

*Silenced Rivers: the Ecology and Politics of Large Dams. Enlarged & Updated Edition*, by McCully, Patrick. (2001), New York: Zed Books, +416 pages.

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### Political Hydrology: the Damning of Nations

On March 13, 1982, approximately 25 police officers, paramilitary men and soldiers arrived in Rio Negro; a small riverside village nestled deep in a Guatemalan valley. Entering under the pretext of a regionally administered search for illicit guerilla combatants, the soldiers commenced the beating, rape and torture anyone they could restrain. At the end of the bloody episode, 70 women and 107 children lay dead. Later that year in a near by village another 92 were gunned down, their bodies piled and burnt in a bonfire.

Subsequent inquiry found that the region was anything but a haven for guerilla activity. Instead, the murdered were peasants who refused to leave their land to make way for the construction of a hydroelectric dam project destined to flood the valleys they had farmed for generations. The events described above are elaborated upon by Patrick McCully's book *Silenced Rivers: The Ecology and Politics of Large Dams*. Just one the many similar stories that accompany dam building schemes, this incident centers on the Guatemalan government's use of terror tactics in their attempt to expatriate the Maya Achi Indians from their ancestral lands. After receiving sizeable loans from the World Bank, the Inter American Development Bank, and the Italian government for the construction of the Chixoy dam, thousands of indigenous people were faced with forced resettlement or submergence under the rising reservoir waters. Those refusing to cooperate also faced the threat of murder.

Although the book is not what most academics would consider a political ecology, it is certainly one of the most thorough reviews and critical analysis of the environmental and political impacts of dams compiled to date. The hydroelectricity industry, the technical failures of large dams, the elusive benefits of hydro projects, large scale agriculture and irrigation, watershed policy, renewable electricity, the political economy of dams-- it's all here, neatly compacted between the covers of a single volume. Although portions of the work lapse in to journalistic prose, it is meticulously researched with almost every issue or technological argument made by dam advocates accounted for and strategically reproached. There exists no work more precise, thorough or devastating in its treatment of large hydroelectricity and large-scale irrigation projects. Take for example McCully's understanding of complex ecological issues: although hydroelectric projects are often envisioned as 'clean and green' alternatives to fossil fuels, McCully describes the myriad of reasons why dams are ruinous to the environment, reinforcing each of his arguments with carefully selected data.

A point of particular interest is hydroelectricity's contribution to global warming. By flooding lands behind dam walls,

"...The pattern of fluxes of CO<sub>2</sub> and CH<sub>4</sub> with the atmosphere is totally altered...plants and soils decompose when flooded and will eventually release almost all their stored carbon.... hydropower reservoirs, especially in tropical forest areas can make a significant contribution to global warming, in some cases as much or even more than fossil fuel burning" [141-142].

Climate change is not the only problem tackled: river sedimentation, the alteration of water temperatures, invasive species, geological effects, and hydro's role in malaria exacerbation are all considered in explicit detail in relation to their detrimental ecological impacts. For example,

"...roughly estimated for a 1987 World Bank study...around 50 cubic kilometers of sediment--nearly 1 percent of global reservoir storage capacity-- is trapped behind the world's dams every year" [107].

The sediment load disrupts dam functioning and decreases dissolved oxygen availability that also increase water temperatures behind the dam wall. Hydrological processes are thus altered in

ways that wreak havoc on local fish and wildlife. Also considered is what many charge as the world's most water consumptive industry: agriculture.

Irrigated agriculture makes use 70% of freshwater resources worldwide. The majority of this water is concentrated in the hands of large-scale producers, and up to 40% of the water transported is lost en route from source to sink due to pipeline leakages, evaporation and other inefficiencies. The Green Revolution in agriculture, which began in the 1950's and expanded dramatically during the 70's, popularized a set of production techniques involving improved seed varieties, inorganic fertilizers, pesticides and irrigation. The Green Revolution can thus be understood as one of the primary drains on freshwater resources. Intended to supply foodstuffs to impoverished countries, the Green Revolution marked a policy shift by numerous third world governments towards centralized irrigation schemes for selected producers. Improved "high yielding" hybrid varieties of rice and wheat demanded massive inputs of irrigation. This required the construction of hundreds of dams worldwide.

