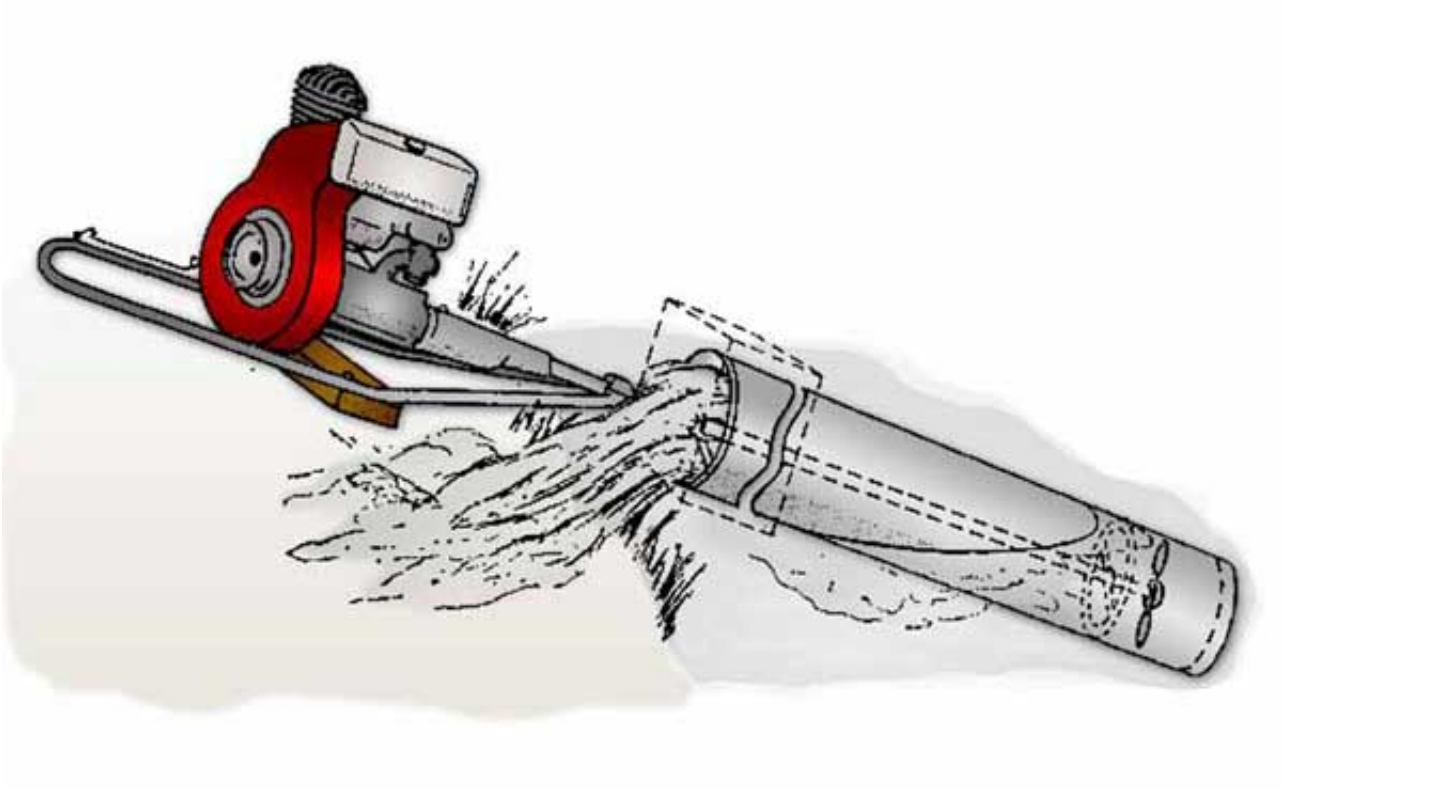
Print

The not-so-silent revolution

Written by David Biggs.

During the Vietnam War, the Mekong Delta was perhaps best known as a Cold War battleground. While the war raged, however, a technological revolution, every bit as profound, was underway as farmers began adapting small engines for water pumps and boat motors. Since the introduction of these engines in the early 1960s, almost every household managed to acquire one. Mounted on a water pump, these engines enabled farmers to irrigate crops and double their yields. Higher yields permitted other purchases from bicycles and Honda motorbikes to generators and sewing machines (see I remember Honda rice). As the war escalated in the late 1960s and the Vietnamese government's authority deteriorated in the countryside, a sort of fragmented modernization was underway. After a relatively brief respite after 1975, imports of these engines have surged since the 1990s.

