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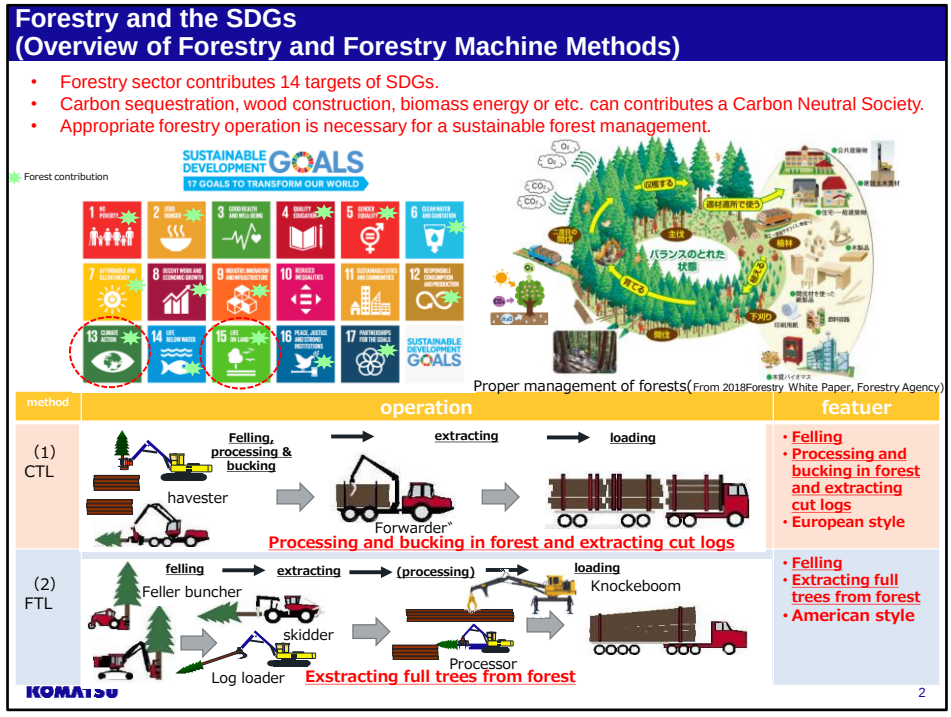
IR-Day 2021

Forestry Machine Business

Contribution to Sustainable Forestry

Komatsu
Construction Equipment Solution Division
Green Business Promotion Department (Forest and Agriculture)

16th December 2021



2 Page ;

Komatsu thinks that the forestry business is very important to achieve SDGs. Recently, it is an industry that can contribute to decarbonization such as carbon absorption by the forest, wood construction and biomass fuel. In addition, we think that it is necessary to operate properly using appropriate forestry machine to establish sustainable forestry.

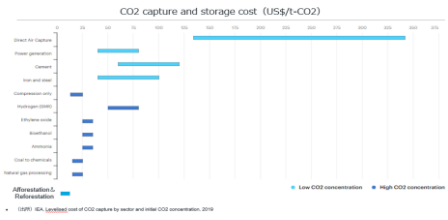
In forestry there are two main methods, CTL method, which is developed mainly in Europe and FTL method, which is developed mainly in North America. Each method is used different

machine and our main forestry business is CTL machines.

Forestry Contributes Carbon Neutral Society

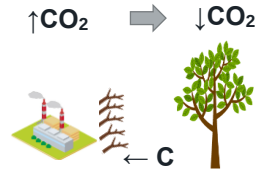
1. Growing forests absorb CO2 and planting trees on harvested areas is an effective forestry management.

To absorb CO2 - forest is the most effective method in terms of cost compared with other methods.



2. Wood products continue to store carbon until the day the product decays or is burned.

3. Substitution, Wood products replacing fossil products, reduces the volume of new CO2 released into the atmosphere , Carbon neutral energy.



