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*Note: This is a work in progress. Cite, quote, or steal at your own risk. See robertwellmancampbell.com for some images of Cambodia, which I will show at the Hall Center during the Nature and Culture Seminar on February 8th.*

**Red Water:  
The Khmer Rouge and the Environmental Transformation of Cambodia, 1975-1979**

The United States would have to relive 11 September 2001 every day for a quarter century to suffer a loss proportional to that of Cambodia's from 1975 to 1979. The sheer demographics of this human disaster, which some call the most severe known to history, overshadow its environmental aspects, with some propriety. But it is generally agreed that for every person murdered in the mass executions of the Khmer Rouge's "killing fields," another ten people may have died from that regime's rice paddies-- from the starvation diet they yielded or from the slave labor used to rebuild them into a new grid served by new irrigation and new roads. Cambodian communists attacked not only Vietnam, modernism, internal enemies and external models of development-- they attacked nature. They said so; they chanted and sang of their mastery over nature. Nature, in that neighborhood, is basically the Mekong River, and sadly the Mekong was scarcely more affected by Cambodians' dying than was Vietnam or modernism.

This paper attempts to put this environmental story, gleaned from English-language secondary literature and American satellite images, into some context of Cambodia's own history.

## **Democratic Kampuchea's physical and political context**

Physically, Cambodia is likened to a tilted saucer; it is round, mountainous at the edges, flat and wet in the middle, and "cracked" north-to-south by the Mekong River. Only five thousand years ago it was a bay of the South China Sea, between two peninsulas roughly corresponding to Vietnam and Thailand today. The Mekong carried Cambodia downstream and dumped it where it lies today. This is why the country's center is so flat; this is why it has almost no petroleum or minerals; this is why its soil is poor, deprived of nutrients from parent rock.

Cambodia's great shallow lake, Tonle Sap, is in the country's center, connected to the Mekong by a spur. It is extremely productive of fish, including more than a dozen ocean species still living there, and at its lowest it is only 60 centimeters above sea level, if that can be believed. For about a third of every year, from July to October, the Mekong floods again, reversing the flow of Tonle Sap's outlet, and ballooning it to about six times its normal area. The main rice-growing areas are around the Mekong and Tonle Sap, enriched by annual silt. "When the waters flood," goes the proverb, "the fish eat ants; when the waters recede, the ants eat fish."<sup>1</sup>

Politically, Cambodia has always been nibbled on from both sides. Where Indochina has been the cultural "Poland" between India and China, Cambodia has been that political Poland within Indochina. It is much smaller in area, population, and resources than both Thailand and Vietnam, to the east and west. Its only real advantage has been its amount of arable soil per capita, poor though it is. Cambodia has spent centuries dominated by other countries, avoiding foreign wars, or trying to play one side off the other. In some ways, European imperialism

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<sup>1</sup> John V. Dennis, "Kampuchea's Ecology and Resource Base: Natural Limitations on Food Production Strategies," in David A. Ablin and Marlowe Hood, eds., *The Cambodian Agony* (Aramonk, N.Y.: M.E. Sharpe, 1990), p. 218-236. Ben Kiernan, *The Pol Pot Regime: Race, Power and Genocide in Cambodia under the Khmer Rouge, 1975-79* (New Haven: Yale U. Press, 1996), p. 7.

stabilized its borders and security, especially since the French were pushed out without the huge battles required in Vietnam.

Cambodia's amazing continuity through the Second World War, independence, the nightmares of the 1970s and their aftermath, is the nine-lived Norodom Sihanouk (commonly pronounced SIN-uck), Cambodia's durable head of state. He gained the reverence of Cambodia's peasants by leading them into independence, but he irritated the urban elites and middle class by his quirky "Buddhist socialism," his political wavering, and just his ever-present personality. Rarely has a country been so dominated by one character, right down to the feature films he wrote, produced, directed, starred in, distributed, and awarded with prizes. (Pol Pot's maniacal anonymity, to the extent of the world not knowing that he or his party existed, was Sihanouk's very antipode.) The coup that toppled the vacationing Sihanouk in early 1970 interrupted a thousand-year monarchy, introduced a decade of disaster, and more immediately swung him into a strange political marriage with Cambodia's insignificant Communist party, which he had been attacking just a month before. As the Khmer Republic died over five years, the communists pushed Sihanouk aside till he was less than a figurehead, held under house arrest through the Khmer Rouge regime.