Although it is impossible to ignore the massive increases in yield brought by these technological changes, such advances did not come without losses. According to McCully,

"...after decades of modern perennial irrigation, soils which in many cases had supported traditional farming for hundreds or even thousands of years have become so degraded that they are not suitable for agriculture. Huge areas of irrigated land are now waterlogged and clogged with salts [145]."

McCully also debates the measures of efficiency used to analyze modern cropping systems:

"Irrigation together with inputs such as modern seed varieties and agronomical chemicals can clearly increase crop yields by significant amounts...Critics of the Green Revolution argue that this misleads as to the impact of intensive irrigation. Many irrigated areas are in fertile plains which were already more productive than other areas. As modern irrigated fields grow only a single crop, official statistics measure only the yield of this crop" [179].

The productivity of the cropping system is therefore not considered from an integrated and ecological standpoint: there is little recognition of ecosystems services which may or may not be supplied in these irrigated monocultures, nor is there mention of the potential negative impacts of these cropping systems, for example nitrate pollution, the low energy efficiencies of agricultural inputs, or the loss of biodiversity.

The following chapter is rife with historical data accounting for the ways in which dams can be harmful to human populations. For example, in 1975 maintenance workers at the High Teton dam in southern Idaho

"... saw a muddy stream gushing through the dam's north abutment. A few hours later a large wet spot appeared on the dam's downstream face, the spot turned to a spring, then a waterfall, then a 20 story high torrent burst through the northern third of the dam [102]." Unwilling to expend additional funds for geological retrofitting, engineers approved blueprints for construction that were poorly developed and faulty. This resulted in an "...ensuing deluge that damaged or destroyed 4,000 homes and 350 businesses in these small towns downstream and scoured the topsoil off several thousand hectares of farmland. It killed 14 people...and caused property damage costing up to \$1 billion [102-103]."

As mentioned above, McCully's book is not intentionally written as a political ecology. His work is not expressly academic and his approach drifts from that of a well-seasoned activist, to an ecologist, and at times to that of a political economist. Readers more familiar with the 'traditional' frameworks presented in anthropology or political ecology (discourse analysis, the politics of resource exclusion, etc.) may therefore find the book lacking. Nonetheless, McCully does attempt an analysis of the ideologies invoked by dam builders and proponents of similar 'megadevelopment' projects by employing tantalizing quotations in which such actors clearly demonstrate their adversarial and dominating relation to the environment. Scholar Arturo Escobar [1996] wrote eloquently on the process by which nation-builders attempt to "discipline nature" in order to prove their political and hegemonic legitimacy. By digging into the history of dam building, McCully unearths numerous references that clearly demonstrate Escobar's maxim. For example, there is writer M. Gorky who wrote "Soviet dam builders sought to 'make mad rivers sane [17].' Dams are thus more than 'modern temples' constructed in honor of Statehood—they are also symbols of man's never-ending quest to extract unabated resources from the earth.

Stalin's writing [1979] that '...water which is allowed to enter the sea is wasted' is echoed in a document produced in 1987 by the globe's leading proponents of neo-liberalist development, the World Bank.

"It is difficult to conceive of a scenario in which India can afford to let the waters of a major river such as the Narmada run wasted to the sea. Dams are therefore symbols of 'the progress of humanity from a life ruled by nature and superstition to one where nature is ruled by science and superstition is vanquished by rationality [237].'"

Consequently, without committing to restrain their rivers in the name of electricity and irrigation, nations are barred from modernity and 'development' remains but a dream.

Although McCully notes these issues, his analysis falls short from a full understanding of the ways in which damming projects are but another expression of the cultural and political hegemony exhorted by advocates of industrialization as progress. This is perhaps one of the most negative points of the book—by failing to produce a theoretical examination of the unspoken connections between such mega-technologies and the expansion of modernist ideology, an unparalleled opportunity to demonstrate with clarity the pervasive authority of industrial culture is lost. Instead we are presented with slices of a full critique. McCully deploys multiple arguments denouncing the supremacy of the discourse of global environmental management and modern development. In the absence of easily quantifiable facts, dam builders contend that their projects contribute to human progress. Supporters of the Global Environmental Management paradigm argue that, although there may be negative environmental consequences, their work is on the whole positive, and that the bureaucratic agencies, government and industry collaborations necessary to complete dam construction are symbolic of the 'highest rung' in environmental management. In the name of modernity and progress, 'wild' rivers must be 'tamed,' made productive and brought under the administrative purview of state agencies and industry—only then do they achieve a sense of cultural and economic worth. Rivers are thus converted from a natural state of unabated functioning into a productive machine reminiscent of the modern factory, constantly producing energy for human use and economic gain.

