

World Rivers Review

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Nam Theun 2 Studies Miss the Boat

Project Documents Mask Flaws in World Bank Project

by Aviva Imhof

A series of technical reviews by independent experts for the Nam Theun 2 Hydropower Project in Laos has revealed serious flaws in the project's environmental impact assessment and social development plan – flaws which call into question the project's viability and scale of its impacts. Reviewers note that the project documents lack critical analysis, data and information, and say the project's plans for compensating affected villagers have a high likelihood of failure.

The US\$1.3 billion Nam Theun 2 Hydropower Project would forcibly displace 6,200 indigenous people and impact more than 100,000 villagers who depend on the Xe Bang Fai River for fish, agriculture and other aspects of their livelihood. The project is being developed by Electricité de France (a French utility) and two Thai companies in cooperation with the Lao government. One of its big selling points is that it will generate foreign exchange for Laos by selling the power to Thailand. The World Bank, Asian Development Bank and other donors will make a decision on whether to support the project in coming months.

Technical reviews of the EIA and Social Development Plan (SDP) were commissioned by NGOs on five different aspects of the project, including hydrology, water quality, impacts along the Xe Bang Fai River, and the viability of the resettlement plans for villagers living on the Nakai Plateau. Contrary to claims by the World Bank and the Nam Theun 2 Power Company that the project is "world class" and that studies are "comprehensive" and in compliance with World Bank safeguard policies, reviewers found major gaps in the documentation.

"Nam Theun 2 has been under preparation for more than a decade, which makes these gaps quite alarming," said Shannon Lawrence, with the Washington, DC-based group Environmental Defense. "Considering the project's size and scope and the significant resources that have already been poured into its development, it is shocking that more rigorous analysis of potential impacts and clear, feasible plans for compensating affected people still do not exist."

Viability in Question

The review of the project's hydrologic data found that the analysis is so deficient that it is impossible to predict how much water is available for power generation. The reviewers found that the lack of long-term stream flow and rain flow monitoring, coupled with questionable statistical analysis techniques, makes the project "high risk for meeting its power generation predictions and for estimating potential project impacts." In addition, the project developers have undertaken no analysis of how global climate change might affect flows in the Theun River.

"Project planners propose to make irreversible commitments of the hydrologic integrity of these two river basins, the livelihoods of basin residents, and a large capital investment," says Dr. Peter Willing, a hydrogeologist who reviewed the plans. "The EIA's underlying data is inadequate to sustain a conventional hydrologic analysis. The consequences will be vast and difficult to predict: flooding, erosion, disruption of biological and human systems."

The reviewers found that the project developers have also failed to examine how



Boy with fish trap. Increased water flow along the Xe Bang Fai will destroy fisheries in the river.

increased water flows will affect the upper and middle reaches of the Xe Bang Fai River, the river to which Nam Theun 2's water will be diverted. This is of concern as more than 7,600 people live along this stretch of the Xe Bang Fai and will be seriously affected by increased flooding and erosion, as well as by depleted fisheries and other impacts.

Fisheries Impacts Underestimated

David Blake, a fisheries specialist based in Thailand, looked at the project's potential impacts on fisheries in the Xe Bang Fai and other downstream rivers. According to Blake, Nam Theun 2 "is likely to have multiple serious, negative impacts on the aquatic

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SPECIAL FOCUS ON
ASIA

COMMENTARY

Think Globally, Act Responsibly

I am writing this just one month before leaving my role as Executive Director of International Rivers Network, an organization that I love very deeply, and one whose work I will always advance. I leave confident in and stimulated by what the future holds for IRN and the organizations and people worldwide with whom we work, side-by-side. Together we've seen to it that respect for both environmental integrity and human rights results in improvement in people's lives; that in finding the best in each other – those from the north and those from the south – we find strength, understanding, and hope.

The oft-repeated dictum coined at the 1972 UN Earth Summit in Stockholm, "Think Globally, Act Locally," describes one way to approach the serious problems facing our world today, but offers little direction for a US-based NGO working on international issues. From the very beginning, IRN took an approach that would better be described as Think Globally, Act Responsibly. This means taking our lead from people directly affected by destructive river projects and the many allies they have in their local and regional communities. This is the only way IRN's role has ever made sense, the only way it could ever succeed, and is the central thread running through the fabric of IRN's experience. That local communities join together in regional networks, and that regional networks form international alliances, is the foundation on which international campaigns are built. These are the means for civil society to understand, influence, criticize and hold accountable the formal and informal institutions that effectively (or in many cases, it can be argued, ineffectively) govern the globalized world.

It is somewhat ironic, therefore, that those who find themselves defending outdated and poorly conceived development projects of the type that IRN opposes have often chosen to attack us and those we work with not on the substance of our collective arguments, but by charging us with an amorphous and usually customized form of "irresponsibility." The arguments, while intellectually stunted, have amazing range and staying power, largely because they play well in the popular media, which likes simple answers to complex problems. Before you know it, NGOs are being characterized as potential threats to freedom, democracy and poverty-reduction around the globe. That's the northern rendition of the NGO-bashing refrain.

The southern partner in this duet is a kind of mirror image. In fact, governments, dam promoters, development banks, and pundits on the defense have created the perfect trap – charging either that northern NGOs such as IRN are insufficiently knowledgeable or accountable to people directly affected by projects, or that we are full-time manipulators of local efforts (thereby guilty of green, imperialistic hegemony). Very tidy package.

The arguments are hogwash and do little damage to IRN. But for those in local communities with whom we work, they are destructive and potentially dangerous.

In my 15 years at IRN, and in 25 years of working with people from diverse cultures, of many races and all classes, I've learned that progress depends on an internationally shared respect for the earth and all the life that depends on it (thinking globally), and a solid commitment to act in an international sphere (acting responsibly).

Living on the earth in peace and using its resources sustainably and equitably has never, despite the publicity that tells you otherwise, been a "not-in-my-backyard" endeavor. NIMBY was as much a creation of defensive short-term thinkers as is the most recent manifestation of NGO-bashing. It is by caring for each other, across all manner of borders, that we will achieve energy, food, and water security; that we will nurture and improve the health of the planet and its people; and by so doing, achieve the more talked-about security of peace.

This is what IRN has always been about for me. To all of you have been a part of it so far and to all of you who will continue to work toward a more equitable and just world, I send my gratitude and deepest regards.

In solidarity,
Juliette Majot

Note: IRN welcomes Patrick McCully as our new executive director. You'll be hearing from him next issue.

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China Suspends Additions to Three Gorges Over Environmental Concerns

In an unprecedented show of environmental regulation, Pan Yue, the deputy director of China's State Environmental Protection Administration (SEPA), announced on January 18 that 30 projects in 13 provinces – including a massive new hydropower project on the Yangtze and power plant additions for the Three Gorges Dam – have been suspended after failing to comply with the national Environmental Impact Appraisal Law.

"The projects were halted because they failed to pass environmental impact assessments according to the country's laws and regulations," he said, adding that the projects posed considerable threats to the environment. This marked the first time that SEPA has reined in ongoing projects by demanding compliance with the EIA law, which came into effect on September 1, 2003.

Because 26 of the 30 blacklisted projects are power projects (including a number of polluting coal plants), the suspension could have a significant impact on the development of China's power industry, which has been in overdrive to keep up with its booming economy.

According to the Associated Press, Chinese officials said they expect widespread energy shortages to ease within a year or two and that capacity will far exceed expected demand with the current levels of investment. Late last year, the government said it was stepping up controls on investment in power plants, saying many were being launched without legal approvals. It estimated the capacity of unauthorized power plants under construction at 120,000 megawatts, or more than one-quarter of current national generating capacity.

Because It's the Law

The 30 suspended projects were launched without the approval of related environmental protection bureaus, Pan said. The laws stipulate that all projects must have approved EIAs before they can be built. However, many local governments go ahead with construction even without the agency's green light. "We must sharpen our teeth. We shall never be rubber stamps," Pan said, vowing that his administration would step up efforts to curb heavily polluting projects, especially in power generation and the production of iron, steel, cement and aluminum.

Pan stated that the quality of environmental impact assessments must also be improved, noting that some domestic institutions lacked the ability to carry out sound assessments. "We shall introduce foreign assessment institutions to China to improve the overall assessment quality," he said.

"We must sharpen our teeth. We shall never be rubber stamps."

