

New Technology Makes Agriculture Possible on Barren Land

“Film Farming” Applies Cutting-Edge Japanese High-Polymer Expertise

Have you heard of “film farming”? This is a revolutionary Japanese technology that makes it possible to grow crops in the desert, on concrete, in wetlands, on contaminated soil—virtually anywhere. Film farming uses waterproof sheets to separate the crops being cultivated from the ground underneath. This method has many advantages. Most notably, it prevents water and fertilizer from leaking, meaning only the minimum amounts of them are necessary. It is already being used to grow tomatoes in places around Japan and at overseas locations including Shanghai, Singapore, and Dubai. The technology for this method, called Imec®, was developed by Mebiol, a small corporation based in Hiratsuka, Kanagawa Prefecture, about an hour’s ride from Tokyo by train.

The special features of the new technology are to be found in the film, which is made of hydrogel, a hydrophilic polymer gel used in disposable diapers and other products. The film’s design incorporates nano-sized (one millionth of a millimeter) pores, which absorb water and nutrients but block germs and viruses. This means only small amounts of agricultural chemicals are needed, ensuring the crops are safe to eat. As the film holds on to water, it also makes the plants work harder to get it by increasing osmotic pressure; the plants create more amino acids and sugar, and so they taste better and have higher nutritional value.

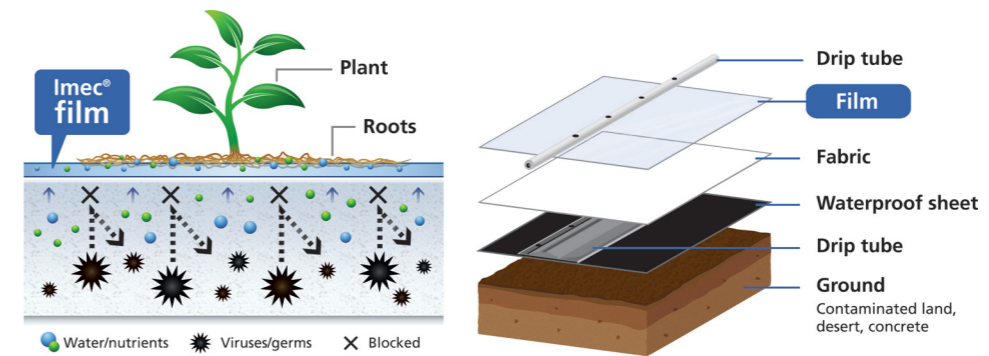
Dr. Yuichi Mori, Mebiol’s chief executive officer, is a polymer physics researcher. After having spent around 20 years researching such areas as catheters, artificial blood vessels, and membranes for dialysis at major Japanese and U.S. chemical and medical equipment manufacturers, in 1995 he founded Mebiol as a university-born start-up company. At that time, problems related to global warming—water shortages, soil degradation, food crises—were already emerging. Seeing plants as the key to solving these problems, he started researching resource- and energy-efficient ways of growing high-quality crops using membrane and hydrogel technologies developed in medical fields. After around 20 years of trial and error, Dr. Mori and his colleagues succeeded in creating the film farming system.

At first, it was a struggle to get farmers to accept the film, as they did not really believe it would be possible to grow crops on it. But Dr. Mori has continued to steadily and enthusiastically promote the usefulness of the new agricultural method, and now 150 farms around Japan have introduced it. The method is also being used to promote the revival of farming areas along the Tohoku coast, which were contaminated by such substances as oil, sludge, and salt as a result of the tsunami that followed the Great East Japan Earthquake in 2011. Further, as there is no need to expend the considerable time and effort required for learning how to cultivate the soil, it becomes much easier for young people with no previous experience to start out in agriculture. This can contribute to resolving Japan’s problem of an aging population of farmers and a shortage of people to take over existing farms.

So far Mebiol has applied for patents in 134 countries and has acquired them in 116, while 30 countries have already made inquiries about introducing the technology. Dr. Mori has big ambitions and has set his sights on expanding worldwide. “Film farming makes it possible to transform barren land into production bases for high-quality foods. I hope we can contribute to local economic independence and social stability in such regions,” he says with enthusiasm.

Mebiol Inc. official website
<http://www.mebiol.co.jp/en/>

How film farming works



The film absorbs water and nutrients but blocks germs and viruses (left). In the film farming system (right), the nutrient solution supplied through the film from the lower drip tube controls the nutritional value, while the solution supplied directly onto the film from the upper tube controls the yield.



1. Lettuce sends out a profusion of fine roots as it works to absorb water and nutrients from the film, so it is possible to turn the film over without it falling off. 2 & 3. A 1.6-hectare tomato-growing facility in Rikuzentakata, an area affected by the Great East Japan Earthquake, has adopted film farming.



4. Film farming has made tomato production possible even in the desert outside Dubai in the United Arab Emirates. With no water loss, it is an optimal agricultural method for desert regions, where water is expensive. 5. Mebiol’s Dr. Mori (right) is promoting the widespread adoption of film farming: “With this technology I’m aiming for ‘anybody, anywhere’ farming.”