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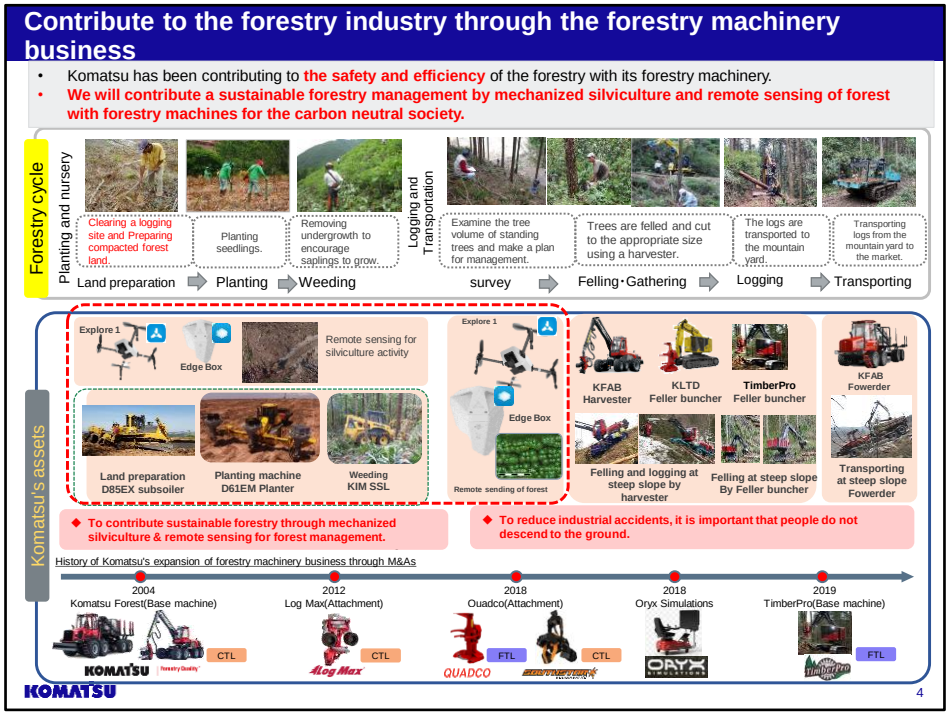
3

3 Page ;
The slide shows that the forestry can contribute to decarbonization. First the CO2 absorption by the forestry is lower than the other methods. In addition, forestry products can stock carbon for long term. Lastly it can be replaced with fossil fuels and materials from them.



4 Page ;
The slide shows the forestry machine business in Komatsu. We have contributed safe and efficient forestry operation by using our technology and experience. In this point we think that it is important to proceed mechanization which doesn't need people to work on the ground for reducing industrial accidents. As in the chart below, our forestry business have grown up by M&A. In 2004, Komatsu acquired CTL forestry equipment manufacturer Paltech Forest, and in 2019, it acquired FTL forestry equipment manufacturer

Timberpro. Now we are contributing efficiency of forestry supply chain and planting etc.. Concretely it is to mechanize planting and remote sensing forest to establish sustainable forestry.

Forestry machine

1. Forestry machine

Dev.	Sweden	USA	TimberPro USA	JPN/Indo/Ru	USA	Indonesia	JPN
Pro.	Sweden	USA	TimberPro USA	Bra/Ru/Indo	Bra	Indonesia	JPN
	 Harvester ・ Forwarder	 Feller buncher Log loader	 Feller buncher	 Harvester (PC200F)	 Feller buncher (PC350F)	 Harvester/feller buncher (PC135F)	 Harvester (PC138US)
method	CTL	FTL	FTL	CTL	CTL・FTL	CTL・FTL	CTL
market	Eur, Ru, N.A, Aus, Bra, Indo.	N.A & Aus	N.A & Aus	Bra, Ru, Indo	Bra	Indo	JPN
category	Purpose build	Purpose build	Purpose build	CE	CE	CE	CE

2. Attachement

Dev.	LogMax Sweden	Quadco Canada	Southstar NZ
Pro.	LogMax	Quadco	Southstar
	 harvester	 Felling	 harvester
method	CTL	FTL	CTL

3. Silviculture

Dev.	JPN	Italy
Pro.	Brazil	Italy
	 D85 subsoiler & D61 planter	 Weeding
market	Brazil	Indonesia

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5

5 Page ; The slide shows our product lines that are deploying globally. It is roughly categorized to the specific machine for the forestry and the machine based on the construction machine. It is also divided CTL and FTL.