Pan Yue, Deputy Director, SEPA

Three of the largest projects stopped by the action are under the aegis of the Three Gorges Project Development Corp, the company responsible for constructing Three Gorges. Two are auxiliary power facilities connected with the dam, while the third, the Xiluodu Dam on the Jinsha River, is part of a massive plan to develop the hydropower resources of the upper Yangtze. Xiluodu is part of what is being billed by the Chinese government as a "second Three Gorges." It is unclear if the suspension of

construction pending approval of the project's paperwork would deter plans for Xiluodu.

The Three Gorges Project Corporation was caught unprepared by the news. On Jan. 19, a spokeswoman for the Corporation told Interfax news service that the corporation had yet to prepare a response for the media. The suspended projects would increase the dam's output by 4,300 MW.

In late December, Premier Wen Jiabao, who heads the Three Gorges Project Construction Committee of the State Council, called on developers to pay greater attention to engineering quality and safety, resettlement of affected people, local socioeconomic development and environmental protection in the dam area, and the management of reservoir. The premier publicly expressed his support for the project suspensions the day after the announcement by SEPA.

Chinese environmentalists were delighted that the EIA law is now being enforced. Said one, "When the legislation came into force, it was clear that enforcement would be a big problem. There were suggestions that large, politically favored projects would be able to escape its reach. The tough action taken by the top environmental watchdog is a very positive move." ■

Fast Facts on China's Energy

- Per capita power generation in China compared to US: one-thirteenth
Compared to Japan: one-eighth
- Years left for China's coal reserves at current consumption rate: 83 years
Years left if consumption doubles: 20 years
- Estimated hydro resources the government believes could be developed: 390,000 megawatts
- Estimated usable windpower resource in China: about 500,000 megawatts on land, 3-5 times that at sea
- Number of wind fields in operation in China today: 40, which generated 560,000 kilowatt-hours of electricity in 2003
- Rough investment costs for an imported wind generator: US\$70,000
For a domestic-made wind generator: US\$12,000
- Percent of energy to come from renewables by 2020, according to target set by Chinese government last year: 12%
- Amount of windpower China might install under that scenario: 170,000 megawatts
- Reduction in CO₂ if that much windpower is installed: 325 million tons

Voices from the Zambezi

River Communities Speak Out

by Gustavo Mañez and Lucia Scodanibbio

"The Zambezi River is the source of life for our families... [it] is generous and other users along with us benefit from it. We respect all of them as good neighbors, and we especially recognize the important role of Cahora Bassa dam... However, in the 30 years since the dam's construction, we have lost productive lands along the river and on the islands. The reeds we use have disappeared. Fish in the river have also decreased. In the delta, the River arms are progressively drying up. The mangroves are threatened, and so, too, is the prawn fishery..."

These are some of the conclusions that a group of 70 subsistence farmers, fishermen and NGO members from the Lower Zambezi River in Mozambique developed in a declaration they presented to government authorities in October 2004. Representatives from the four provinces crossed by the Lower Zambezi came together in the city of Tete, 120 kilometers downstream of Cahora Bassa Dam (the fourth largest dam in Africa) for a three-day workshop. This was the first meeting designed to analyze the river situation from the perspective of subsistence users in Mozambique. Government representatives from the Zambezi Water Management Authority and the Zambezi Development Authority also attended the workshop, which was facilitated by Justiça Ambiental (JA!), a Mozambican environmental justice NGO.

The meeting was the culmination of a one-and-a-half-year capacity-building process, supported by the Siemenpuu Foundation, in which JA! worked with local communities and NGOs along the Zambezi River. The process was designed to raise awareness about dams in the Zambezi in view of the proposed Mphanda Nkuwa hydroelectric project and about problems with current river management. The Mozambican government plans to build the 1,348-MW Mphanda Nkuwa Dam 80 kilometers downstream of Cahora Bassa. The underlying aim of the meeting was to convey the recommendations of the World Commission on Dams (WCD) to communities along the Zambezi, to support their implementation from the "bottom-up."



WCD workshops have helped empower Zambezi villagers affected by past and future dams.
Photo: Lucia Scodanibbio

As the workshop's declaration affirmed, the Zambezi is in dire need of better integrated management, with greater consideration of social and environmental uses of the river. Since the construction of Cahora Bassa by colonial Portugal in the early 1970s, the poverty and vulnerability of subsistence populations in the Lower Zambezi Valley has worsened. Several scientists have documented major impacts on the downstream environment, caused by reduced variability in river flows and the dramatic decline in the rainy-season flood flows. The impacts on the river and its delta (which is a Ramsar site, and one of the richest wetlands in Africa) have been extensive, creating enormous social problems for the local populations whose survival depends on the availability of natural resources and productive riverbank land. Approximately 800,000 people have been affected by the dam, but their concerns

have never been taken into account in any decision concerning the river, which is the basis of their livelihoods. Sadly, history may repeat itself with the proposed development of Mphanda Nkuwa.

The consultation process for Mphanda Nkuwa's EIA only included the people who live in the future reservoir area, those in the provincial capitals and the capital Maputo. Rural downstream people received no information on the proposed scheme, despite the fact that if the dam goes ahead, its operation will preclude flood-recession agriculture and fishing for at least 100,000 people. Of those affected, the promoters have only considered compensation measures for the 1,400 who will be resettled for the reservoir. Ironically, UTIP, the dam promoters, claim internationally that the project is following WCD recommendations. Lamentably, both UTIP and Cahora Bassa management declined to participate in the October workshop.

Empowering River-Users

JA's efforts to address these imbalances include sharing information about Mphanda Nkuwa's impacts with those who could be affected by them, promoting participation and integrated water resources management, and sharing information about the WCD. Over an 18-month period, JA! worked with 25 villages along the river valley, and trained more than 350 people in river management issues. Throughout the process, people raised the problems of current river management, such as the long-term losses in subsistence agriculture and fishing; the drying of the delta and the decline in prawn catches at the river's mouth. Local farmers were especially troubled by the fact they lose part of their agricultural production every time Cahora Bassa opens its sluice gates – a frequent but unpredictable (to them) event. During the training, communities requested the implementation of effective warning systems for unexpected dam releases, and a return to more natural flow patterns from Cahora Bassa, to help restore riverine ecosystems and the delta.

Community members trained in river management issues were outspoken during the final workshop in Tete. Despite the

continued opposite

Unfulfilled Promises: Indigenous People Press for Justice on Colombian Dam

by Monti Aguirre

In December, 400 Embera-Katío indigenous people from communities harmed by the Urrá Dam occupied the grounds of the Colombian Ministry of the Environment, Housing and Land Development. This was their second occupation of government facilities in five years as part of their ongoing efforts to get the government to address the dam's impacts on their lives. Around dawn the day after they began this recent occupation, riot police forcibly displaced them (including 185 children). The police blocked the street where the office of the National Indigenous Organization of Colombia (ONIC) is located, and where the 400 indigenous peoples are now encamped.

The 340-megawatt Urrá I Dam on the Sinú River in northwestern Colombia began operations in early 2000. Built by Swedish construction company Skanska, the US\$800 million project was 40% financed by the Colombian government, and 60% through international lenders, including the Canadian Export Development Corporation, Swedish Nordbanken and the Nordic Investment Bank. The dam affected more than 70,000 people, including the Embera-Katío

communities upstream; and downstream, fishing and peasant communities, and Zenú indigenous peoples.

The Embera are demanding that the government and Urrá Company comply with agreements signed in 2000 that address land restitution, sharing of project benefits, resettlement, mitigation of impacts, human rights, and measures to end the violence against the indigenous communities, which began with project construction and continue to date. "If the government had fulfilled their promises, we would not be here in Bogotá," said Martha Pernía, daughter of Kimy Pernía Domicó, an Embera leader in the dam fight who was kidnapped in 2001 and is presumed murdered. The government has ignored demands made by the Embera during both occupations, and has not demonstrated any interest in negotiations.

The Embera also seek the modification of the project's environmental license to address impacts foreseen by the community prior to dam construction, but not by the project authorities. "There are new impacts caused by the dam which the Urrá company denies responsibility for, such as river sedi-

mentation, death of fish upstream, forced changes to our subsistence economy, and changes in our spiritual lives, among others," said an Embera communiqué. They are also demanding an audit of the impacts of the dam by an international expert panel.

The Embera Katío are decisive in maintaining their campaign until the government addresses the issues that affect their cultural survival, and their rights to economic, cultural and environmental health.

