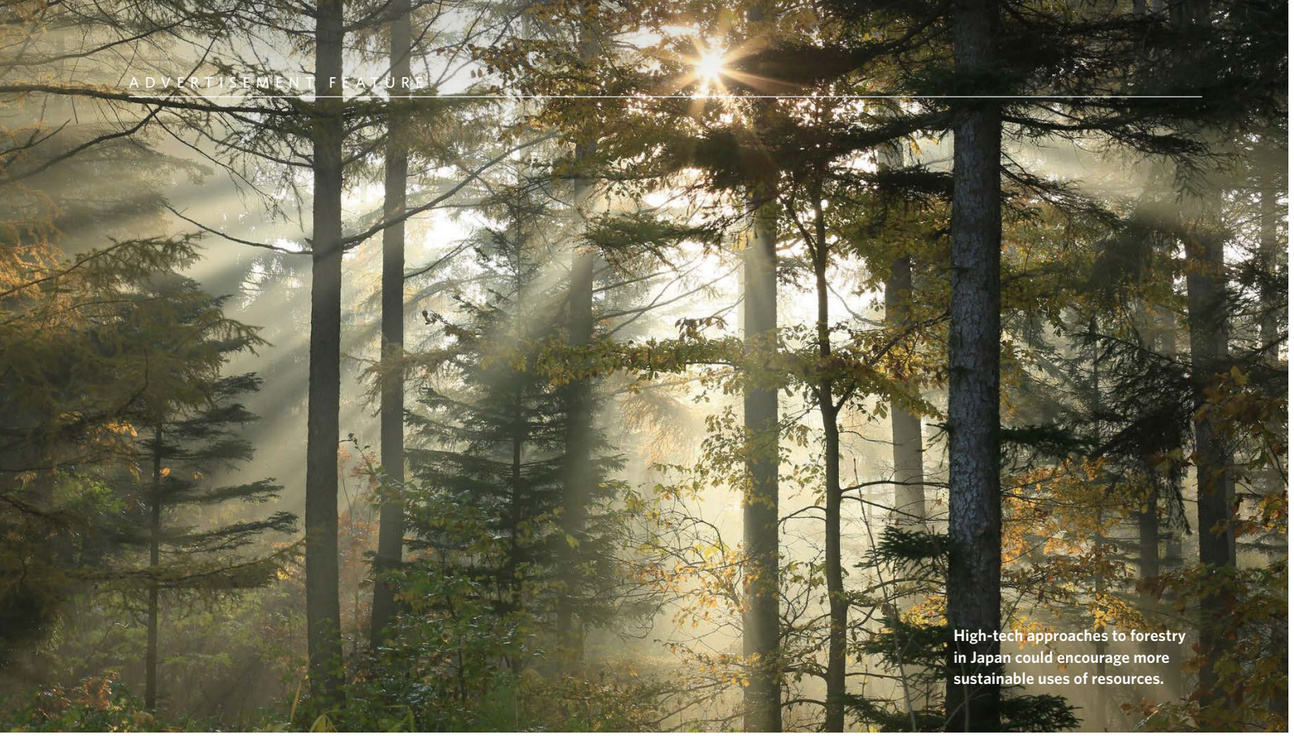

High-tech approaches to forestry in Japan could encourage more sustainable uses of resources.

HOW TECHNOLOGY IS SPEEDING SUSTAINABLE DEVELOPMENT

INNOVATIVE SOLUTIONS are empowering progress toward sustainability, exemplified by a Japanese company improving its operations around forestry, cotton production and energy.

Precise digital snapshots of Japan's forests captured by aerial survey are enabling progressive forestry practices that are profitable and sustainable. This finely grained data will aid efficient management that balances income generation, carbon uptake, biodiversity preservation and water retention.

The project, led by Mitsui & Co. — a general trading company with interests in many industries, which is based in Tokyo — showcases it's use of technology for business that is aiding progress towards the United Nations' Sustainable Development Goals (SDGs).

Related ventures at the company include establishing global supply chains for next-generation carbon-free fuels, and improving the earning potential of African smallholder farmers.

GAP IN THE MARKET

Japan is renowned for its picturesque mountainous forests, but the rugged geography is an impediment to profitable forestry in today's globalized timber market.

"Across Japan, only 30% of forests are being replanted after the timber is harvested," says Chisato Onda, general manager of Mitsui's corporate sustainability division, which operates the company's forestry business. The remaining 70% of logged forest is abandoned after clearing, with significant environmental implications, she adds.

Mitsui, Japan's fourth largest private forest owner, took a digital approach to streamline its forest management. In 2019, the company deployed drone and aerial survey technology to digitize its forests, capturing the underlying geography as well as the species, height and diameter of individual trees.

