Soldier-Scientists Join Counterinsurgency in Afghanistan

When Alexander Stewart went to war in Afghanistan, his foe was the unstable landscape. Every spring for a thousand years, an artificial reservoir on the Ghazni River has swollen with runoff as snowmelt pushes from the Hindu Kush mountain range. The current dam, the Band-e Sultan Dam, is so massive that “it’s something you can imagine the Tennessee Valley Authority might have built,” says Stewart, an assistant professor of geology at St. Lawrence University in Canton, New York. But the decades-old concrete edifice wasn’t built to last. On 29 March 2005, a section collapsed, sending a torrent downstream that flooded Ghazni city and drowned 14 people.

Four years after the disaster, Stewart was in Afghanistan poring over photos and reports for clues to why the Band-e Sultan gave out. Stewart, a glacier morphologist, was one of a dozen “soldier-scientists” assigned by the National Guard Bureau to an elite company, the U.S. Army’s 143rd Infantry Detachment, Long-Range Surveillance, for a 1-year tour of duty. Low-profile platoons like Stewart’s, deployed by the military’s Agribusiness Development Team (ADT) program, are part of the U.S.-led military coalition’s counterinsurgency strategy, which aims to coax Afghans to rely on their government rather than the Taliban.

It is the first time that soldier-scientists have been deployed on noncombat missions in a war zone, says Stewart, who described his experience at the Geological Society of America’s annual meeting in Denver last week. “It’s an unprecedented, modern approach to fighting,” he says.

Operating in 10 Afghan provinces (see map) for the past 5 years, the program has spent $42 million on more than 680 projects, such as coring trees for climate records; shifting farmers from growing opium poppy to saffron; and assessing the Taliban’s potential to generate income from mining in their strongholds. Some geoscientists decry the effort. “They call it ‘weaponizing geology,’” says John Shroder, a geoscientist at the University of Nebraska, Omaha, whose research in Afghanistan predated the Soviet invasion in 1979. Shroder disagrees. “Scientists are doing a noble thing to help people there.”

Top brass are mulling whether to continue deploying such units after the coalition completes the drawdown of combat troops next year, according to the ADT Mission Office. And they may see action in future conflict zones: According to the National Guard’s 2012 Posture Statement, former U.S. Defense Secretary Robert Gates stated that the military is working to develop more programs like ADTs.

Before shipping out for Afghanistan, Stewart and the other scientist-soldiers were instructed how to build relationships with village elders, ascertain local needs, and send a proposal up the chain of command for funding. Among the missions of Stewart’s ADT was teaching villagers how to use wire gabion baskets to reinforce berms, showing farmers how to trellis grapes—“they had been growing them right on the ground,” Stewart says—and setting up an experimental farm for Ghazni University. It is vital work, Shroder says, because 3 decades of turmoil in Afghanistan “destroyed their education system.”

Stewart put his geoscience expertise to work on the dam collapse at Ghazni, which had serious repercussions for the region’s water and food security. “If you don’t control the 1 month of water you get from the Hindu Kush, you’re without water for 11 months,” he says. The Band-e Sultan’s stored water irrigates 15,000 hectares of cropland for about 25,000 families. The Afghan government had quickly mended the breach of the dam’s wing wall, but Stewart’s team wanted to figure out why the wall crumbled and assess the repair’s integrity.

The dam section that failed turned out to have been built on lake silt. “There was no structural stability,” Stewart says. And photos of the rubble revealed that the concrete lacked reinforcement bars. Visiting Band-e Sultan that July, Stewart’s unease grew. He calculated that the “flimsy” new wing wall could reliably withstand the water pressure only if the reservoir was filled to less than 60% of the wall’s height. In the 4 years since Stewart’s assessment, the Afghan government has not followed through on promised sturdier repairs.

The Taliban, who regularly threaten to blow up the dam, have thwarted other missions, such as a plan to stock highland lakes with fish. A key dirt road leading into the mountains wends through Taliban territory. “We thought to airlift the [fish] tanks,” says Neal Litton, captain of the ADT that Stewart served on. “It was just too complicated.”

The expertise of scientists such as Stewart is vital, says Litton, now a financial advisor in Plano, Texas. “He’d tell me when something was not going to work.” But Litton says that other soldiers and superior officers didn’t always welcome such frank assessments from lower-ranking personnel—even if they are Ph.D. scientists.

The satisfaction Stewart took in applying his expertise to helping Afghans was marred by tragedy. On 16 October 2009, when half of his company was returning from an ADT mission on a rugged dirt road from Jaghori, an improvised explosive device detonated beneath one of the armored Humvees, and mortars rained down. Christopher Staats, a renewable resources specialist, and Gabriel Green, a livestock specialist, died. “They were my brothers-in-arms,” says Stewart, who was at the base that day. A grim reminder that for soldier-scientists, danger is never far away.

–RICHARD STONE