"In these past ten years we have seen our situation worsen and our dignity as a people disrespected, our leaders and autonomy disregarded. We demand the decommissioning of the Urrá I dam, which has made the Sinú River a cry of sorrow," said the Embera authorities. ■

What You Can Do

Write to Presidencia de la Repùblica:
Dr. Álvaro Uribe Vélez, Cra. 8
No. 7-26, Palacio de Nariño, Santa Fe
de Bogotá. Fax: (+57 1) 566.20.71
E-mail: auribe@presidencia.gov.co

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recent history of fear and repression in Mozambique, many participants boldly described their problems before government officials, speaking about the impacts they have been suffering since Cahora Bassa was built and complaining about the lack of warning when the dam opens its sluice gates. They also appealed to authorities for an urgent change in dam management. Regarding Mphanda Nkuwa, some raised doubts that it will help their communities, and said they believe the benefits will be exported to South Africa or go only to an elite few. All agreed to request that UTIP undertake comprehensive studies to determine the impacts on their livelihoods, and to be properly consulted according to WCD recommendations.

Government officials who participated in the workshop unfortunately interpreted the meeting to be a direct attack on Cahora

Bassa, Mphanda Nkuwa and consequently on the current paradigm regarding Mozambique's development – i.e., mega projects that, in theory, have "trickle down effects" to the nation's poor. Officials also minimized the significance of the dam's impacts, by conveying that the production of small farmers is not economically valuable and is therefore not worth protecting.

In the 30 years of Cahora Bassa's existence, trickle-down effects have remained unknown to the rural populations who live along the Zambezi. What they do know is that their resources are fewer and their quality of life, already precarious, has worsened. As one of the trainees stated, "People do whatever they want to the rural farmers, because we don't know anything ... But with this training we have learned what the law says, now we have to speak up to those in government to respect our rights."

And speak they did! In the aftermath of the workshop, they have vowed that they will not sit back waiting passively for action. Members from different communities in the Zambezi Valley are forming an association to represent their interests and engage with government, and push for a change in the management of the river. They will provide input into a new river basin committee that the Water Authority has committed to form, in part thanks to public pressure, and to have their voices heard in the Mphanda Nkuwa process. These basic steps will ensure that the voices from the Zambezi will become louder and better heard, for the benefit of all its users and the environment. ■

For more information on Mphanda Nkuwa, see www.irn.org/programs/mphanda

A Future in Doubt

Reviewing Dam Builder's Efforts to Restore River-based Livelihoods in Laos

by David Blake

For the past four years, the Lao-based Theun-Hinboun Power Company has invested significant resources to mitigate and compensate for the impacts of the Theun-Hinboun hydropower project in central Laos. While the company has made "good progress," according to a third-party review panel, there are serious concerns over the effectiveness and long-term sustainability of its program to restore affected people's livelihoods. Here, a member of the review panel, a British fisheries and sustainable aquaculture specialist who lives in Thailand, shares some of the panel's findings and his outlook on mitigating the impacts of Theun-Hinboun.

More than 3,000 families in at least 57 villages have been negatively affected by the Theun-Hinboun Hydropower Project. Built primarily for power export to Thailand with funding from the Asian Development Bank, this run-of-river project diverts water from the Theun-Kading River, one of the Mekong's largest tributaries, through a tunnel to a 210-MW power plant before release into the Hai/Hinboun river basin. After the project was completed in 1998, the changes it made to the rivers resulted in people suffering from flooding of dry season riverbank gardens, declines in fisheries, loss of drinking water sources, riverbank erosion, downstream sedimentation and income losses due to delays in providing mitigation and compensation.

As part of its plan for compensation and mitigation, Theun-Hinboun Power Company (THPC) requires a third-party review to be conducted every two years to examine the effectiveness of its program and issue recommendations for improvement. In March 2004, three independent experts, including myself, travelled to Laos for one month to conduct the program's first review. We spent 90% of our time at the project site and impact area, meeting with a wide range of affected persons, project staff, local government officials and other stakeholders. At press time, the panel's final report had not been publicly released.

The Plan

THPC's Environmental Management Division (EMD) staff, in charge of implementing

the plan for compensation and mitigation, have initiated a broad range of rural development activities focusing on establishing village development committees, savings and credit schemes, health and sanitation, food security and livelihood restoration.

Two primary strategies have been used for affected communities. Villages along the headpond, which flooded a considerable length of the Nam Theun/Kading River, were targeted for a gradual conversion from shifting cultivation to more permanent agricultural practices like wet rice terracing, agroforestry and horticultural production on irrigated plots. Lowland villages along the recipient Nam Hai and Hinboun rivers were offered irrigated fruit tree and vegetable plots on river levees, support for livestock rearing and intensive irrigated dry-season rice cultivation, as the chief compensatory measures for loss of livelihoods from declines in fisheries and riverbank garden production.

Most of these activities resembled those of a conventional donor-funded integrated rural development project, and there was plenty of evidence to suggest that they were successfully meeting many local needs. For example, the panel found that THPC's activities in

establishing village savings and credit funds, installing wells for water supply, building toilets and distributing mosquito nets were all going well.

It is important to keep in mind, however, that this mitigation program is not an ordinary aid-driven rural development project to improve people's living conditions. Instead, this program was created to mitigate the impacts of an environmentally destructive project carried out without properly consulting the traditional users of the local natural resource base beforehand, and who have ultimately borne many direct and indirect costs and risks to their former river-based livelihoods. The program's ultimate success must be judged according to whether it adequately compensates for costs already incurred by affected people. Although the program has had some initial success, its overall effectiveness in restoring livelihoods will remain in question for many years to come. Some areas of concern are described in the following excerpts from the review panel's report.

Aquatic Resources

The panel found that "the poorest sectors of the impacted communities, and those heavily reliant on living aquatic resources for their livelihoods and diets ... have not been adequately included in project activities to date." This has resulted from difficulties in



Photo: David Blake

Fish catches have declined considerably since the river's flow was diverted in 1998. These villagers are now at risk from even more damage to livelihoods from proposed upstream dams, including Nam Theun 2.

including the poorest villagers in a primarily agricultural production-oriented development strategy, as well as delays in conceiving and incorporating a fishery management component into the project. It was also found that there are some villages located above the headpond which have been negatively affected by the project, but have never been recognized as such and thus have not received any assistance from THPC.

Although fisheries decline was one of the project's most significant impacts and significant declines in fish catches were predicted before the dam was built, THPC has not yet implemented fisheries mitigation activities. THPC has never fully acknowledged the extent and severity of the living aquatic resource impacts, and still stubbornly clings to the belief that they can be mitigated using technical solutions (e.g., construction of a fish ladder, larger re-regulation pond, erosion protection, etc.) or compensated for using other production-based livelihood options, euphemistically named "protein replacement" options. This is a common misconception among hydropower proponents and developers in the lower Mekong region.

Villagers I spoke with in March 2004 and during a previous visit in 2000 complained about the rapid decline in fish catches following the dam's construction. Many had given up fishing in recent years because it was "a waste of time." They have resorted to gathering more non-timber forest products for income and trapping small game to compensate for the loss of protein. According to the village headman of Ban Kapab, which formerly was an important area for dry-season rapids fishing before the dam was built, nowadays it can take all day to catch enough fish for a single meal, even using several nets.

One of the review panel's key recommendations is for THPC to widen the recognized impacted area to include villages affected by declines in fisheries and other aquatic resources, especially in villages above the headpond. The company should also develop a participatory aquatic resource management program, which includes conservation awareness programs, small-scale aquaculture schemes and a long-term monitoring program in partnership with local communities. Without such a program, it is likely that the poorest villagers will slip through the safety net provided by THPC. If the aquatic resource base further declines, "intra-village wealth disparities may well widen," since the poorest community members rely more heavily on these resources for their livelihoods. The review panel also recommended one-off



Ban Kaengbit villagers pan for gold downstream of the dam.

Photo: David Blake

non-cash compensation payments for affected villagers.

The panel recognized that "improving social economic conditions within the headpond area presents a daunting challenge." Part of this is due to THPC's emphasis on encouraging villagers to switch from shifting cultivation to sedentary agriculture. "Many projects have tried and ultimately failed to convert land with such marginal soils to productive sedentary agriculture."