Challenge to carbon neutral ; KFAB new factory

- The new plant has consolidated old plants located separately mainly in Umea, optimizing the production process and layout.
- It has also adopted new manufacturing engineering benefits, including an automatic assembly line with automated guided vehicles (AGVs) for the first time in the Komatsu, achieving 30% improvement of productivity compared to old plants.
- it has achieved carbon neutrality, for the first time in Komatsu's plants, through a substantial reduction of power consumption volume by adopting renewable energy supply facilities, such as solar panels which cover about 19,000 m2 of the roof and heating equipment which uses geothermal energy.

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6

6 Page ; I will introduce about new factory of KFAB that is responsible for the development and production of CTL forestry machine. It is located on Umeå city in the north of Sweden and began to operate in August 2021. We have achieved carbon neutral by utilizing solar panels and geothermal heat.

Mechanized silviculture system for sustainable forestry cycle

- Wood production is increasing app. 2.5% annually and globally. → Plantation forest is necessary.
- Planting tree is labor intensive and hard job. → Manpower is decreasing.
- Mechanized planting can promote efficient and safety forestry cycle.

1. Manual labor

Tree planting in Brazil

2. Mechanized system

1) Flat area

D85 subsoiler

D61 planter（Video）

2) Steep area

H/E PC240 planter

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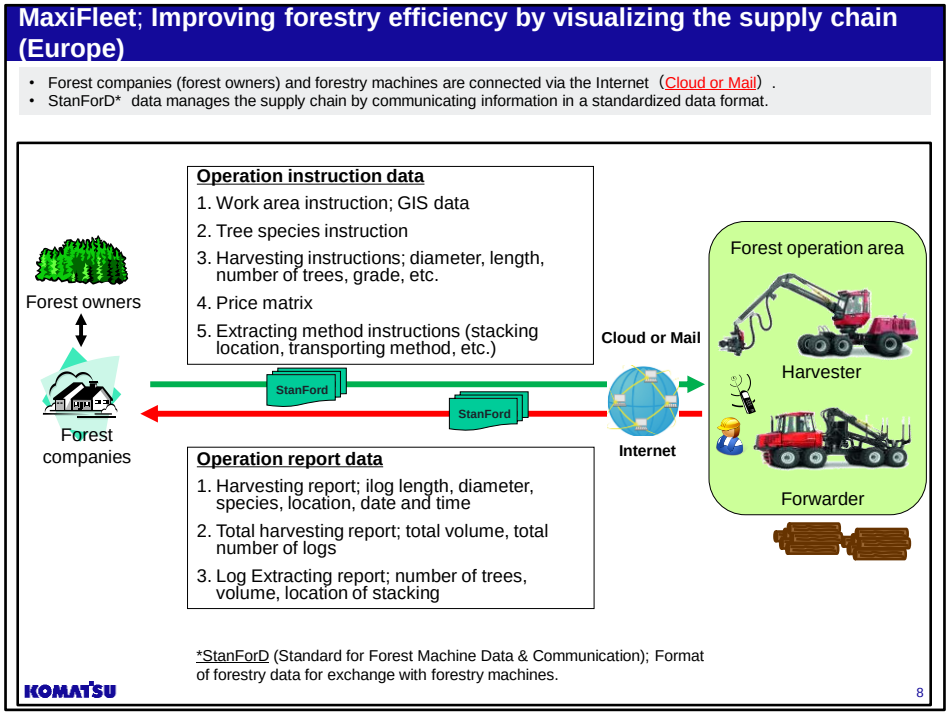
7

7 Page ; This is introducing about mechanization of planting. According to FAO statistics, global timber consumption is increasing by about 2.5%/year. The background is the increasing demand for housing building materials and paper products. It is necessary to plant trees after logging for sustainable timber production. This shows plantation forestry in Brazil, and manual planting is hard work. In addition, as the number of plantation area increases, working labor is being. We would like to realize a safe and efficient forestry cycle by mechanizing

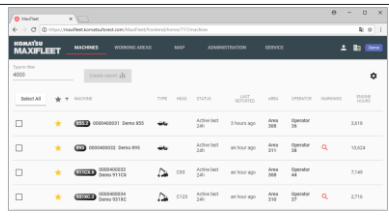
planting.