Cambodians hoped the 1975 coup might end the five years of killing, but it accelerated. The Khmer Rouge regime, usually referred to as Democratic Kampuchea or DK, killed not only political enemies but political allies, class enemies, ethnic minorities, apolitical peasants, and even Vietnamese citizens through foolhardy invasions. It attempted a sort of Great Leap Backward to "Year Zero," wrenching Cambodia back to its agricultural glory days almost a thousand years past. Within days of marching into the capital city of Phnom Penh (pronounced p-NOM PEN), the Khmer Rouge virtually emptied it of its 2-3 million people, as it did the

smaller cities. They claimed this was to avoid American bombing and start rebuilding the country's agriculture, but it certainly scrambled political resistance. The heavily rural Khmer Rouge proceeded to blow up banks, outlaw private property and currency and even barter, kill educated people, and close most schools. Besides these forms of urbanity and modernity they also attacked Buddhist monks and temples, Muslim Chams, and ethnic Vietnamese. In theory they divided the population into 20 economic classes and three political classes, but in reality they discriminated between Base People, on whom the new state could be built, and New People, who were suspect. The division was roughly half and half, since many peasants had tainted themselves by even fleeing to the cities. As people were forced into communal labor the New People were worked harder, fed less, punished more, and perhaps deliberately liquidated. Instead of recovering from civil war, conditions deteriorated for everyone as the regime consolidated: starvation, overwork, epidemics, political purges, continued warfare. It has been estimated that 85% of women in Democratic Kampuchea stopped menstruating. By the beginning of 1979, when the Vietnamese swept in and toppled the Khmer Rouge, 1-2 million Cambodians had died, perhaps over a fifth of its population. Experts debate whether this constituted class war, ethnic genocide, "multiple genocide," "autogenocide," or just a "social catastrophe."<sup>2</sup>

### **Democratic Kampuchea's environmental agenda: irrigated rice**

Democratic Kampuchea sometimes saw its people as draft animals. Khmer Rouge leader Ieng Sary said in August 1975 that it was to "the heavy task of economic revival that the entire

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<sup>2</sup> Marlowe Hood, *The Cambodian Agony*, 2nd ed. (Aramonk, N.Y.: M. E. Sharpe, 1990), pp. xxv-xxvi, lii. Kiernan, *Pol Pot Regime* pp. 323, 456-460. Karl D. Jackson, "The ideology of Total Revolution," in Karl D. Jackson, ed., *Cambodia, 1975-1978; Rendezvous with Death* (Princeton: Princeton U. Press, 1989), 58. Michael Vickery, *Kampuchea: Politics, Economics and Society* (London: Frances Pinter, 1986), p. 32.

population was immediately harnessed." Hok Sarun, a peasant from the northwest, made it more explicit: "If they want something done somewhere, they just take people there and get them to do it; they never explain why. We just had to work like animals."<sup>3</sup>

More often, though, agricultural workers were seen as soldiers. The national anthem celebrated martyrdom rather explicitly: "The red, red blood spatters the cities and plains of the Cambodia fatherland / The sublime blood of the workers and peasants . . . The blood spills out into great indignation and a resolute urge to fight . . . The blood certainly liberates us from slavery." Combat propaganda went out over the radio, applied to agriculture:

At Chikreng, in Siem Reap province, almost twenty thousand people are united in an offensive struggle to build dikes with a positive and combative attitude . . . Today the dike-building sites are the front lines of the battlefield on which the struggle is being zealously waged, and the peasants of our cooperatives are striving to fight vigorously and without pause, day or night, to achieve the great leap forward . . .

Just as [workers, peasants, and troops] struck down the enemy and his lackeys in the time of the revolutionary war . . . they are now resolved to launch another violent and relentless offensive. . . . all our cooperatives are waging an offensive, struggling on the network of dikes and canals so that there will be many of them in a very short time."

A revolutionary song from the northwest pithily completed the fight-food-fight circle: "With water we grow rice, with rice we make war." Other DK songs, some based on folk melodies, fleshed out more detail and emphasized the mastery this small nation could achieve over nature if not its neighbors:

Dear brothers and sisters . . . let us . . . construct new rural areas.

We raise embankments, and these form a network, like spider-webs, everywhere. We dig canals, small and large, long and short, bringing water and loam to pour on to our fields.

We use fertilizer now, and now we raise embankments, high and low. We choose the seed we want. We wipe out peats. We build fences to protect our plots from beasts.

And we are very happy because we are the masters to a great degree. Problems of water no longer worry us. Even with the floods and droughts, we can grow rice.

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<sup>3</sup> Francois Ponchaud, *Cambodia: Year Zero* (N.Y.: Holt, Rinehart, Winston, 1977), p. 74. Ben Kiernan, *Peasants and Politics in Kampuchea, 1942-1981* (London: Zed Press, 1982), p. 354.