Viability of Irrigation

The heavy emphasis on promoting dry-season pumped-irrigated rice along the Nam Hai and Hinboun valleys was another source of concern to the review panel. We felt the strategy of promoting a high-input, chemical fertilizer-based farming system among resource-poor farmers was risky, and favored the wealthier members of the community who could better afford the risks involved while excluding the poorest. Furthermore, this strategy has the potential to have unintended negative impacts on aquatic ecology by polluting surface and ground water, thus further degrading the very resource base on which the poorest sectors are most reliant.

While the first year's irrigated crop in many villages provided good yields, there were strong indications that problems with pests and disease occurred during the second year. Reports after the end of the 2004 dry season rice harvest confirmed a slump in rice yields from 2003 and economic losses

incurred by farmers, which eventually had to be covered by THPC. The panel also noted problems with pump breakdowns and reluctance of farmers, often the poorest ones, to participate in the program due to concerns about the risks of dry-season rice production. The panel felt THPC was spreading itself too thinly on the ground before villagers have accepted and can deal with risks associated with this new livelihood activity. Given these problems, the future effectiveness and long-term sustainability of this model of compensation assistance must surely be in doubt now.

In addition, THPC's strategy of encouraging villagers to grow fruits and vegetables for sale in local markets to generate income has had limited success. The panel found that "many if not most of the farmers involved in the household garden activities are not yet able to make the major developmental leap to supplying for markets."

The panel recommended that EMD at least partially bear the pumping costs for both vegetable gardens and dry-season rice fields until cash crop production becomes normalized. Given the high cost of diesel, the project should work to improve irrigation efficiency, support conversion to high-value commercial crops with reduced water requirements and promote conversion of diesel pumps to electricity. It is sadly ironic that despite the close presence of a large hydropower plant and promises of connec-

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A Holistic Approach to Community

by Alex Zahnd

More than 99% of the world's 2 billion people now without access to electricity live in developing countries, and four out of five live in rural areas. Today, 100 years after Edison's seemingly forward-looking statement – "We will make electricity so cheap that only the rich will burn candles" – the promise of cheap, abundant electricity seems to hold true only for industrialized countries. Who anticipated that today, more people have no light in their homes than the entire world's population in Edison's time?

There is a clear relationship between poverty and access to electricity. The more remote the community, the greater its poverty level, and the higher the costs for electrification and other development projects. Approximately 85% of Nepal's 26.5 million people live in the rural areas, and about half of these live in such remote areas that neither a road nor the national electricity grid will reach them for decades to come.

Families in the remote areas use precious trees for firewood for cooking, room heating and light. These activities, especially the indoor cooking on open fireplaces, have a direct chronic impact on people's health and are a major factor in the extremely low life expectancy for women and the high death rate of children under five. In some places, families do not even name children under five, since child mortality is so high. Deforestation is alarming in these regions. The once picturesque, biodiverse forests and valleys are being stripped of their resources in unsustainable ways. Drinking water is taken from dirty streams, as there are no latrines. Nepal has no fossil fuel resources, but plenty of renewable energy resources such as water, sun and wind.

Over the past eight years of working with remote villages in Nepal's high country, four issues have again and again been identified by the local people as their most urgent needs for their holistic and sustainable development: light, smokeless stoves, clean drinking

Bringing Water, Sanitation, Heat and Light to Rural Villages in Nepal

This Nepali woman has lived her whole life without indoor lighting – until now.

water, and latrines. Our research has found that this "family of four" increases each other's benefits when developed together.

In remote and poverty-stricken mountain villages in Humla in northwestern Nepal, a program designed and led by Kathmandu University, and sponsored by the ISIS Foundation, is trying out new ways to utilize local renewable energy resources in more affordable, sustainable and appropriate ways. In project villages, three 1-watt white LED lights are installed in each household, powered by a commonly owned, centrally located, self-tracking solar PV system with underground wiring. The LED lights and the self-tracking frame for the four solar modules have been developed and manufactured in Nepal, as part of the University's research program. Further, an efficient smokeless metal cooking and heating stove has been designed and developed with these villagers' needs in mind. The stoves consume half the firewood of an open fire, and offer a smoke free, safe way to cook and heat the home. In keeping with the desire to address the community's needs in a holistic way, a pit latrine for each family and a commonly owned village drinking water system are also implemented in close partnership with the community. Project planning, installation, and local training for operation and maintenance are all part of the excitement.

It is crucial to understand that the local community is at the center of any holistic development project and that the technologies applied are to serve and support their struggle for a better life. Therefore, any project has to be based on a thorough understanding of the local context and culture, and must include an understanding of the "invisible" causes of poverty, and the impact



on the community of decades of deprivation. This approach demands time, compassion and dedication. These more "human" aspects of a development project are crucial factors that need to go alongside the technical aspects. In this way the people are recognized from the beginning as equal partners and not as receivers of imposed ideas. This time-intensive, often frustrating process is central to a holistic development project.

The Situation in Nepal

Every home in the remote, high-altitude villages in Humla uses wood in indoor open fireplaces for cooking, heating and light. Women and children are most likely to suffer from the enormous health effects of this indoor air pollution. The deforestation results in a scarcity of local firewood, and forces villagers (mainly the women and children) to spend up to seven hours every other day gathering fuel wood. Thus it is understandable that women place a high value on improved energy services, because they are not only the primary users of the household energy, but are also exposed to the greatest health risks and work loads.

Lack of electricity and heavy reliance on traditional biomass are hallmarks of poverty in developing countries. This is generally

Development

true for Nepal, and in particular for the mountain communities in Humla. No light and no stove in the home also lead to generally poor hygienic conditions for families. It is also common to have no latrine and no access to clean drinking water. But through ongoing awareness-training with educational tools such as simple brochures, colorful posters designed according to the peoples' context, and songs in the local language, people understand quickly that light in their homes, a smokeless metal stove, pit latrines and clean drinking water are not just desirable, but necessary for the healthy development of their families and community.

Nepal has plenty of renewable energy resources, in particular water and sun energy. As of 2003, only 533 MW have been developed nationwide (nearly all hydropower), which represents less than 2% of the technically and economically feasible potential. The sun's plentiful and free energy provides an excellent local renewable energy resource, with an average solar insolation of 5.5 - 6 kWh/m² per day.

Lighting is often the first use of electricity in a developing country, and people are often willing to invest in home or village electrification once they understand the potential health improvements, the possibility for improved educational opportunities for their children, and the possible financial savings for their families. Solar PV technology is increasingly viewed as an important option, especially by governments in developing countries with a limited and poor national grid network. The technology has proven to be robust in developed countries under field conditions and is considered mature. Installation and maintenance are simple for solar home systems, if installations are done professionally, the systems used according to their design, and maintenance is done faithfully.

In order to design a solar village PV system that will provide the expected energy service in reliable ways, over a typical life span of 20 years, one needs not only technical information about the solar insolation and irradiation for the location, but also detailed information on where and how the system will be installed and maintained. The

participation of all stakeholders in all project steps is crucial for ownership. Culturally appropriate training, hand-over and operation periods have to be incorporated into the process as well.

In order to design projects with these considerations in mind, Kathmandu University and the ISIS Foundation – in partnership with the local communities in the high-altitude mountain areas of Humla – have built a high altitude research station. Here, all the technologies that will be used in the villages are thoroughly tested as part of research projects for students and faculty. The smokeless metal stove, solar cookers, a University-designed solar water heater for high altitudes, a pit latrine, and solar PV modules with self-tracking frames have been tested over an extended period of time at the research station.

Taking it to Villages

In June 2003, Kathmandu University launched a program to help bring holistic development to poor villages in Nepal. The two poorest villages in the area near the university's high-altitude research station were chosen to become pilot projects for holistic village development. In each home a smokeless metal stove, a pit latrine and lights are installed. Each home will have access to pure drinking water through a village water system that taps into a natural spring. One of the two villages, Chauganphaya, now has a centrally located

300-watt solar PV system for its lighting system for 63 homes, and clean water and a pit latrine (previously there was none for the 365 residents, which contributed to a variety of diseases). In the second village, Kholsi, a 1-kilowatt pico hydropower plant powers lighting for its 60 homes. Water and sanitation will be installed once political tensions ease off. As Kholsi's 180 LED lights are only consuming a maximum of 250 watts, it also has a warm water heating system. Both villages have efficient metal stoves in all homes.

