

REVIEW ESSAY  
**DAMMING THE NARMADA AND THE THREE GORGES**

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**I. Damming the Narmada —  
India's Greatest Planned  
Environmental Disaster**

by Claude Alvares  
& Ramesh Billorey,  
© 1988 Third World Network,  
Malaysia, 196 pp.

**II. Studies In Ecology and  
Sustainable Development 3:  
High Dams on the Narmada —  
A Holistic Analysis of the  
River Valley Projects**

by Vijay Paranjpye, © June 1990,  
Indian National Trust for Art and  
Cultural Heritage (INTACH),  
New Delhi, 320 pp.

**III. Damming the Three  
Gorges — What Dam-Builders  
Don't Want You to Know**

Edited by Gráinne Ryder,  
© December 1990 Probe International,  
Toronto, 124 pp. plus index.

**Introduction: Recent Events**

On April 3 this year, China's National People's Congress approved the building of what could be the largest dam ever built, the Three Gorges Dam on the Yangtze River in China. While this decision was no surprise, since the People's Congress is normally little more than a rubber-stamp parliament, what is surprising is the fact that about one-third of the committee members abstained or voted against the project. Also notable was that no time was set for completion of the project, something normally expected from such a vote. Opposition to the vote has been both domestic and foreign, both lay and scientific.

At the same time as the world's largest dam is being approved for China, all sides anxiously await the World Bank-funded report by Thomas Berger, who in the late 1970s and early '80s led an investigation of the proposed MacKenzie Valley Pipeline Project in Canada's Northwest Territories, which was subsequently halted. He has been travelling independently in India with interpreters to interview locals in all three states involved in the Narmada project. As resistance to the project has been high, his report is expected to be a "damning" one; yet it is tragic and telling that while the protests of thousands who are going to be ousted are ignored or downplayed, the report of one western expert might

have the clout to get the whole thing called off. Publication of Berger's report is expected at the end of May.

**The Narmada Project**

Resistance to the Narmada Project has centered around the issue of resettlement and rehabilitation (R & R). While work on the dam has begun (with delays due to demonstrations by oustees and also strikes by workers who have been protesting the slave-like conditions of their jobs), plans for R & R are barely in existence. World Bank installations earmarked for R & R have been used to pour more concrete and raise the Sardar Sarovar Dam in Gujarat (now said to be seven percent completed), necessitating more money earmarked for R & R, which the Bank is all too willing to send. In the low-lying town of Manibeli, meanwhile, villagers have made "drowning pacts," vowing to stay in their homes even as the waters rise to flood the town. In 1990 the waters did not rise and flood the town as expected. During the next monsoons, these villages will likely be flooded, adding to the numbers of those who died as a consequence of World Bank-funded development schemes. Police have reportedly been using force and violence to drag people out of the village.

*Damming the Narmada* begins with a straightforward argument in Part One, entitled "The Narmada Project and Why It Should Be Cancelled." In six succinct

chapters the background of the project, the projected numbers of persons to be resettled, the impact on forests, farms and wildlife to be submerged, and the cost-benefit analysis used to push the project through parliament are all assessed; alternatives are suggested, and the authors conclude that if carried out, the damming of the Narmada will result in "the world's largest planned, environmental and human tragedy" (:59).

The holy Narmada River in India stretches from the Plateau of Amarkantak in what is actually the Eastern half of India, in the state of Madhya Pradesh, flowing 1 300 kilometers across Madhya Pradesh and Gujarat, emptying into the Arabian Sea. Over 20,000,000 persons inhabit the Narmada Valley. The proposed project involves a series of about 3,200 major and minor dams, submerging a total of about 350 000 hectares of forest lands and 200 000 hectares of cultivated land, and eventually displacing over a million persons. The number of dams is astronomical, the authors claim, because the Narmada Water Dispute Tribunal, set up in 1969, provided a forum for the Gujarat and Madhya Pradesh governments to compete in convincing the Tribunal that each "had the best, and the most extensive plans for using the river's waters in their states, and therefore should be given a greater share