Invasion of the small engines



Across monsoon Asia, a similar small-engine revolution occurred. Powering scooters, three-wheeled trucks, boats, and water pumps, low-horsepower (hp) engines have radically altered the social and ecological fabric of rural life. Almost everyone is familiar with their sounds, if not their operation. Rarely a moment exists in the rivers or fields when one does not hear the percussive rattling of a motor. Such goods first became widely available in the 1960s. And, since the 1980s, their use has grown exponentially. The adoption of cheap internal combustion engines to power pumps allowed farmers to start growing with high-yielding rice and fertilizers that have become the norm today. These pumps have played a pivotal role in what Francois Molle and others call a silent revolution.

Local ingenuity

Although American and international aid missions were usually quick to claim the credit for "winning hearts and minds" via such introductions of new machinery, American technical advisers were, for the most part, the spectators, and local farmers the inventors. Robert Sansom, a Rhodes scholar who studied the rural economy of the Mekong Delta in 1966-67, noted that an enterprising Vietnamese dredging mechanic adapted an impeller to build a "shrimp-tail pump" (may bom duoi tom) out of the engines available in 1963. By 1967, he sold some 80,000 pumps across the delta and made a sizable fortune. It was only after Dr. Sansom related his observations to officials at the U.S. Agency for International Development (USAID) in Saigon that Robert Komer, an American ambassador and head of U.S. President Lyndon B. Johnson's nation-building operations, considered the revolutionary implications.

Farmers, working in muddy fields far removed from agricultural extension offices, experimented with engines for several years before the Americans and the Saigon government paid any attention. The ironic role reversal here was not simply a case of the tail wagging the dog, however. The Americans played a supporting role in this "takeoff" story through a Commercial Import Program that promoted the widespread importation of American technology at cut-rate prices. There were other factors, too, particularly the involvement of Asian technical advisers. In the same town where the dredge mechanic improvised the shrimp-tail pump, Taiwanese advisers successfully introduced the first high-yielding rice

varieties from the International Rice Research Institute (IRRI) that could produce more rice when irrigated.

Big engines vs. small engines

To understand both the popularity of the small engines and the challenges faced by governments and people in the region today, one must consider the problems inherent with the older, state-managed forms of large water pumping stations and canals ("big engines"). Reclamation programs initiated by the French colonial government produced an agricultural landscape that depended on large inputs of labor and funding. In the Mekong Delta, this infrastructure fell into disrepair as Japanese military occupation (1940-45) gave way to almost three decades of fighting. Throughout this era, engineers, social scientists, and aspiring Vietnamese nationalists all debated the future of water management in the delta.

After the Geneva Accords were concluded in 1954, the U.S. advisory mission in Saigon immediately embarked on an ambitious scheme to use its own big machines, especially a fleet of multimillion-dollar, cutter-suction dredges manufactured in Baltimore, Maryland.

President Ngo Dinh Diem presented Americans with ambitious plans to resettle hundreds of thousands of northern Vietnamese refugees on abandoned rebel-held lands of the delta, and Americans responded by sending several dredges to clear the main canals for these grid-like projects covering thousands of hectares. With a surge in violence in 1959, communist insurgents began a concerted effort to attack the American machines. In new settlements across the delta, platoons of a new People's Liberation Armed Forces scattered settlers and then opened fire not on government troops but on the dredges. While the insurgents deliberately shifted targets, the new socialist government in North Vietnam also favored big-engine approaches to irrigation. Insurgents appropriated small-engine technology for immediate tactical needs, but the general attitude in the north was that irrigation was the responsibility of the state, typically involving mass labor campaigns and Russian-designed pumping stations.

A not-so-silent revolution

The shift to an agricultural economy dependent on small engines began simultaneously at many sites across the region in 1963. American and Vietnamese archives suggest after the President of South Vietnam, Ngo Dinh Diem, was overthrown in 1963 the way was opened more importers to participate in American-backed programs. Four years later, in 1967, American officials first noticed the demand for this equipment, and they began promoting motorized equipment in their overall nation-building strategy. Among English-language sources, the best known account of the shrimp-tail pump's development comes from Dr. Sansom's 1967-69 research.

A severe drought in 1962 prompted farmers around the town of My Tho to start major canal projects to save their harvest. One prosperous farmer in a nearby village bought a diesel-powered centrifugal pump for roughly US$600. Another farmer witnessed how the pump effectively lifted water into that landowner's fields and quickly grasped the value of motorized irrigation. This man had worked on French dredges as a mechanic in the 1940s, so he set to devise an impeller similar to suction dredges in use after 1945. After several unsuccessful trials with a French bicycle motor and a Japanese 4-hp engine, he purchased a 4.5-hp Clinton engine, and within months turned a profit by renting out this improvised pump. In 1964, dealers improvised their own impellers and tin sleeves. Across Asia, sales of similarly made motor pumps increased steadily. In each place, locals circulated their own stories of invention.