Since the mid-1990s the Nepal government – financially supported by various international nongovernmental organizations and donor agencies – has run subsidized solar programs. This caused a mush-

rooming of new solar PV companies in Kathmandu. Today, the appropriateness and effectiveness of solar PV electrification is questioned in many rural places, as solar home systems in Nepal have often not performed as expected or delivered what was promised. The price for a system is so high that subsidy programs will have to run for decades to come if the poor communities are intended recipients. Further, there has not been enough consideration to sustainability, maintenance and availability of spare parts.

With the Chauganphaya solar PV system, we are trying new ways to address these issues. Centrally located solar PV systems use four 75-watt solar modules, mounted on a self-tracking frame to increase the daily energy output by up to 40%. Underground cables connect each home from the centrally located powerhouse. This armored cable is able to cope with a 300% power transmission growth in the years to come, and wires are not exposed to the high UV radiation. Each home has 3 white LED lights (consuming 1 watt each), just enough to read and socialize,



The High Altitude Research Station enables local testing of technologies.

Photo: Alex Zahnd

and deeming obsolete the smoky resin-soaked pine-stick lighting.

The lights used in this system have an expected life of 100,000 hours (or 45 years if used for six hours a day), making it close to unnecessary to ever need a spare bulb. The PV system's battery bank means that even after five days of no sunshine there is still plenty of power, and the life expectancy is 8-10 years. The program trains three local people per village, who participated after their initial training in the actual installation work (and thus earned credibility from fellow villagers). They are also responsible for the solar PV system's maintenance and monthly fee collection in order to maintain the whole system.

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Big Plans for Patagonia's Rivers

by Glenn Switkes

The turbulent, glacial-fed waters of the raging rivers of Patagonian Chile are facing the prospect of being dammed to provide energy for the country's growing urban areas and industrial centers. Spanish transnational ENDESA has indicated it would like to move ahead with a US\$2.5 billion plan for construction of four large dams on the Baker and Pascua rivers, and Chilean companies are evaluating plans to dam the Futuleufú River. At least \$1 billion of this investment would be used to connect the remote Patagonian rivers to the national electrical transmission grid, a distance of some 1,500 km from the projected dam sites.

The rivers of Patagonia are known worldwide for the challenges they present to kayakers and for their pristine beauty, which draws a growing number of tourists each year. Born in clear blue lakes fed by ice melt from glaciers, rivers here cascade with enormous force down rocky canyons. Their enormous hydroelectric potential, estimated to be 12,000 MW, is more than Chile's current generating capacity.

The Patagonia region is characterized by its fragility, highly varied ecosystems, high biodiversity and large number of endemic species. Within a 200-mile swath beginning on Chile's Pacific coast of fjords, islands and archipelagos are coastal temperate rainforests, coastal mountain ranges, the snow-covered Andes Mountains, and a drier zone of grass and shrub-covered steppes. Rainfall varies from 8,000 mm per year in the southern ice fields, to 3,500 mm per year in coastal rainforests, to less than 300 mm in the drier interior.

Two of Chile's most controversial dams to date, the Pangue and Ralco hydroelectric dams on the Biobío River, are now on-line, temporarily diverting the attention of power companies from the hydro-potential of Patagonia. However, in early 2004, Argentina told Chile that it would cut its exports of natural gas to Chile by nearly half to attempt to resolve its own energy shortfalls. Spain's ENDESA, which also built the dams on the Biobío, quickly proposed "solving the crisis" with a series of dams in Patagonia. Natural gas imports from Argentina have since returned to 80% of previous levels, but ENDESA has not backed off on the idea. Earlier struggles with ENDESA over the Biobío dams have placed Chilean environmentalists on alert.



Numerous dams are proposed in Patagonia.

Photo: Glenn Switkes

Damming the Baker

The 170 km long Baker River is born in Lake Bertrand, and has an average flow of 875 m³/sec. The 62 km long Pascua averages 574 m³/sec. ENDESA says it plans two dams for the Baker, called Chacabuco and El Saltón. Chacabuco would be 71 meters high, with a capacity to generate 390 megawatts. El Saltón would be 115 meters high, and would have an installed capacity of 920 MW. The projected dams on the Pascua River, called Rio Pascua Alta (182 meters high) and San Vicente, would generate 1,350 MW at full capacity. The dams are expected to be attractive financially, based on the fact the rivers' flow is considerable year-round. Environmentally, they would be a disaster, flooding a diverse series of fragile ecosystems and forming stagnant reservoirs that would back up into the pure glacial lakes from which they currently spring. Eco-tourism, the region's fastest growing economic activity, would be devastated, and a host of endangered species, including the *huemel* deer, puma, *ñandu* bird, condor, and the southern river otter would be further pushed to the brink of extinction.

Patagonian activist Peter Hartmann, of CODEFF Aisén, says "There have been no studies as to what the impacts of these projects might be. The Baker River dams would flood one of the few valleys in the region, turning the southern part of the province

into a series of reservoirs, possibly affecting the San Rafael Lagoon National Park and Biosphere Reserve. They would degrade the exceptional water quality we have in the upper part of the basin, and maybe in the lakes as well, also affecting native fish species, and simply destroying an incredibly beautiful stretch of the river."

Hartmann was a leader in the campaign that resulted in Canadian mining giant Noranda in 2003 suspending its plans for the Alumysa dam and aluminum smelting complex, which would have been Patagonia's largest industrial project. The "No Alumysa" campaign was an inspiring victory for Chile's well-organized and experienced environmental movement. Campaigners in that fight focused international attention on the region's ecological value, and their efforts are expected to have a carry-over effect as the environmental movement gears up to engage on these new plans for large dams.

Planning for Action

In December 2004 in Santiago, activists from more than 20 of the country's principal national environmental organizations met to help plan a course for a campaign in defense of Patagonia. They stressed that the region should not be considered "virgin," since it has suffered significant environmental impacts from sheep herding, hunting of

continued opposite

Breathing Life Back into a Choked River

by Elizabeth Brink

Local officials cast a vote for river restoration when they recently signed off on an environmental review of plans to tear down Matilija Dam in Southern California. This move sets the stage for realizing a project designed to rescue an endangered migratory fish and restore sand flows to depleted beaches.

A coalition of government officials, environmentalists, water agencies and others has been working for years on plans to dismantle the 168-foot-high structure.

Built in 1947 to provide water storage for agriculture and limited flood control, the dam has trapped so much sediment that its capacity has been dramatically diminished. The dam has about 5% of its original capacity and can hold less than 500 acre-feet of water.

"The dam was originally given a lifespan of 36 years, and here we are 50 years later," said Paul Jenkin, representing the Matilija Coalition and the Surfrider Foundation.

Biologists say removing the structure would allow water to flow freely down the Ventura River, restoring a historic run for endangered steelhead trout. About 5,000 steelhead once swam upstream each year to reach breeding grounds. Today, their number is about 200.

Casitas Municipal Water District, which operates the dam, first opposed the plan

because of concerns about water quality and supply. Officials also raised questions about rights to the water behind the dam after the demolition. Casitas board chairman Jim Word said the district has agreed to separate the water rights issue from the demolition matter.

"We have worked out the larger differences," Word said. Casitas has also offered to study water quality impacts. "We don't know if they've addressed that in the final EIR, but if they don't, we're willing to do a big part of taking that on," Word said.

Meanwhile, the county also has allayed concerns over impacts to groundwater wells owned and operated by the Ventura River County Water District. Demolition plans call for depositing sediment 300 feet away from three of the district's wells. Officials feared that silt could percolate down to the wells and contaminate groundwater.

Despite concerns about potential decreases in area water supplies, the Board of Supervisors unanimously endorsed a report outlining the environmental challenges and benefits posed by the project.

If funding is secured and all goes as planned, the design process will begin next year, with removal scheduled to start in 2008. The project would take approximately three years to complete, marking one of

the largest dam removal efforts in the nation's history.

"We're beginning to put some life back into this watershed," said Supervisor John Flynn.

Demolition plans involve building a 7-mile slurry pipeline to carry away 2.1 million cubic yards of fine sediment. The rest would be jettisoned from the dam in periodic releases. A facility downstream would send clean water to Lake Casitas while diverting water with heavier silt and cobble to the river mouth at the ocean.

Demolition costs are estimated at \$110-130 million, with local agencies picking up 35% of the tab. The district is negotiating with the California Coastal Conservancy for more funding while it waits to see if a Congressional lawmaker will sponsor a new water authorization bill.