**Table I: Some World Bank-Funded Dams Involving Displacement**

Country	River	Dam	Area Flooded Sq km	Persons Displaced	Height (meters)	Power (MW) predicted/actual	Construction Dates
Egypt/Sudan	Nile	Aswan	6 500	120,000	121	2100/1815	1967-69
Ghana	Volta	Akosombo	1.1m ha	80,000+	134	1824/760	1964-66
Ivory Coast	Bandama	Kossou	1 750	75,000	-	175/-	1970
Zambia/ Zimbabwe	Zambeze	Kariba	5 300	57,000	-	-	1959
Brazil	Uruguai	Itaparica	-	45,000	-	-	1985-90
Nigeria	Niger	Kainji	1 250	44,000	66	1000/760	1967
Indonesia	Serang	Kedung Ombo	(postponed) <sup>†</sup>	25,000	-	-	-
Brazil	Tocantins	Tucuruí	2 430	24,000+	106	8000/4000	1983-84
Brazil	Uruguai	Balbina	4 000	- <sup>††</sup>	-	-/112	1985-

<sup>†</sup>After funding 75 percent of the project, the World Bank dropped it in 1985, while 25,000 people waited for proper resettlement and rehabilitation. In 1989 1,500 families refused to leave the submergence area, prompting the World Bank to investigate.

<sup>††</sup>This project forced one-third of the Waimiri Atroari Indians from their land, producing such social and economic disruption that more than half the population died within a few years.

in the river's resources" (:11). Such a project would take a century to complete, or in other words, many of the proposed dams are merely projects designed to impress the Tribunal.

The most striking presentation in this book is an interview with S.C. Varma, who was at that time (1987) chairman of the Narmada Valley Development Authority (NVDA) — he has since resigned. From the interview we learn that even though the project had begun, no botanical survey had been carried out, that no study for compensatory afforestation had been carried out, that the study to examine the possibility of wildlife extinction had not surveyed the entire catchment area, and that no serious problems regarding seismicity are foreseen for the project, in spite of a report that mentions the possibility of earthquakes up to a magnitude of 6.5 occurring in the valley. Varma responds to this point by saying: "I know that what you are saying is quite clear. But, you see, the earthquake that was last seen was several kilometres away from the place where we are going to build the dam" (:71).

Indian authorities and the World Bank recognize that this project will be the largest river basin population resettlement to date (Three Gorges aside). The authors claim that 47 percent

of the people will be "tribals," the indigenous peoples who are the most marginalized segment of Indian society, not incorporated into the Hindu mainstream.<sup>1</sup> The evacuees have been categorized into groups and are to be given three years' annual income, and new land to replace lost lands. The land was not yet located as of 1988, though construction had begun. A proposal to give villagers money so that they would have to buy land on the market was opposed by researchers in Delhi, who claim that while the government would tend to undervalue land to be submerged in villages where people were forced to migrate, land prices would be inflated in areas where oustees would be seeking to buy. Studies cited show "an abysmal lack of information among the Sardar Sarovar oustees about their impending displacement and relocation" (: 22). At the Narmada Sagar site in Madhya Pradesh the situation is far worse due to the large number of people to be ousted and an absolute scarcity of land. The authors quote S.C. Varma's own study that concedes that after their highly fertile plots along the river have been flooded, the land that will be provided for the oustees will not even be suitable for crop production! Furthermore, in the catchment areas of the two major dams, the numbers of

landless families constituted 30 percent and 43 percent respectively. If landowners will not be compensated with even modestly adequate land, landless families are in a worse position. Varma pontificates that the landless will have to be absorbed into non-agricultural activities, whilst acknowledging that they have no skills beyond cultivation. The authors conclude Varma could only have perennial unemployment in mind for these landless persons.

Further, Varma is cited as writing that: "the whole gamut of resettlement needs very careful planning and execution" because "human beings have feelings; they cry and laugh, they can organize and also show their anger. If not handled properly, these human beings could even impede the progress of project building. They could constitute pockets of protest, unrest, and dissatisfaction..." These human beings have been doing just that, and the police response to numerous protests to the project has involved violence.<sup>2</sup> The World Bank has apparently ignored the protests, while it and the Indian government are cooperating in full violation of international law, which protects the rights of tribal peoples to maintain ownership of the land they have traditionally occupied, and both are

**Table II: Some World Bank-Funded Dams Scheduled to be Built**

Country	River	Dam	Area to be Flooded	Persons to be Displaced	Cost (US\$)	Height (meters)	Power (MW) Predicted
China	Yangtze	Three Gorges	44 000 ha.+	1.5 million**	\$12 bil.	185	13,000
India	Narmada	Narmada Sagar	91 348 ha.	170,000	\$13.7 bil.	177	223
China	Yellow River	Xiao Langdi	-	140,000	\$2.3 bil.	171	1,800
India	Narmada	Sardar Sarovar	39 134 ha.	100,000	\$8.8 bil.	139	300
China	-	Shuikou	-	63,000	\$250 mil.	101	1,400
India	Subernarekha	Icha/Chandil	30 000 ha.+	68,000	\$127 mil.†	-	-
Argentina /Paraguay	Paraná	Yacyretá	1 700 sq.km.	40,000	\$12 bil.	43	2700
China	-	Ertan	-	30,000	\$1.885 bil.	240	3,300
China	-	Daguangba	-	21,400	\$255 mil.	56	240
Thailand	Mun	Pak Mun	-	20,000*	-	-	-
Lesotho	Orange	Katse High Dam	-	-	\$1.828 bil.	-	-

†with another \$480 million in loans pending.

