Japanese robo-suit promises superpowers for greying farmers

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A Tokyo Agriculture and Technology (TAT) University postgraduate student is seen demonstrating the new power-assist suit for elderly agriculture workers, developed by TAT professor Shigeki Toyama. The power assist suits are said to reduce the user's physical effort by about 62 percent.

While Robocop and Iron Man can dodge bullets and crush villains, a new powered suit from Japan promises its elderly users more modest powers, such as pulling up radishes without getting a backache.

Unlike its heavily-armed Hollywood counterparts, the Power Assist Suit aims to make life easier for Japan's army of greying farmers.

The metal-and-plastic exoskeleton boasts eight electric motors that amplify the strength of the wearer's arms and legs, as well as sensors that can detect movements and respond to commands through a voice-recognition system.

Professor Shigeki Toyama and his team developed the power-enhancing suit at the Tokyo University of Agriculture and Technology, and Toyama plans to set up a company to start producing the futuristic outfit by the end of the year.

"If the farmer bends over to grasp a radish, his back will be firmly supported," said Gohei Yamamoto, one of the students working on the team, as he recently demonstrated the suit on his university campus.

"A brief vocal instruction will instantly straighten the rods along his legs, giving him the power he needs to pull the vegetable without effort."

Fifteen years in the making, the robosuit will soon hit the market in Japan to help ageing farmers harvest their fruit and vegetables while avoiding backaches and nasty cramps, its developers say.

Japan, with a low birthrate and a high life expectancy, is facing a demographic crisis as its population rapidly ages and shrinks.

Industrial robots have long been common in Japan, and robo-suits are making inroads in hospitals and retirement homes, where they can help carers lift patients or aid in physical rehabilitation exercises.

But with two thirds of the country's farm-workers already over 65 years old, the agriculture sector is a potentially lucrative untapped market.

The suit should hit the Japanese market in 2012, when it will initially retail for about one million yen (11,000 dollars), a price tag its makers hope to halve if the device is mass-produced, the team said.

There are however no plans so far to sell the suits overseas.

"I doubt that the suit would sell in Europe and in America, where foreign migrants workers often perform farm-related tasks," Toyama said.

The team has developed a heavy-duty 30 kilogram (66 pound) model, for lifting big loads and pulling vegetables out of the ground, and a 23 kilogram

version designed for lighter tasks such as picking grapes.

The robo-suits can reduce the user's physical effort by 62 percent on average, the inventors say. When bending knees the muscular activity is reduced by half, and the suit can also take most of the strain out of crouching.

"We conducted a survey of 102 people for the latest model, asking what part of the body hurt when they picked grapes," Yamamoto said. "Most farmers complained about aches in their arms, necks and lower backs."

The suits are already tough, but soon they will also become smarter.

By the end of the year Toyama plans to start working on augmented reality goggles on which useful information could be displayed for the farmer, in much the same way as data is projected onto the inside of a fighter jet's cockpit.

Useful information might include how ripe the grapes are, or the user's heart rate and calorie consumption, said Toyama. "The goggles would tell you for instance how long you've been working and when you should rest."