Funding for the project is now uncertain after a Congressional bill authorizing up to \$130 million for the dam's removal died in November. A spending bill recently signed by President Bush contains \$388,000 for Matilija Dam for 2005. But the Watershed Protection District and Army Corps need about \$6.5 million to finish the plan's design and engineering phase. Funding delays could stymie the county's ability to win state water bond dollars and move the project forward. ■

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marine mammals, mining, logging, and industrial salmon culture since its initial colonization in the mid-19th century. Millions of hectares of native forests were burned to make way for livestock grazing, leading to erosion and soil degradation. Nearly all the aboriginal peoples of Chilean Patagonia were exterminated by the late nineteenth century.

Still, population concentrations are low (Aysén has only one resident per square kilometer), the air and water are mainly pure, and nature is still exuberant, giving rise to the hope that the region could still achieve a degree of sustainable development. According to Juan Pablo Orrego, one the coordinators of the newly evolving campaign, "We want to emphasize the unique value of Patagonia as a way to mobilize citizen action on the local, national, and international levels in defense of the region."

As an alternative to the industrial development promised by Noranda, activists joined local politicians, the flourishing tourism industry, and Patagonian residents to propose designation of the Aysén region as a "Life Reserve," and plans are now being discussed for expanding the region's protected areas. Hartmann is a strong advocate for extending Patagonia's network of protected areas and nature tourism corridors, finding economic uses for herbs found in the region, and for sustainably exploiting the exceptional purity of the region's waters.

Hydroelectric dams currently generate 46% of the nation's electricity, with nearly all the rest generated by fossil fuels. The Sustainable Chile Program estimates that electricity consumption could be cut by 20% through demand-side-management efforts, eliminating the need for the Patagonian hydro plants. Researchers and activists say that a national

renewable energy policy including incentives for renewable energy sources and energy efficiency is urgently needed. Environmentalists have now joined a group of legislators in proposing a law establishing a public investment fund for renewable energy. Less than 1% of the nation's electricity is currently generated by renewables, mostly biomass and wind generation. Pointing to Chile's growing vulnerability to cutoffs of Argentine gas imports, and the prospects of exhausting Argentina's gas reserves within the coming decades, they have brought the proposal into the arena of national debate.

The group also points to the need for comprehensive studies on Chile's wind-generating potential, which is thought to be substantial, and on the geothermal potential in the Andean region, which has been estimated to be up to 3,350 MW in the most promising geothermal fields. ■



GUATEMALA: Carlos Chen, a leader of people affected by the Chixoy Dam, was detained in January for a day on charges of making threats and threatening the internal security of the nation. The Guatemala-based NGO Rights Action says these are trumped-up charges, and notes, "The Guatemalan authorities are using the legal and penal systems as political tools of repression. These charges are very serious."

The dam, completed in 1985, was funded by the World Bank and the Inter-American Development Bank, in partnership with the military regimes controlling Guatemala at the time. Repression related to the construction of the dam included the massacre of more than 400 community members.

Chen's arrest came on the tails of a major demonstration by the communities negatively affected by the Chixoy Dam. On September 7, 2004, more than 1,000 people from the dam-affected communities peacefully demonstrated at the dam site to call attention to the lack of reparations for the human rights violations and losses incurred during the construction of the dam.

On September 8, the communities ended the protest after signing an agreement with representatives of the Instituto Nacional de Elecificación (INDE), other government authorities and human rights observers. This agreement was, ostensibly, to set up a "discussion table" to assess all the damages and losses caused by the dam.

Then, on September 14, INDE representatives formally presented a complaint to the Ministerio Público, Public Prosecutor's Office, in Cobán against the eight leaders of the "Coordinator of Communities Affected by the Chixoy Dam" – the same leaders with whom they had signed the agreement.

At press time, local groups were worried that the authorities might arrest the remaining seven community leaders. Rights Action is asking for letters to the Guatemalan authorities and World Bank; see www.irn.org for the latest details.

CHINA: A major dam project suspended last year by Prime Minister Wen Jiabao is now the focus of a bureaucratic scuffle between pro-development forces pushing to restart the project and environmentalists who want public hearings and further research, *The New York Times* reported on January 3. The conflict highlights the growing tension

between the need for environmental protection and China's growing hunger for energy to fuel its booming economy.

The original project called for 13 dams on the Nu River, which flows through a remote, pristine region in western China that has been designated a World Heritage Site by UNESCO, and one of China's last free-flowing rivers. The project would also force the relocation of more than 50,000 people, many of them ethnic minorities, and flood an area rich in biodiversity and wetlands. Last spring, the prime minister unexpectedly halted the project so that environmental impacts could be studied, a decision that led to speculation that the project was dead.

In November, Pan Yue, the deputy director of the State Environmental Protection Authority (SEPA), announced that public hearings would be held early this year to discuss the impact of the dams. *The Times* notes, "The hearings, a very rare step in China's closed political system, come as environmental officials are trying to gain greater regulatory power after years of being steamrolled by more powerful ministries charged with economic development." While the official said that SEPA does not have the power to cancel the dam project, he said the agency is reviewing the EIA for these projects.

Local environmental groups note that the Nu River project EIA includes only a half-page report on the project's earthquake risks. The area is earthquake-prone.

In recent months, witnesses have reported that some construction work is under way in the area. Advocates of the project continue to lobby in Beijing to restart the project. The Hong Kong based *Wen Wei Po* newspaper reported on December 11, 2004 that local officials have stated construction will start within 10 years on three of the dams.

BRAZIL: The consortium led by aluminum giant Alcoa has resumed logging in the area to be flooded by Barra Grande Dam (see WRR, December 2004). The consortium recently reached an agreement on social issues with the Movement of Dam Affected People (MAB). Although environmentalists and the dam builders remain at odds concerning the legality of the plan to log more than 10,000 acres of native forests filled with rare species, a federal district judge in January gave the dam builders permission to go ahead with the deforestation.

MAB's agreement with the dam builders provides that 214 additional families will receive compensation for losses of land and employment, that the company will invest more than \$2 million in regional development plans benefiting 1,140 dam-affected families, that they will finance MAB's construction of resettlement housing, and that the timber cut from the forests will be donated for the construction of low-income housing. MAB, in turn, agreed to lift its blockade of the clearing crews.

Meanwhile, in mid-January, MAB began a blockade of the highway which provides access to the Campos Novos dam site, a project under construction in the same region as Barra Grande. Campos Novos is financed by the Inter-American Development Bank. MAB is protesting plans for 25 dams in the Uruguay River valley, and pressing for fair compensation for the affected communities.

AFRICA: After completing a January tour of seven African nations, Iran's President Mohammad Khatami has signed several significant bilateral agreements that include oil and other extractive resources in exchange for dam construction, among other benefits. The tour included Benin, Mali, Nigeria, Senegal, Sierra Leone, Uganda, and Zimbabwe. Iran agreed to assist in rehabilitating the Kainji Hydropower Dam in Nigeria and to expand the Kariba Hydropower Dam in Zimbabwe. In Sierra Leone, an agreement was signed that included mining and oil exploration, dam construction and energy, and the promotion of banking operations by the Export Development Bank of Iran and the Export Guarantee Fund of Iran. Iran will also assist with financing energy development projects in Senegal and Mali, though specific hydropower projects were not mentioned.

TAIWAN: The proposed Hushan Dam literally threatens the birds and the bees, and wildlife groups are gearing up to fight it. The dam site will flood 422 hectares of a wilderness area, which provides habitat to threatened species. One of those that would be harmed by the dam, the Fairy Pitta, is a migratory bird that feeds and breeds in Taiwan. According to the Taiwanese group the Wild Bird Society of Yunlin County, its population in the area was less than 200 individuals in 2001, and just 108 individuals 2002. "The dam site supports the most densely populated area of Fairy Pittas in the world," says S.C. Wu of the Wild Bird Society. The bird has been designated as an endangered species under Taiwan's Wildlife Protection Act, as well as listed as a vulnerable bird by

Birdlife International and IUCN, and regulated under CITES.

The area is also home to numerous endemic species, most of which have already seen their habitats shrink and would be further harmed by the flooding of this territory. "One might wonder how this area came about to sustain such diversity of lives," says Ching-chun Chen of the Wild Bird Society. "But if you stride into one of the two remaining wild woods within the dam site, the secret book of diversity of Taiwan is there for you read."

