

fieldwork, say project leaders Minderhoud and Pham Van Hung, director of the Center for Water Resources Technology for the South of Vietnam in Ho Chi Minh City. Geologists, for example, will map layers of sand, clay, and peat, which compact in different ways. Such data will be fed into modeling tools that will help researchers and policymakers understand how water use, development, and sea level rise could affect the fate of the delta.

One sensitive question is exactly how much of the subsidence is due to groundwater extraction—a main driver of delta economic growth. “People just say, ‘Ground water is causing this,’ but we have no data to prove it,” says Bui Tran Vuong, the deputy director of the Division of Water Resources, Planning, and Investigation for South Vietnam in Ho Chi Minh City. Other factors are likely at play, says geologist Esther Stouthamer of Utrecht University. Urban infrastructure can squash poorly drained soils, and intruding salt water can weaken the chemical bonds between soil grains, making soils more likely to compress. Still, Stouthamer says, “ground water is probably the main driver” of subsidence.

In other nations, government efforts to limit groundwater use or switch to surface supplies have slowed or halted subsidence, but can require intrusive regulation and expensive infrastructure. Another option is to pump water back into the ground to raise the surface, a process called recharge. But the pumping tends to require a lot of energy, the water can escape through unseen cracks, and roads and buildings can “buckle as the land rises,” says James Syvitski, an oceanographer at the University of Colorado, Boulder.

Syvitski is similarly skeptical of scenarios that envision the delta becoming an Asian version of Holland: a lowland protected from the sea by tall dikes. “Doing that for the Mekong coastline is cost-prohibitive,” he believes. Others disagree. “Life on the future delta will be lived below sea level,” predicts historian David Biggs, a Vietnam specialist at the University of California, Riverside. “But to make it work on the scale that we see in Holland will require a lot of education and democratic participation.”

In the meantime, the delta confronts existential threats from abroad. Nations upstream along the Mekong are building dams expected to reduce the flow of sediments that build the delta, and sea level is rising. Still, many researchers are optimistic that such change can be managed. Projects like Rise and Fall are coming none too soon, Syvitski believes. “The Mekong delta,” he says, “is at a tipping point.” ■

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BIOMEDICAL RESEARCH

Canadian registry to track thousands of pot smokers

Data could answer questions about safety, efficacy, and dosage

By Lizzie Wade, in Montreal, Canada

When a healthy looking man in his 70s walked into a sickle cell clinic in Kingston, Mark Ware sat up and took notice. A newly minted doctor, Ware saw many patients in chronic pain who often died young. The elderly Rastafarian seemed unscathed by the disease. “I asked him, ‘What’s your secret?’” says Ware, recalling an encounter that took place 15 years ago. “He leaned over, fixed me with his eyes, and said, ‘Study the herb.’”

Ware is now doing so on a grand scale. A pain management researcher at McGill University Health Centre here, the native Jamaican directs the Quebec Cannabis Registry, a new, one-of-a-kind database that aims to gather information on every patient prescribed marijuana in the province over the next 10 years—thousands in all. By collecting data on symptoms, dosage, improvement, and side effects, the registry, launched on 11 May and funded by a grant from the nonprofit Canadian Consortium for the Investigation of Cannabinoids, aims to fill gaps in knowledge about the efficacy and safety of medical marijuana. It’s a “wonderful step in the right direction” for “legitimizing some of the medical uses of cannabis,” says Raul Gonzalez, a psychologist at Florida International University in Miami who studies the cognitive effects of cannabis use in HIV/AIDS patients.

Most drugs go through years of rigorous clinical trials before they are prescribed. That’s not the case for marijuana. Even as more and more states and countries legalize pot for medical purposes, clinical trials of smoked cannabis remain rare. “Decisions [about medical marijuana] are being made at the ballot box instead of in the laboratories,” Gonzalez says.

Few doubt that the drug can relieve certain symptoms. It eases neuropathic pain, reduces spasticity in people with multiple sclerosis, and improves appetite and weight gain in chemotherapy patients and those with wasting conditions, according to psychiatrist Igor Grant, director of the Center for Medicinal Cannabis Research at the University of California, San Diego. However, doctors have almost no guidance on recommended dosages or possible side effects. “If we knew what we were prescribing more accurately, we’d be a lot more willing to work with it,” says Barbara Koppel, a neurologist at the Metropolitan Hospital Center in New York City.

Amassing and analyzing a large volume of patient data could answer long-standing questions, Ware says. Canada could have done this sooner: In the first 15 years of its medical marijuana program, 40,000 people were authorized to smoke the plant. But “we didn’t learn anything from that process—about who they were, why they used it, how they used it, how much—nothing,” Ware says. “We don’t want to be in the same position 10 years from now.” Through 2025, the Quebec registry

aims to collect anonymous data from 3000 patients, each of whom will be tracked for 4 years to probe for rare side effects.

Large clinical trials would help bring medical marijuana out of the shadows. “Without well-controlled empirical studies, we’re still going to be left scratching our heads about whether [medical marijuana] really works,” Gonzalez says. Funding them is a challenge. Drug companies show scant interest in dried, smoked cannabis, Ware says, because it “may not have long-term payback.” In the meantime, collecting vital data from users can’t wait, he says. Marijuana “is part of our society now,” Ware says, “and we need to have a means of talking to our patients about it.” ■



Scientists anticipate a trove of data on Canada’s medical marijuana use.