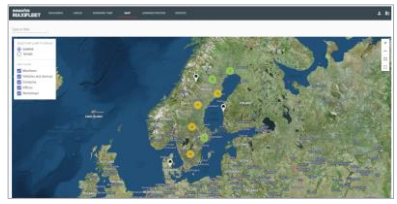
8 pages; Next, we talk about improving the efficiency of the forestry through MaxiFleet, the visualization of the forestry supply chain.
In Scandinavia, forestry machines and forestry companies exchange work instructions and work reports by the Internet via a 4G network. This system is making the forestry supply chain more visible and various operations more efficient.

Basic functions of MaxiFleet

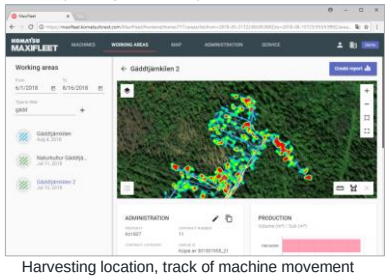
- MaxiFleet is a connected business in global operated by KFAB (Web app.).
- Machine information is sent to the server by an attached modem (4G or Satellite).



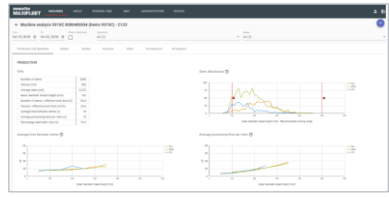
Machine operation overview (type, machine number, area, operating hours, etc.)



Operating location



Harvesting location, track of machine movement



Production progress (number of logs, m^3 , etc.)

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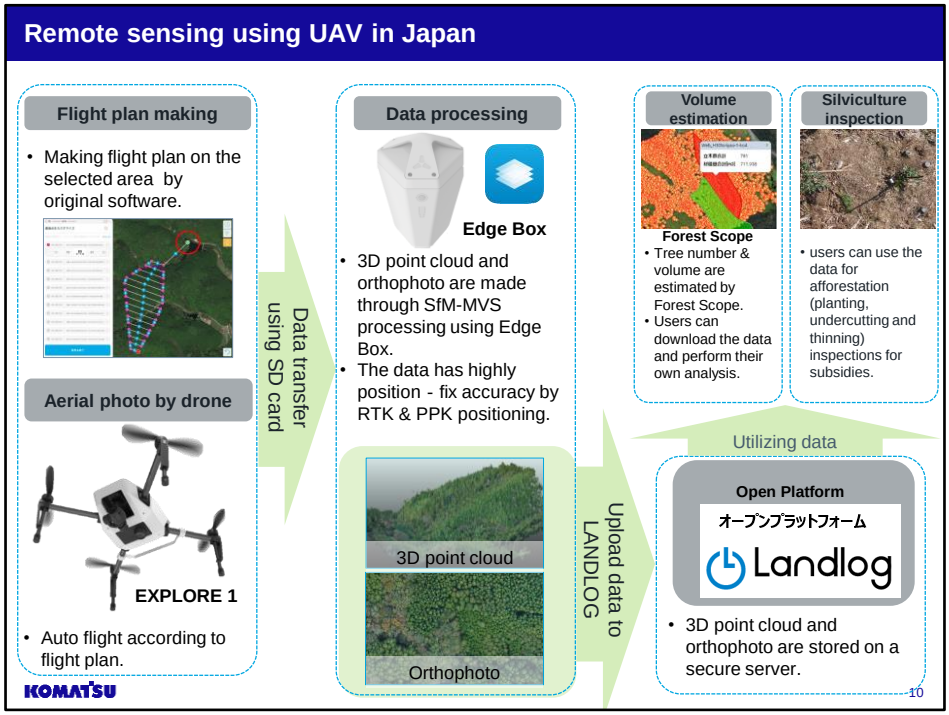
https://www.komatsuforest.com/services/maxifleet

