Collecting Fog on El Tofo

Although fog collectors are working well in other parts of the world, in Northern Chile they have fallen into disrepair. (IDRC Photo: J.-M. Fleury)

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In the early 1990s, the global news media became entranced by a small town in northern Chile that started drinking the fog. Newspaper reporters and television cameras were drawn by the site of the giant mesh collectors that trapped droplets of fog drifting in from the coast. Those droplets — which coalesced as an average of 15,000 litres of water a day — were piped down from the El Tofo mountain for use in the formerly parched community of Chungungo.

The technology worked well and the increased water supply helped to transform the town. In fact, the project served as a prototype and there are now fog catchers or collectors providing water to communities in other areas of the world. But, more than 10 years later, in El Tofo, the nets are in a total state of disrepair. What caused the community of Chungungo to abandon the project that had brought it abundant water and high hopes for the future? And what can be learned from the El Tofo experience? These are questions that people close to the project are now grappling with.

Water and a community transformed

One reason the media reported so frequently on this project, may be because the impact was so direct and easy to see. In 1992, Canada's *Globe and Mail* reported: "Residents in this impoverished coastal region, who for the first time have a steady supply of clean water, call it a miracle." A resident told CNN the same year: "Now I can wash every day. Before I had to watch every drop. You really suffer without water."

By 1995, the *Economist* was still marveling at the sight of a vibrant community where "gardens thrive on land that was once barren. Fisherman whistle and joke as they compare potatoes, peppers, cabbages, and maize." Pure and plentiful water, the *Economist* correspondent wrote, had produced not only vegetable gardens but better health and a new sense of optimism among Chungungo's citizens.

There was hope that this "miracle" could be transplanted. "The new technology — which is cheap to build, easy to maintain, and requires no power — could alleviate water shortages in thousands of rural communities in arid and semi-arid communities around the world," suggested *The Toronto Star*, in a 1993 feature.

Ten years later, a good deal of that promise has been realized. The technology that was perfected at El Tofo — where researchers experimented with different materials and designs — has now either been adopted or is under study in 25 different countries. Recently, for instance, new fog collection projects have become operational in Yemen and central Chile, while other projects are at the evaluation stage in Guatemala, Haiti, and Nepal.

Ironically, though, the prototype project in Chungungo has fallen into disrepair and disuse. By the summer of 2002, only nine of the 94 mesh collectors that once blanketed the mountaintop at El Tofo were still hanging. Cables and meshes had been carted off for use elsewhere, and the operator's house on the site had been dismantled. Most of the town's water supply is now hauled in, at much greater expense, by truck.

Conflicting visions of community development

In a report prepared for the International Development Research Centre (IDRC), Chilean consultant Carolina de la Lastra reported that municipal politicians in La Higuera (the larger jurisdiction of which Chungungo is a part) have begun to lobby for a pipeline that would bring water to the community from the Los Choros river, 20 km away. The officials have taken this approach because they "regard water from fog as an unreliable, irregular, and insufficient source for providing drinking water for Chungungo," she writes. It is nonetheless true that fog catchers continue to function well in other parts of Chile, where they bring water to agricultural and reforestation projects.

IDRC project officer Chris Smart says the community's new desire for piped water may be an indication of a once-common problem where alternative technologies — like solar and wind power — suffer from a lack of local prestige.

Often in developing countries, he explains, "people have certain visions of what it means to be developed, and one of them is that water should be brought to you by the state, and you should never have to think about it." Water that comes from a local source, through a system that has to be maintained by a local committee, may therefore be regarded as second-rate.

The call for piped water

Ironically, this feeling that the community was ready for piped water arose partly because of the Chungungo fog collectors' earlier, stunning success. Although the community, a former mining town, had been steadily losing inhabitants since the mine closed in 1970s, the arrival of fog water led to a tripling of the population. Summer homes and tourist facilities were built nearby. The collectors' success also seemed to breed a new economic and political momentum: Chungungo's new profile and global renown allowed officials to lobby successfully for electricity and telephone service.

