Genetic engineer Pamela Ronald ’82 has developed a new strain of rice that could prevent famine in flood-prone areas around the globe.

In the tiny village of Rajaharat in northern Bangladesh, the rain comes down so hard that it’s impossible to see across the field. The monsoon floods are rising, sending muddy streams of water down dirt roads. Village farmers watch anxiously as the water swamps the earthen dikes and swallows their newly planted rice. Rice is grown in water, of course, but the plant drowns if it’s totally submerged for more than three days. If these plants die, the children—and everyone else in the village—will go hungry.

Year after year, tropical storms bring disaster to farmers across Asia whose rice crops rot in flooded fields. In India and Bangladesh alone, annual floods destroy approximately four million tons of rice, contributing to a perpetual cycle of hunger and poverty—many farmers in Asia live on less than one dollar a day.

This year, however, the farmers of Rajaharat have a new ally against the monsoon: a strain of flood-tolerant rice developed by geneticist Pamela Ronald ’82 and plant breeder David Mackill and their colleagues. After years of research, Ronald and her lab succeeded in isolating a gene that allows rice to withstand submersion for up to two weeks, and then created new varieties that are flood-tolerant and yield three to five times more grain.

Finally, after seven days, the rain has stopped. The waters slowly recede. At first light, the farmers slog out to the fields, braving the ankle-deep mud. They can’t believe their eyes. The slender green shoots are still upright. They have survived.

“The potential of genetic techniques in agriculture is incredible,” says Ronald, professor of plant pathology at the University of California at Davis and co-author of *Tomorrow’s Table: Organic Farming, Genetics, and the Future of Food*, which she wrote with her husband, organic farmer Raoul Adamchak.

From her light-filled campus office, surrounded by oversized computer monitors displaying dizzying columns of data, Ronald directs a 30-person genetics lab whose work has the potential to help feed the world’s population in healthier, less toxic, and more sustainable ways—assuming, of course, that you accept the proposition that genetic engineering *can* be sustainable.

In genetic engineering, scientists “cut” or remove a specific gene from one organism’s DNA, and then “paste” or slice that gene back into the DNA of another organism, transferring, for instance, a gene for resistance to cold from one species to another, making the altered species more cold-resistant.

In Ronald's lab, technicians transfer genes using a common soil bacterium called *Agrobacterium* as a sort of biological "mule." In nature, *Agrobacterium* invades a plant, and then infects it with a segment of its own DNA that instructs the plant to develop crown gall disease. In the lab, the disease-causing parts of the *Agrobacterium's* DNA are removed and replaced with genes that carry desired characteristics.

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