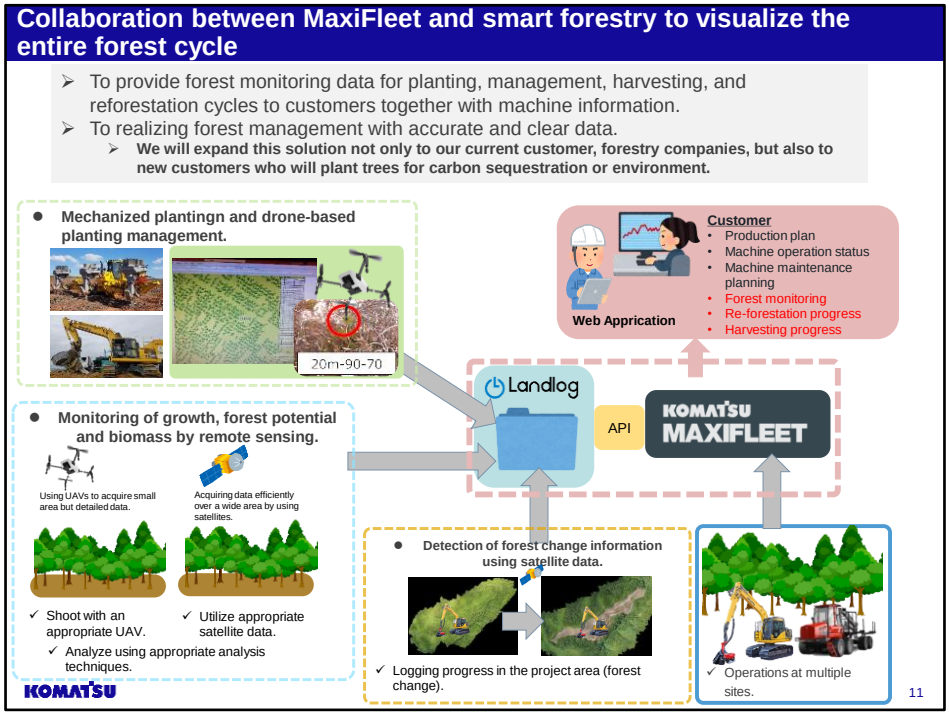
9

9 pages; Komatsu Forest's application for this visualization is MaxiFleet. MaxiFleet is a web application and is deployed by Komatsu Forest in a subscription model. The following information is automatically updated: machine operation, location, logging locations, machine movement tracks, and production progress. Currently, the sales of this MaxiFleet are growing year by year, especially in Europe.



10 pages; In Japan, we are developing the smart forestry since 2019. One of them is a system for estimating standing timber volume using Everyday Drones that is used for Komatsu smart construction. Currently, it can estimate timber volume of standing trees before felling instead of workers going into the forest and measure manually with surveying instruments. By using a drone to measure the volume of standing timber, it is expected to be much more efficient and labor-saving. An application that uses drone data to estimate standing timber volume is named Forest Scope

and is deployed as a Landlog application together with the smart construction.



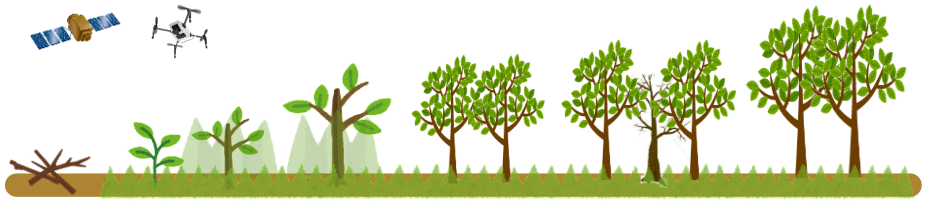
11 pages; From this fiscal year, we have begun to work not only with forestry companies, the traditional customer base, but also with a new customer that is moving into afforestation for the purpose of decarbonization and environmental conservation. The concept of this project is to use MaxiFleet as an interface for customers to provide data obtained from remote sensing technologies such as satellites and UAVs for monitoring forestation, forest volume and biomass, and logging progress. We believe that this will enable us to provide a variety of

customers with a one-face solution for efficient afforestation as well as information necessary for highly transparent forest management.

A new approach to forest remote sensing

UAV sensor : Optical Camera, Multispectral camera or Lidar.