Beyond contributing to the community's ambition to move to a higher technological plateau, success also gave rise to practical problems. With 900 inhabitants in the town — rather than 300 — the original number of fog-collectors could not supply as much water to each household as it once had. Even more unsettling, periods without fog meant depleted reservoirs and occasional drought in the community. Fog collectors came to be seen as an unreliable source of water.

The road not taken

Robert Schemenauer — one of the original designers of the Chungungo project and the current-day president of FogQuest, a nongovernmmental organization (NGO) that helps bring fog technology to arid regions — says the simplest solution to the supply problem would have been to expand the grid of fog collectors.

"It's no different from any other kind of water supply system. If the community grows, you have to increase the supply," says Schemenauer, who is now working on a proposal to revive the El Tofo site.

"The most logical response would have been to simply increase the number of fog collectors, and increase the size of the water reservoir. Then you'd have more water, and a larger buffer capacity to get this larger community through the times when there is no fog. There's essentially no limit to the number of fog collectors you can put up there. You can put ten times, twenty times, fifty times what there is now."

Community leaders, however, clearly preferred the idea of a pipe bringing a steady flow of water from Los Choros — even though this project would come with an estimated price tag of one million US dollars.

The question of community involvement

The fact that there was so little long-term commitment to keeping the fog collectors functional, says University of Guelph rural extension professor Jorge Nef, is an indication that not enough preparatory work was done to determine if the community had the right mindset to sustain this type of technology, and how much they were willing to contribute to keep the fog collectors running. [See related sidebar: Taking a Multidisciplinary Approach]

In his report on what went wrong at El Tofo, Nef recounts that "villagers were not involved in any significant way in [the project's] origins and development" and that there was very little study of their underlying attitudes and aspirations. This meant that they were inadequately informed about the economics of water supply and were unprepared to commit to the fog collectors' long-term functioning.

But Schemenauer believes that any deficiencies in preparing the social ground for the arrival of this new technology, arose because of the project's unusual evolution. The original goals of the project, he explains, were to perfect the technology, construct an array of collectors as a pilot project and then to use the water to feed seedlings for a trial reforestation project on the mountain. The project was not initially designed or funded as a water project for a community. It was only after intensive lobbying by the community that funders reluctantly agreed to provide additional support to have the water diverted down the mountainside to the community.

Switching gears midstream

"El Tofo is not a typical situation," he says. "We worked on the top of the mountain for five years before there was any push to put a pipeline down the mountain. Normally, we work with local NGOs that have a long history in the community and put a strong emphasis on the social side." He adds that — even though there was little formal research into the social character of the community — community members were involved in planning through public meetings.

In Nef's estimation, changing the purpose of the project in mid-course also helped create a management structure that was unclear and unstable.

The project began as a collaboration between IDRC, Chile's National Forestry Corporation (CONAF), and Catholic University. Yet when the project's goal became the provision of drinking water, CONAF (which had no jurisdiction over consumable water) shifted its responsibility to the municipality and to various national and regional bureaucracies.

This created something like organizational chaos. With up to eight stakeholders involved at one time, "there was no single authority looking over the whole system," writes Nef. Within an atmosphere of jurisdictional dispute and uncertainty (contributed to, for instance, by events such as the privatization of the state's rural water agency) the local committee charged with running and maintaining the fog collectors was unable to develop the necessary expertise or to function efficiently. The local committee could collect sufficient fees to pay for routine maintenance of the system but not for increased demands made by regional water agencies or for major repairs.

Lessons from El Tofo

Those who have followed the roller-coaster ride of fog collecting at El Tofo draw some clear lessons from the experience.

One is that fog collecting works. Proof of this can be found in the work of a new network of specialists who have taken this technology to arid areas across the globe.

The other lesson is that understanding social conditions and securing the involvement and commitment of local people — a factor apparently given short shift here because of special circumstances — is always vital to the long-term viability of a development project.