O solidarity group, working in unison, happy and self-assured! Dry-season rice, wet-season rice, light and heavy varieties of rice: our husbandry is successful everywhere. . . .

Francois Ponchaud, monitoring this rhetoric from over the border via radio and press release, made lists of all the mastery in DK slogans, with working people now or soon to be

master of the country  
master of the earth and water  
master of the rice paddies and fields, the forests and all plant life  
master of the water problem, the annual floods  
master of nature  
master of the future, of our destiny  
master of the revolution  
master of the factories, of production  
total mastery over water at all times, mastery during the dry season and the rainy season<sup>4</sup>

Note the minor lip service given to industry, but the great emphasis on agriculture. The DK national emblem likewise featured a factory, but next to a gridwork of irrigation canals, and surrounded by sheaves of rice. The Khmer Rouge left a few hundred factory workers in Phnom Penh, and sent a few million workers out into the fields.<sup>5</sup>

Their model of mastery was the ancient Angkor civilization, dating from about the 800s to the 1400s AD and centered north of Tonle Sap. These constitute the glory days for the Khmers and a two-level debate for historians: how did Angkor rulers farm, and how did the Khmer Rouge think they farmed? Neither level has conclusive evidence, but there was definitely centralized irrigation involved. Art historian Philippe Stern, studying Angkor inscriptions, identified irrigation as the first phase in an Angkor ruler establishing his reign. When Indravarman (r. AD 877-889) became king he said, "In five days I will begin to dig." Pol Pot could have said the same. Angkor rulers had religious motivations for digging; the canals were

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<sup>4</sup> Kiernan, *Peasants and Politics* p. 326. Jackson, "The Ideology of Total Revolution," p. 72. Ponchaud, *Cambodia: Year Zero*, pp. 95, 109, 73.

<sup>5</sup> May Ebihara, "Revolution and Reformulation in Kampuchean Village Culture," in David A. Ablin and Marlowe Hood, eds., *The Cambodian Agony* (Aramonk, N.Y.: M.E. Sharpe, 1990), p. 26.

dedicated to their subjects but also to the water gods, and reservoirs were built partly to recreate the mythical landscape around Mount Meru in northern India, where lakes surrounded the central mountain. In fact, the last phase cited by Stern was mountain- or pyramid-building, dedicated to the king himself as a memorial and burial vault. It is not hard to see the special significance of digging up or down in a very flat land.<sup>6</sup>

But of course the kings had practical reasons to irrigate. The Mekong flooded rice lands once a year with water and silt, but what if they could be flooded with water more often? Multiple croppings could support a larger number of parasitical bureaucrats and enhance the power of the king. This is just what Indravarman's distant successor Suryavarman was reported to do, achieving all the elements of the "Asiatic" mode of production. One of the best documents of this came in 1296 from a Chinese envoy, Zhou Daguan, who reported that 3 to 4 crops were being harvested per year. Some believe this was an unsustainable practice, given Cambodia's soil, and they see in the data signs of decline from the 1100s. Cities were being established far from Angkor itself, perhaps among fresher soils, perhaps because poorly maintained canals went stagnant, breeding mosquitoes and their diseases, cutting further the labor available for maintenance. Others believe that Zhou Daguan, Pol Pot, and many historians are all wrong, that multiple-cropping was limited to very small areas of lowland, or was in fact just different varieties of rice at their various stages of growth when Zhou Daguan went out touring. It is possible the canals discovered by archaeologists delivered water to cities, not to rice paddies.<sup>7</sup>

Whatever reservations historians have, the Khmer Rouge had some kind of admiration for Angkor irrigation, and made it their main goal to harvest two or even three crops of rice per

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<sup>6</sup> David Chandler, *A History of Cambodia* 3d ed. (Boulder Colo.: Westview, 2000), p. 37.

<sup>7</sup> Chandler, *A History of Cambodia* pp. 37, 43, 71, 53. Omar Sattaur, "Raising Rice in Cambodia's Ruins," *New Scientist* 134.1824 (6 June 1992), p. 33-36. Kiernan, *The Pol Pot Regime*, p. 8. Dennis, "Kampuchea's Ecology," p. 213.

year. This would require a great deal of new canals, bunds, and reservoirs, but ironically required much tearing down as well. New rectangular paddies required the tearing down of the old patchwork walls. The old, seminatural irrigation through *colmatage*, which entailed short canals through the Mekong's natural levees, was encouraged by the French but disliked by the Khmer Rouge, since it limited planting to the one natural season; they ordered many such canals blocked or filled in. On the whole, however, communal work gangs built regular grids of one-hectare paddies, and long, straight canals to irrigate them, often at one-kilometer intervals regardless of topography. Western authors travelling through or over post-DK Cambodia reported vast expanses of such landscape. Pol Pot, almost certainly lying, told sympathetic visitors how each region had a large reservoir, each province a medium-sized one, and each district a small one, claiming that 1/3 of all agricultural land had been irrigated.<sup>8</sup>

