customers realize sustainable and high-quality forest management.



Monitoring sapling growth using drones

### Message

**We will accelerate the global circulating forestry business and work together with customers to contribute to the global environment.**



Hiroyuki Umeda

Executive Officer  
President, Forest and Agriculture Business Division

Komatsu works to engage in M&A to expand our forest machine business, with key markets in Europe and North America. To this end, we develop products tailored to the characteristics of each region and establish proprietary production and sales networks. We established the Forest and Agriculture Business Division in April 2023 in light of business expansion to ensure the proper control of business management and governance as a global headquarters. Our forest machine business now has a worldwide presence in Europe, North America, South America, Oceania, Asia, and Africa. We aim to grow our business further by integrating operations across group companies and our locations around the world and aligning internal directions for overall optimization. One year has passed since the establishment of our division. Although our members are working in various regions across the world, I feel that employee motivation has increased now that we can see the faces of those with which we do business.

I expect new players to join the forestry sector market in the future. In addition to traditional timber producers, these new players may include companies that engage in carbon credit trading, tree planting for nature conservation and NGOs. The new market requires higher-quality forest management that includes the quantitative visualization of carbon stocks and biodiversity conservation. Komatsu strives to provide diverse customer values by leveraging our strengths in understanding on-site data and providing solutions that utilize such data.

The reduction of environmental impacts in response to climate change is recognized as one of the most important issues in our materiality. In the forest machine business, Komatsu Forest AB launched the first carbon-neutral plant in the Komatsu Group in 2021. The plant made significant improvements to productivity and introduced renewable energy, thereby significantly reducing electricity consumption. We are also exploring the possibility of leveraging our forest machine technologies and forest management solutions to offset CO<sub>2</sub> emissions from our products. The Forest and Agriculture Business Division will continue to take advantage of Komatsu's assets and accelerate industry-academia collaborations and alliances with collaborative partners to reduce CO<sub>2</sub> emissions at customer sites and develop automation technologies and solutions.

We are committed to contributing to customer businesses and the global environment, while further growing our forest machine business.