\*\*50,000 have already been relocated.

\*Now estimated at only 2,500

also in violation of the International Labour Organization's Convention 107, relating to Tribal and Indigenous Populations.<sup>3</sup> The World Bank has itself admitted: "The odds are high that the majority of oustees will be worse off following the removal." (:22) Amen.

So why, you may ask, and how do such plans get ratified? The answer is simple. It lies in that holy of holies of modern economics, the cost-benefit analysis. Alvares and Billorey carefully critique each point in the benefit-cost (B/C) analysis done by the Indian government, and rather than showing a B/C ratio of 1.52:1, they incorporate such considerations as environmental destruction and loss of wildlife into their own B/C analysis, and calculate a 0.11:1 ratio for the four major dams. The Indian officials estimated the human suffering as three years' annual income of each family, a total of Rs. 20 crore (about U.S.\$8 million).<sup>4</sup> Reading this book gives the reader a clear indication of how the variables on the cost side were played down to an extreme, and the benefits were exaggerated, sometimes simply by changing the numbers!<sup>5</sup>

The Alvares and Billorey book also provides numerous appendices on a variety of topics, including a list of suppressed facts, a discussion of the environmental impacts of the major dams, extensive data on plant and

animal species to be affected, a report on the loss of archaeological monuments, an analysis of irrigation, newspaper clippings, and most notably an article by the late Venishankar M. Vasu entitled "Alternatives to Major Dams." Vasu declared that:

*The need for dams was created by systematically eliminating or crippling the very basic systems of nature which contribute to availability of water. [India] never needed the modern type of dams which we have been building. A void was created to make room for dams and plans to construct them were pushed into that void. (:145)*

Vasu examines the history of the Saurashtra region of Gujarat, telling of its abundance of forests and streams, and high water tables which were virtually dried up in just one century. He asks how this could happen, and gives a straightforward answer: "The British started animal slaughter in this country on a mass scale in 1859. As a result, the free source of dung fuel available to the rural population was curtailed. Hence, people had to turn to the forests for firewood." The result was deforestation, flooding, soil erosion, siltation of rivers, shallower rivers, shorter banks, lack of shade, which caused rapid evaporation of soil moisture, and dwindling water tables made all the more rapid by consumption of huge quantities of water

by new industries. Vasu suggests a six-point plan to reverse this devastation, which includes halting the destruction of animals, digging the streams deeper, planting trees and grass on the banks, building series of small bunds to collect monsoon waters, clearing sediment from ponds and lakes to increase their storing capacity, and putting local village committees in charge of this operation. This procedure would be far simpler and cheaper, he writes, than building the high Narmada dams.

Another book about the Narmada project, *High Dams on the Narmada*, is an extensive study of the project prepared by a research team under the guidance of Vijay Paranjpye.<sup>6</sup> This work sets a new standard for critique of development projects. It begins with a history of development projects in India, and a history of the evolution of the Narmada project. In a section entitled "The Backlog Mountain," we are informed that in India as of 1989-90, there were 168 major and 330 medium dams yet to be completed, of which 73 major and 138 medium dams are being constructed without approval from the Planning Commission of India, some of these being three-quarters completed. Meanwhile thousands of minor irrigation schemes throughout the country are stranded without funds. The spillover cost of completing the major dams alone will be a staggering Rs.16,482

**Table III: Some CIDA-Funded Dams and Problems:**

Country	River	Dam	CIDA Contribution	Problems
Sri Lanka	Mahaweli	Madura Oya	\$71.5 million	Poor Resettlement and Rehabilitation program <sup>†</sup>
India	(in Kerala)	Idukki	\$51.0 million	Earth tremors, environmental problems
Colombia	-	Guario	\$29.0 million	Cost overruns*
Pakistan	Indus	Tarbela	\$29.0 million	Will last only 50 years
Honduras	Humuya	El Cajon Dam	\$27.8 million	Built on a fault, cracks in the dam
Ghana	Volta	Akasombo	\$17.2 million	Erosion
Brazil	Parana	Itaipu	\$ 3.0 million	Inadequate land compensation.**

<sup>†</sup>Funded, in '79, by 1984 60% of the 200,000 oustees still had inadequate water for their crops though they were supposed to be the beneficiaries of the dam's irrigation water. It flooded 263 000 hectares of land, including part of a wildlife sanctuary.