Despite the weak treatment of these points, McCully more than makes up for these shortfalls through his otherwise excellent analyses. Evoking an unintended political-ecological approach to uneven development policies in the third world, McCully explains that "...areas with people who are well off and well connected do not make good reservoir sites [70]." What follows is a description of "The Final Blow," the impact of dams on indigenous peoples. In the Philippines the overarching majority of dams have been constructed on lands claimed by the country's 4.7 million indigenous people. The influence that hydroelectric projects can have on these populations is clear. As indigenous populations are already marginalized from the modernization process, "mountain valley, forest or desert reservations are often their last refuge from cultural oblivion [70]." Relocation from these areas involves the "loss of common resources on which their economy is based, and is a traumatic process from which few cultures survive unscathed [70]." It is in these chapters which McCully writes most lucidly, and in which he weaves the threads of politics, economics, and ecology into a coherent whole.

Take for example the history of the Senegal River in Mauritania. For centuries the floodplains of the river were host to hundreds of thousands of peasant farmers who would follow the rivers retreating waters, planting their crops in nutrient rich sediment deposited annually. The remnant ground moisture was usually adequate to ensure germination and a bountiful crop. Once harvested, nomadic herdsman customarily grazed cattle on the remaining crop stubble, their herds fertilizing the land in the form of manure. At the same time, the river's yearly floods recharged the regions wells from which "women in the valley drew water...to grow vegetable gardens, giving them a measure of economic independence from their husbands [176]."

But when the final paving stones were laid on the Manantali Dam in 1987, the floodplains were pushed into a state of ecological stress, effectively ending this subsistence cycle. Under pressure from the World Bank and the International Monetary Fund, Mauritania implemented a series of neo-liberal measures aimed at privatized rice and sugarcane cultures for consumption in West Africa's burgeoning urban centers. Irrigation for the massive undertaking was supplied with water drawn from the reservoirs of the Manantali River, now dammed and hindered from delivering rich sediment downstream. The consequent decreased yields and increased population pressure on floodplain lands remaining outside commercial agricultural control has heightened ethnic tension between black farmers, who are perceived as Senegalese, and Mauritanian herders,

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seen as Moors. In April 1989 a border flare-up that was exacerbated by the volatile and cramped conditions peasants experience on the now denuded floodplains exploded, nearly bringing the countries to the brink of war. Violence gripped the land when tensions resulted in the looting of Mauritanian owned shops resulted in 250 deaths, at least 60,000 Moors fled or were deported from Senegal, and tens of thousands of blacks were forcibly expelled from Mauritania [176]. Although the social forces leading to these horrific events are extremely complicated, McCully contends that it is impossible to deny that the dam construction and the consequent interruption of subsistence lifestyles was a major influence in igniting the conflict. McCully's ability to trace the threads of environmental exploitation, resource access conflict and social upheaval make *Silenced Rivers* excellent reading. The book is however much more than a chronology of the horrors associated with dam building.

The final chapter, "We Will Not Move," is a review of the international anti-dam movement. Struggles against hydro projects are chronicled in the US, Tasmania, Eastern Europe, Brazil, Thailand and India. McCully concludes by proposing a new approach to water policy aimed at re-envisioning resource management at the watershed scale. Calling for a memorandum on large dam projects world wide, he delves into technologies (ranging from solar to small-scale non-damming hydro) and policies based in community participation in common-pool resource management-- all of which are artfully discussed alternatives to the hydroelectric behemoth. "Although hundreds of large dams are still under construction and many more are on engineers' drawing boards, aid funds and other public sector sources of financing are drying up, and public protests are provoked by just about every large dam that is now proposed in a democratic country," optimistically relates McCully. "The international dam industry appears to be entering a recession from which it may never escape [308]."

*Silenced Rivers*, although not expressly a political ecology is a scrupulous inquiry into the culture of dam building. It addresses in perhaps more detail than many self-proclaimed texts in political ecology, the fundamentals of environmental science, hydrology, conservation and social issues associated with this mode of development. *Silenced Rivers* is therefore indispensable material for political ecologists who wish to understand critically the effects of dam building on the environment and cultures worldwide.