

Fishing for Less Mercury in the Amazon



Mercury pollution can cause motor and visual impairment.

IDRC Photo: Jean Lebel

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People living along the Tapajós River in Brazil's Amazon Basin know that many of the fish they eat are poisoning them with mercury. But how do you avoid mercury contamination when fish is a large part of your diet? This is the quandary facing local villagers and a team of Brazilian and Canadian researchers, who have been studying the problem since the mid-1990's.

Early this year, a workshop was held in Brasília Legal — a village of about 500 people — to discuss the best ways to limit or eliminate the threat of mercury exposure. According to team member [Donna Mergler](#), a neurotoxicologist at the [Université du Québec à Montréal \(UQAM\)](#), the search for solutions focussed on three main areas: people's diets, fish and fishing practices, and deforestation and agriculture.

Research team

Apart from Dr Mergler's expertise, the research team includes specialists in cytogenetics, ethnobotany, biogeochemistry, sociology, the environment, and forestry from the Amazonian Federal University of Pará (UFPA) in Belém, the UFPA outreach campus in Santarém, the Federal University of Rio de Janeiro, UQAM, the [Montréal Biodome](#), and the Grupo do Defencia do Amazona in Santarém. Their work is supported by the International Development Research Centre (IDRC).

When the project began in 1994, the researchers focused on discovering the source of mercury in the Tapajós River region. They also wanted to determine how people in the area were being contaminated with mercury and how it was affecting their health.

Gold mining

It was initially assumed that mercury present in the Tapajós River comes from gold-mining activity. In the past three decades, the Amazon region has experienced a gold rush. Many

thousands of independent miners — known locally as *garimpos* — use a rudimentary mining process that involves mixing elemental mercury with river sediments and soil in order to extract the gold. The scientists discovered, however, that gold-mining accounts for only part of the overall mercury contamination. In addition, "slash and burn" agricultural practices, leading to large-scale deforestation and erosion of soil heavily laden with natural mercury, are a major source of mercury pollution.

The impact of this pollution on the local population was brought to the world's attention by Fernando Branches, a physician in Santarém specializing in cardiology, says Dr Mergler. She describes Dr Branches as a "very brilliant, very observant physician who saw anomalies in the electrocardiograms of patients." Dr Branches developed a fairly simple coordination test, which showed a relationship between declining coordination and increasing levels of methyl mercury — a highly toxic form of the metal — in people's hair. The research team also found that motor and visual function was being impaired at much lower levels of exposure than the threshold considered "safe" by the World Health Organization (WHO) — 50 micrograms per gram of hair tissue.

Working together

During the workshop in Brasilia Legal, held from January 14-17, the researchers presented their information and community members brought their own knowledge about the local ecosystem. "We look for solutions together," says Dr Mergler.

Fortunately for the local people, who derive much of their protein from fish, reducing their exposure to mercury does not mean giving up fish. "It would be absolutely tragic to say don't eat fish," Dr Mergler stresses. "Not all fish contain high levels of mercury. There are more than 40 fish species [in the river]." She adds that fish-eating, predator fish contain the highest mercury levels.

Mercury levels

"The mercury content can even decrease as the size of the fish increases," notes Dr Mergler. "In some species there is more mercury in the juveniles than in the adults. We are looking at all this information, examining some 500 fish samples to see what the mercury levels are. In the end, we will be able to propose fish diets with a minimum amount of mercury. If you eat herbivorous fish, you won't have much mercury in your body."

The workshop also addressed fishing practices. "We work with fishermen to identify the levels of methylation (of mercury) in different fishing spots. Are there areas where more methylation occurs?"

Reforestation

A third area for potential intervention is reforestation and agriculture. According to Dr Mergler, the plan is to test mercury retention in soils by different trees. The team's objective is to "identify the trees that are most efficient in reducing the leaching of mercury. We also want to see whether there are trees that can produce fruit, as a food source."

In 1995, 98 people in Brasilia Legal were tested for their exposure to mercury. They will be tested again in the year 2000 to measure changes in mercury levels and determine the impact of intervention projects. At that point, the researchers may also have a better idea of whether impaired motor and visual function can improve if exposure to mercury is reduced, says Dr Mergler.

Reference centre

Another outcome of the workshop was the launch of an IDRC-supported network and reference centre for Amazonian researchers who study mercury. The reference centre will provide information on sources of mercury and its effects on food chains and human health.

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