"I think the main message," says Smart, "is that the technology may be absolutely wonderful — and in this case the technology works brilliantly — but there's always a social setting, and that's going to demand as much attention as the technical questions."

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Sidebar

Taking a Multidisciplinary Approach

For many researchers, the traditional, monodisciplinary approach to science has outlived its usefulness — particularly with respect to research in the developing world.

Increasingly, the approach to research is more fluid: applied, cross-disciplinary, heterogeneous, and non-hierarchical. In practice, this means researchers problem-solve around an issue rather than through a rigid code of practice associated with a specific scientific discipline. It also means they may work in multidisciplinary teams.

"Imagine that you're trying to improve production in a village wood lot," says Tim Dottridge, Director of IDRC's Special Initiatives Division. "In addition to foresters, you might have a social anthropologist and — since men and women have different interests in the wood lot — socio-economic and gender specialists on your team."

IDRC's shift in programing

For the first 25 years of its existence, IDRC conducted its programs along fairly traditional sectoral lines. In fact, by the early 1990s, it had 55 separate sub-programs delivered by seven program divisions and six regional offices — all with separate budgets. By 1995, however, the shift towards a multidisciplinary approach was complete, and the Centre has never looked back.

"A lot of organizations have tried to embrace a cross-cutting approach without changing their internal structures," says Dottridge. "We went further, and truly attempted to transform the organization. Our approach helps ensure that we practice what we preach. We expect Southern researchers to take a multidisciplinary approach, and we're organized in multidisciplinary teams ourselves to assess the proposal properly."

While IDRC has been influenced by international trends in research, its unique experience and circumstances have also been a motivating factor in the shift towards multidisciplinary teams.

The role of evaluation

The first seeds were planted back in 1978 with the creation of an Office of Planning and Evaluation, and the subsequent integration of those functions with the work of the program divisions. By 1986, the accumulated evaluation work, along with analysis of the external context, led to the first policy shift. A strategic review stressed the "connectedness" of the various elements of development, along with the need for greater coherence in programming.

The review reflected the Board of Governors' ongoing concern about the open-ended nature of programming. Still, while IDRC tried to draw up divisional objectives in 1986, programs received budget allocations without the requirement of a multi-year plan or any specific objectives. And in the 1990s, while IDRC was describing its programs in terms of sustainable development — especially after the Earth Summit in Rio in 1992 — program delivery was essentially unchanged. Meanwhile, evaluations could not conclusively demonstrate that disparate projects added up to more than the sum of their parts.

In 1995, the Government of Canada made widespread cuts to its programs, including IDRC's work. In response, the Centre decided to cut staff and concentrate on fewer research areas. It produced a plan for a more focused program that would lead to measurable results — a decision that led to the creation of Program Initiatives (PIs) as the primary vehicles to fund Southern researchers and research institutions.

Program initiatives

Instead of focussing on single disciplines or sectors such as economics, fisheries, or earth sciences to solve problems, PIs first look at the problem, and then consider what knowledge is necessary to solve it. When Southern researchers and research institutions submit funding proposals, for example, PI teams review them to see how closely they fit with the PIs' objectives and priorities. Often, the initial proposal is sketchy and the PI team encourages the applicant to take a more integrated approach. The team also strives to expand the networks to include members of civil society, policy makers, and extension agents who can help define the problem and set the research agenda.

"The government cuts may have been the final push, but IDRC was already moving in the direction of a true multidisciplinary approach," says Dottridge. "What's remarkable about the transition is that we were effectively undertaking three major changes at once. We were downsizing our operations by cutting staff. We were restructuring our operations. And we were reorienting our thinking. Many organizations have made these changes individually. Few have attempted them at the same time.

"It hasn't been an easy transition, and the system is not perfect. There is always room to improve how we assess and manage projects. But we've positioned ourselves to be a model for a way of working. When we insist on a cross-disciplinary approach to research in the field, we're walking the talk."