"We conducted the survey to make our forestry operation more efficient," Onda says. But the digital forest has since proven to have numerous additional benefits. The company is now sharing its advances with forest managers to improve the sustainability of the entire Japanese forestry industry, Onda says.

CREDIT CREATION

One key advance in income generation from sustainable forestry that Mitsui has pioneered is the use of aerial survey data for carbon credit applications. Originally, forestry carbon credits in Japan could only be applied for using data from ground surveys, but these are slow and expensive.

"We conducted an experiment to compare the difference between tree height and diameter measurements conducted by aerial survey and conducted by conventional manual survey," Onda says.

The difference in the calculation was negligible, the team showed — and Japan's carbon credit authority agreed to accept aerial survey data in its application process.

"All forest owners can now use this approach," Onda adds. "We are sharing our expertise with the tool, to help others in the industry to apply for carbon credits."

The digitized forest also provides a basis from which to enhance other aspects of forest management, Onda adds. "We would like to enhance forest benefits such as biodiversity and water preservation, but it is difficult without supporting information," she says. "Having this data enables us to develop a concrete plan."

TARGETING TRACEABILITY

Digital innovation also underpins a Mitsui co-led initiative to support smallholder farmers in rural Africa. In collaboration with global conglomerate, ETG (Export Trading Group), Mitsui has developed a programme called 'farmers 360° link'. This electronically captures every step in the production of cotton clothing, from the seed being planted to the finished garment hanging in a Tokyo store.

"By scanning a unique QR code on the garment, the consumer can see the farmer who produced the cotton, where they are located, how they live, and environmental impact information," says Nozomu Kobayashi from Mitsui, who is currently seconded to ETG to head up the project.

The tracking system enables part of the premium the consumer pays to be fed back into programmes that support the cotton farming community. These programmes have including providing solar powered batteries for lighting in community schools, and subsidizing fertilizer to potentially boost farmers' income the following growing season.

ETG has a diverse portfolio of interests across agriculture, chemicals, logistics, food processing, energy, minerals and metals, technology and supply chain optimization. The project is built upon ETG's extensive network of field agents and emerging farmers across Africa. "Through this network we have high granularity data, traceable by farmer, of crops grown and inputs used," Kobayashi says.

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▲ A digital initiative in rural Africa (top) is aiding transparency in cotton farming; Technology is helping clean up of energy infrastructure (bottom).

The company created a digital platform to capture and organize this data, which field agents input using a newly developed app. From the moment the harvested cotton is bagged, QR code labels track it through the manufacturing journey to the consumer.

"We believe that we can develop a similar solution for other export-oriented commodities from Africa, including coffee and cacao beans," Kobayashi adds.

CLEANER ENERGY

Innovative implementation of new technology is also critical to the clean energy transition, says Shintaro Nanko, team leader of strategy and planning in Mitsui's Energy Solutions Business Unit.

The unit was formed in early 2020 to accelerate the formation and promotion of business across Mitsui that is associated with clean energy. These projects include power, green mobility and infrastructure, carbon management, next-generation fuels and so on.

A project to develop a supply chain for ammonia as a carbon-free fuel exemplifies the unit's work, Nanko says. Mitsui is partnering on a plant in the southern US which makes ammonia from the hydrogen in natural gas. The CO_2 by-product is captured and injected underground for storage.

The clean ammonia is then transported mainly to Japan. "Through stable supply of this kind of clean ammonia, Mitsui aims to help reduce industrial CO_2 emissions globally," Nanko says. The plan is now to make the project commercially viable by 2027.

Mitsui is leveraging its breadth and depth of expertise across multiple industry sectors to establish supply chains for new fuels at the scale required to impact global greenhouse gas emissions.

In the case of clean ammonia, the company has experience in carbon capture, as well as ammonia transportation and powerplant fuel logistics. "Ammonia needs to be carefully handled during transport, but our chemical unit has 50 years' experience," Nanko explains. The company also has a history of natural gas and LNG since the 1970s. "We leverage the relationship of trust that we have built with our customers and partners through existing business." he adds.

With a partner in Australia Mitsui has been developing a method to produce clean ammonia; this deploys emerging electrolyser technology to make hydrogen from water using renewable electricity and avoids the production of carbon dioxide.

These projects focusing on forestry, cotton and energy illustrate the success of Mitsui's corporate sustainability department in promoting sustainable approaches across the company.

"As the team tasked with driving sustainable development in the company, our forestry operation has helped us to demonstrate that business and sustainability can be successfully combined," Onda notes."It allows us to show to our colleagues that we practice what we preach." ■

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