\*The dam cost more than half of Colombia's budget for all social programs.

\*\*The Guarani Indians lost 1 500 ha. of land and were given 210 ha. "with poison and malaria" as they described it in a letter to the World Bank.

crore (about U.S.\$6.6 billion), over a third of which are in Gujarat and Madhya Pradesh, the two states hosting the Narmada Project. The authors conclude that the approval of the Narmada project, including the B/C analysis was political, and was "reduced to an entirely farcical exercise" (:7).

The authors' portrayal of the R & R aspect of the project concurs with the Alvares and Billorey study: it is abysmal. Although much of the legislation around the project was an improvement over other projects, actual implementation of R & R has been a "dismal reality." Research clearly shows that villagers are ill-informed, misinformed, and that none had been apprised of the full extent of their rights. For example, not one villager had seen a posting of the mandatory Land Acquisition Act of 1894. The chapter on resettlement includes an eight-page assessment of the project by a World Bank appraisal team as well as other World Bank memos. The team concludes that the Bank has only two options concerning the unsatisfactory nature of R & R at the Sardar Sarovar site, to withdraw altogether or to stop disbursements until the state governments are in compliance with the standards set by the World Bank. Though construction continues, World Bank funding is on hold, apparently pending the Berger report. Yet there are reports to suggest that

Japanese investors are considering financing the project.

Paranjpye's study also concludes with a discussion of alternatives. One forgotten alternative in this study noted that the use of tanks to store surplus water, a tradition going back 2,000 years. The use of tanks during British rule was neglected in some states, expanded in others. Since independence the use of tanks has been largely neglected as a water resource.

### **The Three Gorges Project (TGP)**

It is ironic, in fact, that both books just reviewed praise the low-tech, holding pond and small dam construction in China as highly successful and cost effective, for we now turn to a potentially greater calamity: the construction of the world's largest dam... in China. *Damming the Three Gorges*, edited by Gráinne Ryder, is a well-rounded collection of articles covering the major aspects of the Three Gorges Project. It is made up of articles that focus on critiquing the Canadian International Project Managers' (CIPM), CIPM Yangtze Joint Venture (CYJV) feasibility study, commissioned by CIDA and the World Bank in 1989. Joseph Whitney, one of the contributors to the Ryder book (and to this issue of *Refuge*), has already given us an overview of some of the problems with the study. My purpose is to recount some of the problems foreseen

in light of the concerns cited with the Narmada project.

The CYJV study claims that the intent of building the dam is to protect 20 000 square kilometers of downstream floodplain inhabited by roughly ten million people from the disastrous flooding that has occurred throughout China's history. In chapter 8 Phillip Williams<sup>6</sup> criticizes this claim. Only fifteen percent of the projected benefits of the dam are to be realised in flood control. He finds the need for such a large dam to be based on subjective analysis;<sup>7</sup> costs of R & R, upstream flood damages, downstream dyke erosion or failure, coastal erosion, and the possibility of catastrophic failure,<sup>8</sup> were all ignored in the study. Flood reduction strategies, such as ring dykes and refuge centers, provide reasonable alternatives that were not considered. The report also fails to consider the possibility of catastrophic failure.

Regarding seismic activity, Williams finds the CYJV's conclusion to favour the more optimistic view of the risks. Recognizing the weight of the water in a large reservoir can induce earthquakes, CYJV stresses the need for careful assessment of this problem, which apparently has not been undertaken. Only faults near the dam site proven to be active are identified in their study, and "the length of faults passing under the dam itself and the

displacement that would occur if these were activated are not identified. Therefore, it appears that the dam design is based on the optimistic assumption that no movement would occur on these faults..." Williams also questions the study's estimation of the dam's structural stability, the risks caused by catastrophic landslides, and the risk of spillway failure.<sup>9</sup> Incredibly, the CYJV study recognizes the probability of a cofferdam failure during the 20-year construction period, which could result in the deaths of hundreds of thousands of people, as about one in twenty. Needless to say, Williams finds this an unacceptably high risk.