The dam is located in a geologically unstable and earthquake-prone area in central Taiwan. It was designed as an off-stream reservoir, which stores fresh water drawn via a 6.9km pipeline. This dam will also be very costly.

For more information on the campaign to stop this project, contact: titwu@yahoo.com.tw or ccchun@ms19.hinet.net

A BETTER WAY

US: The 1,500 cows at Blue Spruce Farm in Vermont produce milk and electricity. Well, maybe not electricity exactly, but the methane gas from their manure is being used to produce electricity, which is used to power homes in nearby communities. About 1,000 customers have agreed to pay about 4 cents more per kilowatt-hour to support the farm through CVPS Cow Power. Customers can sign up to get all or part of their energy through the program.

"Our goal is to create a brand new market, allowing customers a renewable energy choice, and providing farmers with new income and manure management opportunities," CVPS program director Dave Dunn said.

The concept is simple. Manure is collected in large tanks, where it is heated up, and methane is collected and produced. The gas is collected and fuels the generator, and the manure byproduct that is left – which contains no pathogens, little odor and no viable weed seeds – can be spread on fields as fertilizer, or the dry solids used for animal bedding.

"For every 10,000 head of feedlot cattle, you can produce about a megawatt of power," one expert estimates – enough energy for about 1,000 typical US homes. The US is home to more than 100 million cows, and many millions of other manure-producing animals.

For Blue Spruce Farm, use of the byproduct for bedding could save up to \$60,000 annually. The farm received incentives from

CVPS and state and federal grant programs to get started.

Blue Spruce Farm is expected to produce about 1.7 million kWh of energy per year. Numerous other farms are considering the idea. It takes a farm with about 500 milking cows to produce enough energy for the Cow Power concept to be economically viable.

Similar programs are underway in Wisconsin (where one farm is already producing enough renewable energy for about 600 homes), which recently announced \$2 million in grants for farmers and others who make use of products produced by their land or their animals for energy; and Colorado, where a recently passed renewable energy initiative is expected to invigorate efforts to harvest methane from the output of that state's many cows.

Producing power from manure is already widespread in China, India and Europe. But the US lags behind, and today there are just 40 large-scale methane-digester plants across the country. With help from progressive state governments, perhaps the US is finally moving to adopt this simple and practical energy source.

CHINA: A law has been drafted to boost renewable energy across China. The draft code, submitted to the Standing Committee of National People's Congress (NPC) for a first reading, will offer discount loans to renew-

able energy projects, value-added tax waivers for energy exploration equipment and products that consume this kind of energy, and other tax preferences for projects. The new law calls renewable energy sources such as wind and solar power "priorities" of China's energy strategy.

"There is a pragmatic approach in the draft, because without proper incentives you cannot expect many enterprises to have strong motivation to develop renewable energy," said Chang Jiwen, professor of environmental law with the Institute of Law of the Chinese Academy of Social Sciences (CASS).

The proposed law provides a host of practices to ensure renewable energy can be not only produced but also marketed and used successfully. It orders power grid operators to purchase "in full amount" from registered renewable energy producers within their domains. It also requires property developers to facilitate the use of a solar systems in the design and construction of their projects. Currently, some cities forbid solar panels to be fixed on new buildings for aesthetic reasons, reports the *China Daily*.

Official data indicates that 20,000 or so remote villages housing 30 million people are without modern energy services. About 60% of China's 768 million rural residents still make open fires to cook on or heat their homes, the government reports.

In Memoriam: China Environmentalists Mourn Young Activist

One of China's most passionate dam activists has died at the age of 32. Xiao Liangzhong, a scholar at the Chinese Academy of Social Sciences, died in his sleep from a heart attack on January 5.

Over the past year, Xiao helped coordinate a nationwide campaign to stop construction of the Tiger Leaping Gorge Dam and to defend the rights of people living along the fertile Jinsha river valley. The project would flood one of the country's deepest river gorges and displace more than 100,000 people, mostly ethnic minorities. The tiny farming village of Chezhou where Xiao grew up and where his family still resides would be flooded by the project; this threat galvanized Xiao to become one of the area's most vocal and active dam opponents.

Xiao worked tirelessly to educate environmentalists and journalists about the economic and social impacts of the project and arranged visits to affected areas. His organizing efforts triggered a State Council investigation last fall after Chinese media revealed that preliminary

construction began without central government approval. Although this preliminary work continues, officials in Beijing have assured the public that a thorough scientific and social assessment of the project will be completed before any decision is taken on the project.

In October, the UK newspaper *The Guardian* wrote of the campaign, "The battle to save the gorge, one of the deepest in the world, has pitted a David-like alliance of green groups and local tribespeople against the Goliath of the Huaneng Group, China's biggest independent power producer, working with the Yunnan provincial government. The company is run by Li Xiaopeng, son of the hardline former prime minister Li Peng, who ... was at the forefront of the controversial Three Gorges Dam project." The project is slated to begin construction in 2008.

"Xiao Liangzhong was a voice for the people of the region. His death will definitely be a loss," said an environmentalist based in Xiao's native Yunnan province.

Nam Theun continued from page 1

resources of the Xe Bang Fai, Nam Phit and other downstream river basins. The likely result will be, as predicted in the project's Social Development Plan, a 'collapse in the aquatic food chain' from the Nam Phit down to the Mekong."

Tens of thousands of people depend on the fish and other aquatic resources of the Xe Bang Fai River for protein and income.

Blake's review of the project EIA found that the plan was severely lacking in detail and rigorous scientific analysis. The official prediction of impacts on fisheries for the downstream rivers is based on only three field surveys, all conducted during the dry season. As a result, the EIA likely underestimates the number of fish species present in the Xe Bang Fai, and contains no study of fish migrations in either the Nam Theun or Xe Bang Fai river basins. The EIA also ignores the importance of other aquatic organisms in the riverine ecology and food chain, and therefore fails to consider the implications of the loss of these resources for the food security and livelihoods of the people of the Xe Bang Fai basin.

Blake found that where the EIA does identify serious impacts likely to result from the project's operations, it expresses an unwarranted faith in mitigation methods to alleviate the impacts, despite a poor record of mitigation attempts at other regional hydropower projects.

Blake also reviewed the plan for compensating villagers along the Xe Bang Fai. According to the power company, "all and any negative impacts on villagers' socio-economy ... will be fully compensated" by "fair replacement or in alternative income at least equal to the value lost." However, Blake found that the program is "overly ambitious, poorly reflects actual experience in the region and leaves many questions unanswered."

One of the main plans is to replace freshwater fisheries with aquaculture. However, Blake says that aquaculture should not be considered as a direct replacement to "capture fisheries," as cultured fish do not have an equal economical, nutritional or cultural value in the diets of Lao villagers. Moreover, experiences to date in Lao PDR suggest that adoption of aquaculture is a slow and gradual process, and that the poorest people often lack the land and capital resources to fully adopt aquaculture. Even if villagers did decide to take up aquaculture in any numbers, there is unlikely to be the human resources or supporting infrastructure present in the area to provide sufficient fish seed or offer training and extension services for many years to come.

According to Blake, "the compensation options proposed are incompatible with helping more than a fraction of affected people in the short to medium term, and even then there is a real danger that any benefits will only go to the better-off villagers, who are likely to be chosen for pilot-testing the options."

In this context, the power company's goal of replacing lost livelihoods along the Xe Bang Fai within five years of commercial operation is completely unrealistic. At the downstream Theun-Hinboun Hydropower Project, now six years after commercial operation began, many villagers remain without adequate compensation for lost fisheries and riverbank vegetable gardens, and while there have been some successes, many challenges remain (see p. 6).

Resettlement Failure?

The project will forcibly displace more than 6,200 indigenous people living on the Nakai Plateau, the area to be flooded by the reservoir. According to the developers' plans, resettlers' income will be tripled within seven years. To achieve this, they've promised new irrigated farmland and fruit trees, new livestock and community forestry operations, and a reservoir fishery capable of supporting over 1,000 fishermen. However, many of these plans are simply unrealistic or unviable, and even the developers admit that plenty can go wrong.

Just as villagers feared, the new farm plots are small, and the soil is poorly suited to crop production as it is "heavily leached and infertile," according to the Social Development Plan (SDP). High inputs of organic and inorganic fertilizer will be required to grow anything, but the company plans to help pay for fertilizer for only three years. In addition, there may not be sufficient land for grazing villagers' livestock, particularly their prized herds of buffalo. Instead, the resettlement plans require the villagers to adopt intensive livestock-raising techniques, requiring high levels of labor and inputs in the form of feed and animal health care.