Satellite sensor : Optical, LiDAR, SAR (synthetic aperture radar).



preparation | planting | Weeding | No weeding required | Thinning (Not for use) | Thinning (for use) | Logging

Silviculture Monitoring

1. Seeding number
2. Seedling position
3. Survival rate

Forest Resource Monitoring

1. Tree number
2. Stem volume
3. Biomass amount (CO_2 stock)

Logging progress monitoring

1. Forest change detection

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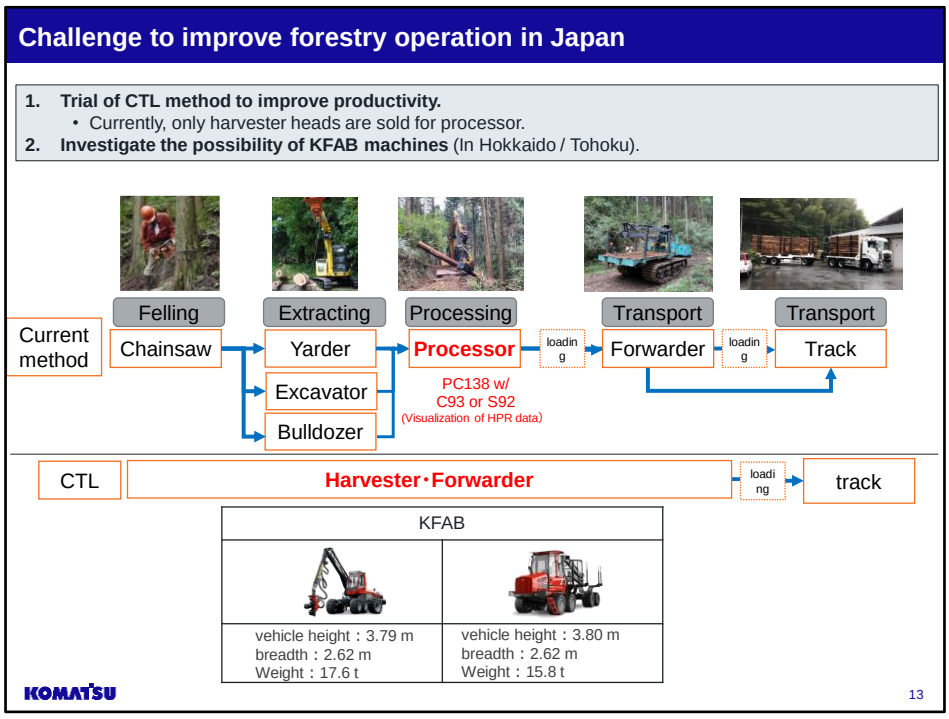
12 pages; Currently, we are starting PoC for these monitoring solutions with companies that have UAV and satellite operation and analysis technologies. We would like to implement this PoC during this fiscal year, and based on the results, we would like to establish a roadmap for commercialization.

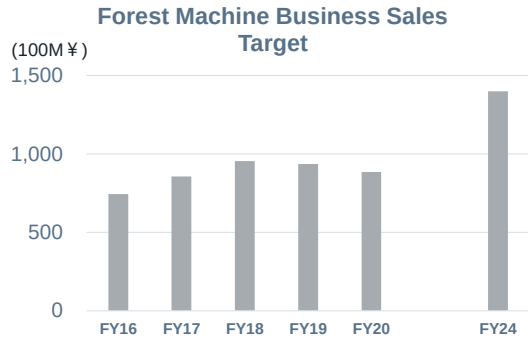


13 page; We will introduce our efforts to promote Japanese domestic forestry. As I mentioned , we are working on smart forestry to improve the efficiency of the supply chain, but I think the biggest challenge for the domestic forestry industry is to improve productivity and reduce logging costs. Considering the steep terrain in Japan, it is not possible to adapt the system to all regions, but where it is possible, we would like to introduce the CTL system, which has high productivity and advanced supply chain visualization such as MaxiFleet. We believe

that this will reduce the cost of logging and make Japanese timbers more competitive in the global timber market.

Forest Machine Business Sales

- Forestry machine business aims for 140 billion yen in FY24.
  - Strengthen North America and strategic market (Russia, Asia & South America).
  - Create New business (Planting & Solution).



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14 page; This shows sales trend of global forestry machine and target in FY24.
We would like to expand it especially in North America, Russia, Brazil and emerging countries, South-east Asia and in new business area, planting and solution.