The environmental impacts of the project are discussed in chapters 4 and 5, where it is concluded that the TGP would deter fish migration, would silt up quickly, accelerating water evaporation and rising temperatures, eroding the banks, and altering the river's chemical and organic composition.<sup>10</sup> The issue of sedimentation releasing harmful chemicals into the water is discussed in detail.<sup>11</sup> The editor discusses China's environmental crisis in the introduction, a crisis precipitated by massive deforestation and conversion of all available lands to agriculture under Mao's "grain-first" policy. Many Chinese scientists began to speak out for the first time in opposition to the government on the proposed TGP. But after the crackdown on the Beijing uprising of 1989 the postponement of the dam was scrapped, and the TGP was put back in motion.<sup>12</sup> Nevertheless several organs within the Chinese government itself remain opposed to the project. The Ministry of Communication argues that the dam will disrupt traffic on the Yangtze during construction, and will increase the cost of shipping after the dam is built. The Chinese People's Political Consultative Conference (CPPCC), the group of noncommunist opposition parties with 410,000 members is opposed on financial and technical grounds. The Municipality of Shanghai meanwhile remains undecided, as it weighs the benefits of more electricity with the risks of

damaging the stocks of fish for its commercial fisheries, and of salt water intrusion into the river from the sea.

The last chapter is by none other than Vijay Paranjpye who points out that no systematic analysis of the entire river basin, considering the interrelationships between the various dams and hydrological systems has ever been done. This is surprising since more than 700 tributaries with development potential for hydropower, irrigation and flood management flow into the Yangtze. But rather than explore the

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alternatives first, the CYJV financial analysis begins with the statement: "The Three Gorges Project will be the only economical way to significantly increase flood protection in the middle reaches of the Yangtze." (p. 113) Paranjpye notes that "no analysis was given to support this assumption."

Much like the Indian Officials at Narmada, the CYJV study lauds China's new "resettlement with development" policy as "among the best in the world." But Phillip Fearnside argues that China's resettlement record is not good, citing the case of the Danjiangkou Dam, where it took ten years to get "adequate" funds to the oustees, which may still not have been adequate for building decent infrastructure, including housing.<sup>13</sup> Fearnside criticizes the CYJV study for assuming that land found for relocation

will be equally fertile as the riverine lands flooded by the dam. A major concern to Fearnside is that the Chinese government has already attempted resettlement in Tibet, or along the Thai and Burmese borders, areas populated by minority groups, to populate the area with China's majority Han people. If plans to resettle the oustees of the TGP on higher regions and to intensify agricultural production in other areas prove less successful or more expensive than expected, the temptation would be to look for alternative location sites, possibly areas now dominated by minority groups, such as in Sichuan.

Another problem with R & R is that 10 to 30 percent of urban dwellers are illegal immigrants who are considered "nonpersons" to the Chinese government. This "floating population" is included in the CYJV study, though it keeps its numbers to the lower, 10 percent end of the range. The Chinese government has disputed with the World Bank that to provide R & R to these persons would reward illegal behaviour, but it has agreed to provide some assistance to those who have resided in county seats and towns for more than a year. Yet no housing is planned for them, and clearly many, perhaps most, are still excluded from the plans.

### **Conclusion: "...so that others may live in happiness"**

I have chosen to review works on these two projects for obvious reasons. The scale of both projects sets new levels for development projects, the numbers of "developmental/environmental refugees" to be ousted by the projects is enormous, the environmental costs will be enormous, and finally, both China and India are large, heavily populated countries with numerous minority and underprivileged groups.

Organizing opposition to central government projects such as these is not only difficult, but highly dangerous.

Tables I - III show some of the major dams funded by the World Bank and CIDA, comparing the Narmada Project

and the TGP with other dams. The World Bank recently earmarked \$1.3 billion for its "environmental defense" fund. This "green fund" is supposed to go toward pilot projects that are in the "global interest" (biodiversity, climate change, etc.). Critics say that most of this money is in fact going towards already existing projects, and is tacked on as an expense for "greening up" the projects. This fund would never have been created but for the pressure and criticism of environmental groups and local NGOs. It is quite transparent as an attempt at placation, to ease criticism of the World Bank's funding of environmental disasters. These three books provide a solid basis for the critique of projects (one ongoing, one proposed) funded by the Bank and other major lending institutions. Readers will find not just a resource of statistical data, but well-formulated, logical arguments that need to be developed further, and popularized in order to halt the projects. These arguments make it clear that the benefits of such projects go largely to western banks, local elites, or nearby urban populations, at the expense of indigenous and minority inhabitants of the land to be flooded.