IRRI's high-yielding rice also played an important supporting role in the small-engine revolution. Privately owned water pumps allowed farmers to more reliably irrigate fields planted with one of the early high-yielding varieties, IR8, introduced in 1966. This variety required about 30 fewer days to mature than most varieties, and it was extremely responsive to nitrogen fertilizers, but it required steady irrigation for maximum productivity.

By 1967, 80,000 shrimp-tail pumps were in use based on an American estimate citing import statistics for 4-hp engines. With Dr. Sansom's revelations to colleagues at USAID and successful IR8 trials, American aid officials were aware that a kind of agroeconomic revolution was underway. Meanwhile, war-related violence escalated and the canal infrastructure deteriorated further. By 1974, a Dutch advisory team

estimated that more than a million pumps were being used across the delta for irrigation and flood control.

Inefficiency and insurgency

Although American advisers and Vietnamese officials in Saigon generally supported modernization, their reactions to the improvised pumps and shrimp-tail motors ranged from concerns about inefficiency to outright opposition. American advisers, in memos and promotional literature, favored the more efficient single-purpose centrifugal pumps while ignoring the importance of the shrimp-tail as a twin-use pump/motor. Local government representatives often refused to publicize the shrimp-tail pump because it was only 5–40% as efficient as the centrifugal pumps. In keeping with the USAID line on inefficiency, Vietnamese publications on motorized water pumps excluded the shrimp-tail from the lineup.

The South Vietnamese response ranged from obstructionist to concerns over military security. One of the biggest bottlenecks to the rapid sale of engines in the 1960s was not supply or even hard currency, but the arcane process in which only farmers lucky enough to acquire a license were permitted to buy an engine. Navigating government and insurgent checkpoints also slowed the transport of equipment from Saigon docks to the delta with bribes and taxes, thus raising the end price. Government bans also aimed to prevent the sale of boat motors to insurgent-controlled areas. By restricting the sale of engines and even rice seed in government-held areas, the end result was to spur rice production in “liberated zones.”

Thus, the shrimp-tail revolution became an integral part of the Vietnamese revolution, too. An American report in 1970 noted that government bans on the sale of equipment had resulted in the rapid movement of equipment into territory held by the National Liberation Front (NLF). With rice prices at all-time highs in 1970, much of the rice was then being sold in government-controlled markets to generate cash.

Postwar epilogue

Although academics have extensively examined mechanization, the rural cash economy, and the Green Revolution in most of monsoon Asia, the role of small engines has been largely ignored.

The rapid adoption of these engines raises important questions about the state’s role in managing water resources. This is an increasingly difficult task even in countries such as Vietnam that advocate a form of “state-managed capitalism.”

The postwar government in 1975 first supported a model of centralized state control over irrigation with large irrigation stations and mass-labor public works campaigns. After 1986, with Vietnam’s liberalization policy, imports in boat motors, motorized pumps, and other equipment surged as the state reduced its obligations. This small-engine revolution produced a kind of ecopolitical impasse in which states and their constituencies were at odds over measures to divide up increasingly scarce resources. This resulted in some notable disasters such as a 2002 forest fire that consumed much of the U Minh Forest, a freshwater area with cajuput trees that once protected a large rear base for the NLF. The pumping of groundwater on surrounding farms lowered the water table in the forest and dried out the layer of peat, which fueled the fire.

Advances in small technology since the 1960s, the not-so-silent revolution, have literally empowered millions of individuals to improve crop yields and to survive ecological challenges brought by natural and social changes. However, to the extent they contribute to groundwater depletion and other problems, they point to a present-day predicament for states trying to manage increasingly scarce water resources. The turn towards everyday technology since the 1960s has produced a middle ground on which farmers and

states alike must navigate landscapes shaped both by small-engine technology and aging networks of levees, canals, and older works. States have, for the most part, been left in the dust and engine exhaust of the small-motor revolution, and it remains a challenge for experts and intellectuals to catch up and respond to this trend.

Dr. Biggs is an associate professor of history at the University of California at Riverside. His research reflects interests in Southeast Asia, environmental issues, and agriculture. His most recent book is Quagmire: Nation-Building and Nature in the Mekong Delta (University of Washington Press, 2011).

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