The Khmer Rouge have been bitterly ridiculed for their technical incompetence. Part of this was their habitual inflexibility. They thought in terms of one reservoir per district, one canal per kilometer. Even personal work quotas were fixed and rigid, many said; some workers would knock off early while others would stay and work in the dark. Districts likewise had quotas, regardless of their appropriateness according to folk knowledge or technical specialists. Zhou Enlai criticized them personally for their hubris in sticking to a Great Leap Forward model. The few engineers around criticized them for their misplaced pride in their waterworks. Even the peasants ridiculed them; instead of singing "With water we grow rice, with rice we make war," they sang "Before, we cultivated the fields with the heavens and the stars [i.e. followed the seasons] and ate rice. Now, we cultivate the fields with dams and canals, and eat gruel." People

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<sup>8</sup> Kiernan, *The Pol Pot Regime*, p. 167, 382. Dennis, "Kampuchea's Ecology," p. 214. Scoville, "Rebuilding Kampuchea's Food Supply," p. 267. Twining, "The Economy," p. 145.



laughed at Khmer Rouge reliance on "the strength of our people" while leaving 200 donated Chinese tractors to rust.<sup>9</sup>

This image of incompetence can become a caricature, which some have tried to rectify. Karl Jackson has argued that DK was not all antimodern or anti-industrial, that the attempt was to leap *forward*, after all, though emulating the past in some respects. For example, he emphasized the cities being gradually repopulated by trustworthy peasants to work in factories. John Dennis has pointed out that Cambodia did have modern rice varieties coming in before the Khmer Rouge, and they brought in the modern, short-stemmed "friendship rice" varieties from China. Charles Twining takes many reports of failure with a grain of salt, considering the disgruntled sources; Vietnamese encouragement of Cambodians to maintain the new waterworks should show some of their value from a skeptical source, he argued.<sup>10</sup> Foreign technicians attempting to assist relief work during in the early 1980s suggested that poorly-designed DK waterworks were not to blame for that period's heavy flooding to the extent that others were suggesting. In fact, as it stands it is hard to judge what went on. With much of the society's competent people killed or hiding, and with so much fear current among survivors, even Pol Pot and Sihanouk had very poor information about real conditions. With the paucity of sources, especially environmental ones, we should remain open-minded to some benefits from an odious regime.

One underused though imperfect source of information is unclassified satellite images from the U.S. government, besides whatever may be declassified in the future. Landsat 1, the first sensor for land-resource monitoring, was launched in 1972, so we can assemble a coarse

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<sup>9</sup> Twining, "The Economy," p. 129-131. Jackson, "The Ideology of Total Revolution," p. 63. Kiernan, *The Pol Pot Regime*, p. 246, 320. Vickery, *Cambodia, 1975-1982*, p. 228-229.

<sup>10</sup> Jackson, "Ideology of Total Revolution," p. 58. Twining, "The Economy," p. 146. Dennis, "Kampuchea's Ecology," p. 226. Vickery, *Kampuchea*, p. 144.

photograph of the country before the Khmer Rouge took over. For political and technical reasons the data are poor for DK's immediate aftermath, but another mosaic can be assembled for roughly the mid-1980s, and the two compared.<sup>11</sup> These images show an impressive amount of new gridwork reported by many post-DK observers, though principally around Phnom Penh, particularly east and south of the city. While not sufficient resolution to show the jumbled old bunds transformed to one-hectare plots, they do show many linear features at perfect one-kilometer intervals, which are almost certainly canals and not roads. There are also an impressive number of new canals, reservoirs, and possibly roads around Tonle Sap. What the images do not show is the country as a whole transformed to a mass grid like the Midwestern United States. Western visitors to post-DK Cambodia, particularly in the 1980s while most of the country was very dangerous for travel, may have spread a false impression similar to Zhou Daguan's in 1296. Just as the Angkor kings' rule did not extend evenly over the whole country, neither did the rule of the fractured, schism-ridden Communist party of Cambodia. Impressive developments near the capital should not be assumed to apply far away as well.

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<sup>11</sup> Thanks to the United Nations' UNEP GRID Sioux Falls office for their generosity in providing the majority of these data, via the Tropical Rainforest Information Center, in conjunction with the U.S. Geological Survey, NASA, and the Raytheon corporation.