Minorities have little political or economic power, and as they often have no certificates of land ownership, minority areas are perfect for making an argument that a chosen few will have to do without for the benefit of the majority. Such is the logic of Canada's James Bay Project, a project that threatens the habitat of the Cree people. When the project began, the Cree were given no warning that their lands were to be flooded. Phases I & II of the project will cost Quebecois \$11 and \$52.5 billion respectively. Such huge debt from foreign financing with huge environmental costs and impact on indigenous populations is familiar to Third World countries, but now we are seeing it in Canada.<sup>14</sup> Cree opposition to the project has been stiff, and as the project figures into the budget of Quebec, the project, which was recently dealt a major setback, is an important factor in Quebec's bid for independence.<sup>15</sup>

Every dam and every mega development project is different, but the attitude of the officials and planners towards the people whom they have to evict has been consistently callous. The following quote by S.C. Varma summarizes very well, I think, that attitude. One can easily imagine the same words coming from the lips of an official rationalizing the need for the TGP or the James Bay Project:

*No trauma could be more painful for a family than to get uprooted from a place where it has lived for generations and to move to a place where it may be a total stranger... Yet the uprooting has to be done. Because the land occupied by the family is required for a development project which holds promise of progress and prosperity for the country and the people in general. The family getting displaced thus makes a sacrifice for the sake of the community. It undergoes hardship and distress and faces an uncertain future so that others may live in happiness and be economically better off. (Alvares and Billorey: 18) ■*

## Notes

1. In Appendix 4 of the book, Medha Patkar claims that 99 percent of the oustees at Sardar Sarovar will be tribals, 25-50 percent of them being landless.
2. In the Paranjpye book to be reviewed below, pages 27-30 review the protest by oustees and their representatives. One mass rally on 28 September, 1989 drew over 30,000 oustees and concerned citizens at Harsud. Other protests have involved up to 60,000. These pockets of resistance would perhaps be even larger if the oustees had the means and the wealth to take more time off from their vital activities.
3. In the Paranjpye study, relevant articles from ILO Convention 169 of 1989 (nos. 1, 2, 7, and 15), are given on pp. ix-x.
4. One crore = 10 million; 1 lakh = 100,000; I am estimating 25 rupees to U.S.\$1, which was the rate when I left India last August, the rupee had devalued from 19:1 to 25:1 during the six weeks I was there. It has likely devaluated even more since.
5. An official document in 1984 gave a B/C ratio of 1.74:1, though its own numbers actually worked out to 1.52:1 (cf. p. 46).
6. Paranjpye is professor of economics at Ness Wadia College of Commerce in India.
7. The CYJV study claims a need to protect the flood plains from 1,000-year floods (the highest level of flooding expected in the course of 1,000 years), over the present protection against 250-year floods.
8. (which is easily as likely as a 1,000-year flood); 75 million people live downstream from the Three Gorges, including those in the cities of Wuhan and Shanghai. In the event of war, China's enemies could bomb the dam and cause untold destruction of life.
9. The dam will have the largest spillways ever, twenty-seven of them, each with the capacity of the average flow of the Missouri River in the United States.
10. Wegner points out the lack of sufficient research on the impact the dam will have on water and terrestrial wildlife. What I was unable to find in the book as a whole, however, was mention of the status of any botanical survey to examine danger to various plant species, or any mention of compensatory afforestation. Perhaps unlike the Narmada, there are no forests, or very few, to be compensated.
11. This is discussed by Alan Penn, an advisor to the Cree Regional Authority, who discusses how the inhabitants of the region face the same danger as Cree Indians in Quebec who were found to have large traces of the poison methyl mercury in their hair after the first phase of Hydro-Quebec's James Bay project. In 1984 a full two-thirds of the Cree in Chisasibi, Northern Quebec were found to be poisoned by the fish that they depend on. Some elders developed numbness of the limbs, shaking, neurological damage and loss of peripheral vision.
12. Opposition to the TGP is said to have added fuel to the student protests of 1989.
13. Fearnside is a research professor at Brazil's National Institute for Research in the Amazon.
14. Webster, P. "Quebec Inc. Unplugged," *The Nation*, April 27, 1992, p. 548.
15. Quebec's independence movement was recently dealt a blow when New York state pulled out of its \$12.5 billion contract for electricity from James Bay, possibly bringing about an end to the project, and relief for the Cree.