According to the reviewer of the resettlement plans, "this proposed change in agricultural and livestock raising practices is nothing short of a revolution in farming methods for the resettled villagers," a revolution that has a "high likelihood of failure."

Villagers are also supposed to derive some income from logging a community forestry area. However, even the developers aren't optimistic about this plan. They report that "profitability of pulpwood production is likely to be close to marginal given the poor sites available at the Plateau. ... [and is]

What is IRN Doing?

IRN is lobbying the World Bank and Asian Development Bank (ADB) to refuse support for the project. As part of this effort, IRN will circulate the technical reviews to key decision-makers in donor countries and to Executive Directors at the World Bank and ADB, highlighting how the project documents fail to comply with their policies.

For copies of the reviews:
www.irn.org/programs/mekong/namtheun.html.

fraught with risks as many things could happen over the long term that pose a threat to the profitability of the crop." Meanwhile, villagers will be losing a major part of their income from the collection and sale of non-timber forest products (NTFPs), many of which will disappear once the reservoir is flooded. While villagers were hoping that the community forest area could be used for collection of such products, the SDP reveals that due to the poor soils, this area will produce "very few NTFPs."

While the SDP also promises significant incomes for villagers from fishing in the reservoir, a review of the fisheries management plan by fisheries specialist Eric Theiss has found that it is unlikely that the Nam Theun 2 reservoir will be able to sustain a significant fishery. According to Thiess, "the fishery is intended to be developed from fish trapped by the dam, however, many of these fish will die, and it will be difficult to build a substantial population." Dam operations will shrink the reservoir to less than a fifth of its size during the dry season, which eliminates most of the underwater habitat. What water is remaining is likely to be lacking in oxygen, making it difficult for fish to survive.

According to Grainne Ryder from Probe International, "A fair compensation plan would look very different from the current plans. Quite apart from investments in dubious livelihood improvement schemes, the Nam Theun 2 Power Company owes Nakai villagers for sacrificing their land and resources, and for enduring a decade of economic stagnation. The company owes anyone displaced by the project full market value compensation for lost resources, livelihoods, income, and opportunity, for at least as long as the project fails to triple resettlers' income as promised. Anything less makes Nakai villagers victims of the Nam Theun 2 Power Company, not its beneficiaries." ■

Theun Hinboun continued from page 7

tion by Electricite du Lao for many years, most villages affected by the project are still without electricity.

Livestock Program

To compensate for losses in dietary protein, THPC has worked with villages to improve livestock management through penning of animals, vaccinations, training of volunteers and other interventions. While the strategy for improved livestock management was considered "generally sound," the review panel reported that the benefits will take "some time, likely many years, to reach the majority of households." The review panel reported that present efforts to vaccinate livestock are not reaching most animals, and owners are "enduring economic losses" from annual livestock mortality and disease. Villagers frequently requested greater efforts to provide regular veterinary care for livestock.

Riverbank Erosion

One of the most visible impacts of the Theun-Hinboun Hydropower Project is the severe erosion and collapse of riverbanks along the Nam Hai River. THPC has invested considerable resources to understand the erosion problem and examine its impacts on water quality and downstream fish popula-

tions. It is estimated that two meters of riverbank have eroded each year since the project was completed.

The review panel speculated that mitigation of riverbank erosion "may not be possible" and recommended against implementation of vegetative erosion control techniques and fencing along banks since these would bring only marginal benefits. The panel did suggest small improvements to THPC's monitoring program to inform decision-making on appropriate mitigation strategies. The impacts of past and continuing erosion on water quality are mainly elevating suspended solids and turbidity levels in the dry season, thus curtailing light penetration, which impacts the entire food chain, including the fish, mollusks, shrimps and aquatic weeds which formerly provided subsistence diets and income for villagers. Beyond this, bed-load sediments from bank slumping and other sources are infilling pools, which were formerly important dry season fish refuges. Many of these are now reported by villagers to be half as deep as a decade ago.

Conclusion

The findings of the Theun-Hinboun Mitigation and Compensation Program Review panel underscore the serious difficulties

inherent in trying to replace former natural resources and river-based livelihoods with agricultural-based livelihoods in a limited time frame. This is a longterm and tricky task even for conventional development projects, but is made all the more difficult where the aquatic resource base has been severely depleted by massive environmental changes wrought by a trans-basin diversion of water between river basins with different base characteristics. Even with the high level of commitment shown by EMD staff and significant financial resources made available to the program, there were still signs of exclusion of many of the poorest and most vulnerable community members from core program activities designed to mitigate and compensate for their loss of livelihood. At the same time, it was noted that a participatory living aquatic resources co-management program that might provide more long term benefits for the poorest sectors, had been slow in coming, after a series of conflicting fishery studies over the years. There are strong implications arising from our findings for the future success and sustainability of other hydropower projects planned or under construction in the region, in particular, the World Bank-supported Nam Theun 2 Dam. ■

Nepal continued from page 9



A family enjoys a smokeless stove.

- Increase in the literacy rate and children's education level;
- Increase in social gatherings after dark, leading to improved relationships;
- Increased willingness and demand for non-formal education during the evening hours, and
- Increased awareness of community development possibilities.

The program is looking at changes in the villages through a series of surveys. The first was carried out before any community development work had taken place, and a second survey will take place about 12-18 months after initial installation.

The initial success and strong participation of the local communities, along with the continued support from ISIS, has enabled Kathmandu University to extend the programs in Humla. While the "family

of four" – light, stove, latrine, drinking water – remains fundamental, this year we will also include a non-formal education program for mothers and out-of school children (especially girls), a greenhouse for growing vegetables out of season, separate bathing centers for women and men using high altitude solar water heaters, and a water filter project. All these projects will be implemented in 2005-06 in one neighboring village. Additionally, we will be following up with previous project villages by revisiting families to discuss the ongoing changes and impacts of the projects. The goal is to determine whether or not the villagers' needs have been met, and if overall living conditions have improved as hoped, or if changes in the project approach is needed. ■

The author works in applied renewable energy technology research projects at Kathmandu University in Nepal. His design for a smokeless metal cookstove has been installed in more than 2,600 homes in remote Nepali villages. He can be reached at azahnd@wlink.com.np, or at Kathmandu University RDC Unit, P.O. Box 6250, Kathmandu, Nepal.

Take Action for Rivers on March 14!

This March 14 marks the eighth annual International Day of Action for Rivers. Last year, thousands of people from around the world took action to protect living rivers and protest projects that would harm them. They marched to dam sites, held river blessing ceremonies, organized conferences and photo exhibits, and participated in hunger strikes. We invite you to join the growing ranks of celebrants and take a stand for healthy rivers.

To honor the incredible efforts by affected communities around the world on river preservation and restoration, participants are also encouraged to celebrate a day of action themed around affected peoples and reparations. Over the past year in the US, at California's Shasta Dam site, the Winnemem Wintu tribe performed their "War Dance" for the first time in over 100 years, fasting, dancing and praying for the protection of sacred and historical sites threatened by the proposed raising of the dam. The message the tribe wants the world to hear is that their history and culture is intrinsically linked to the river. Also in California, the Hoopa Valley and Yurok tribes celebrated a long awaited

victory in their effort to restore the Trinity River and their ancestral fisheries when a federal appeals court ordered implementation of the 2000 Trinity River restoration plan, which would increase flows from dams to the river.

Also last year, after a thousand Mayan villagers displaced by the Chixoy Dam in Guatemala occupied the dam's hydroelectric facility, the government agreed to reparations talks. A group of experts on social impact assessment and resettlement found that there is an urgent need to provide reparations to the communities affected by the dam, as well as for the World Bank and the Inter-American Development Bank to honor their obligations by participating in the negotiation process that began recently. The courage demonstrated by these people serves as inspiration for



A 2004 action in Patagonia. This dam has now been suspended.

communities around the world fighting to protect their livelihoods from the devastation wrought by poor planning and damaging river infrastructure projects. International Rivers Network hopes you will join this effort, and asks you to let us know about your plans. ■

For more information, visit www.irn.org/dayofaction, or email dayofaction@irn.org

SPECIAL FOCUS ON ASIA

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