



Ecohealth Works

Environmental Pollution

Environmental pollutants from many different sources contaminate water, air, and land, putting humans and ecosystems at risk, and often pitting people against industry. By viewing competing interests and their implications within a broad ecosystem analysis, ecohealth approaches strive to protect health while balancing the needs of various stakeholders and contributing to safeguarding the ecosystem.

THE CHALLENGE

Worldwide, thousands of different types of chemicals pose serious risks to human and ecosystems' health. Populations in developing countries are especially at risk because of often inadequate knowledge, lack of appropriate regulation and enforcement as well as barriers to accessing "cleaner" technologies. People often have little capacity to protect themselves and their voices are not heard in political discussions.

Economic development is clearly essential for communities' livelihoods and the well-being of nations, but is often a source of harmful environmental pollution. Everyday human activities such as cooking, heating, and transportation also produce pollutants. The poor and underprivileged are especially vulnerable.

Humans are paying the price of these pollutants on many levels: from direct harm to health through cancer, neurological impairment, and other ailments, to contamination of the food chain and the failing capacity of ecosystems to absorb wastes and provide the essentials for life. These complex and urgent problems require innovative, flexible, and action-oriented approaches to finding solutions.

WHAT'S HAPPENING?

Responding to the challenge, the International Development Research Centre (IDRC) supports ecohealth research and networks to develop sustainable responses to environmental pollution. Ecohealth projects generate sound scientific knowledge and build capacity of local researchers and communities, while seeking to influence



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In Molango, researchers measured atmospheric manganese stirred up by truck traffic.

policies to effectively improve human health and protect developing country communities from environmental pollution. Projects in Mexico, Ecuador, and India illustrate such achievements.

GENERATING KNOWLEDGE

IDRC-supported researchers have successfully applied ecohealth approaches across the developing world to produce knowledge to a number of environmental pollution issues.

Making the links between manganese pollution and neurological impairment in Mexico

In the district of Molango, Mexico, rich natural deposits of manganese have been mined since the 1960s. Relationships between the mining company and surrounding communities have deteriorated over time as local populations experienced lower production from their traditional agricultural livelihoods and attributed them to dust and smoke emissions from the mines. Many families blamed the company for their polluted environment and health problems.

In 2002, a team of ecohealth researchers began a study of the transport of manganese through different components of the ecosystem and, ultimately, its impacts on human health. They discovered that exposure to contaminated air, rather than water or food, was the culprit. They traced the path of manganese from mine smokestacks, through wind and dust, and even from trucking corridors, right into people's homes. The team showed that exposure to manganese led to motor skill damage in adults, especially in women. The project further identified nervous system risks in children. These findings led to concrete changes in local policies as explained in more detail below.

Mining for knowledge in Ecuador

In the Puyango River basin in Ecuador, small-scale gold mining is common. Due to rudimentary technology and lack of regulation, gold mining activities are inefficient, hazardous, pollute the environment, and contribute to the vulnerability of the population.

Smelting gold ore releases many toxic heavy metals. Researchers first determined upstream and downstream population exposures to mercury and lead. They expected downstream

populations to be exposed, through their consumption of fish, to mercury released by upstream mining activities. In the Amazon, previous IDRC-funded research had demonstrated that naturally occurring mercury is released from the soil by erosion following deforestation, and is then washed into the river, where it is transformed into toxic methyl mercury, which accumulates in the aquatic food chain. But this was not observed in the Puyango River. The study documented that workers in gold ore processing plants upstream were the ones being exposed to mercury through the amalgamation and burning processes.

Water and fish consumption in downstream communities were associated with nervous system and learning problems. Rather than being caused by mercury poisoning, these problems could be linked to lead and manganese present in the river. The study investigated other sources of lead exposure. Again, upstream ore-smelting industries were implicated as an exposure source for workers, as well as the use of cooking pots made of metal alloys containing lead in both upstream and downstream communities. Arsenic was also found in the Puyango River.

The research showed that heavy metal pollution of the Puyango River basin was clearly due to upstream gold mines. Communities harnessed these results to press decision-makers for action.

Stone quarry owners in India work to improve environmental conditions

In India's Madhya Pradesh, stone quarrying and crushing provide a much-needed source of extra cash for local farmers. However, the work is dusty, noisy, and dangerous. Consequently, workers commonly suffer respiratory illnesses, hearing problems, and injuries. Their communities are also affected by dust and noise, on top of chronically poor nutrition and inadequate access to health services.

An ecohealth team of researchers worked with stakeholders to evaluate health risks and develop solutions. The team bolstered the capacity of community health providers to diagnose and monitor respiratory diseases, providing training and equipment that brought medical



professionals closer to the community. The plant owners also agreed to use the dust abatement technology developed by the project team.

“Because stone quarry owners, community residents, health professionals, youth groups, regulators, and even policymakers have all been involved in the process, it is quite likely that the impacts of the project will endure and grow many-fold in the near future,” says Dr Kalpana Balakrishnan, who co-led the research with Dr Vijaya Lakshmi. Both researchers believe that the community’s capacity for risk management has improved tremendously.

BUILDING CAPACITY

IDRC strives to build capacity of local researchers and organizations to generate meaningful results and promote excellence in research. Ecohealth projects also seek to empower communities to take charge of their own environment and health through the research activities.

A community of practice gains momentum in Latin America and the Caribbean

From an initial membership of 13 scientists in 6 countries in 2006, the Community of Practice in Ecosystem Health to Reduce Toxic Exposures in Latin America and the Caribbean (COPEH-TLAC) grew to more than 120 members in 25 countries in five nodes by 2007. Each node conducts its own research activities and outreach programs, while a coordinating group promotes exchanges between the different regions and ensures general management of the community of practice. COPEH-TLAC collaborates with the Canadian community of practice, sharing technical and strategic knowledge.

To build its overall capacity for ecohealth research, the community of practice exchanges knowledge and techniques through workshops and conferences, including an ecohealth summer school in Mexico.

Increasing demand for ecohealth courses in Mexico

Since 2002, with support from IDRC, the National Institute of Public Health (INSP) in Mexico hosted a summer training program in ecohealth approaches to human health. There have been guests lecturers from all over the

continent. In 2007, the school received more than 70 applications for the 20 available spaces. Course organizers are convinced that this huge demand is due to the growing influence of the region’s community of practice, COPEH-TLAC.

INFLUENCING POLICY

Policy influence is a means of transforming new knowledge into enduring change. This can be achieved through the continued engagement of policymakers throughout the research process.

Joint plans to reduce emissions in Mexico

In Molango, the manganese research team and study communities are working with state and health authorities to control exposure and mitigate health effects. The plan includes paving roads to prevent inappropriate use of spent mining ore to resurface local roads, developing strategies to control household dust, establishing more stringent national air quality standards for manganese pollution, and monitoring programs to ensure compliance.

In Madhya Pradesh, the community’s capacity for risk management has improved tremendously.



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Getting the lead out

In Ecuador, the research team worked with municipal authorities and community leaders to develop policy and an action plan to reduce river pollution upstream and population exposure downstream.

The upstream municipalities of Zaruma and Portovelo have now integrated environment and health management into their strategic plans. In the two municipalities, the research team worked with community leaders and stakeholders to increase environmental awareness. Ecological youth clubs have been created as part of several community initiatives. Two isolated downstream communities have begun to use sand filters to decrease levels of chemical and biological water contamination, while another community now benefits from a water processing plant. In addition, the Ecuadorian government has felt pressure to clean up contaminated segments of the river before moving ahead with a plan to build a dam, jointly with Peru, that would supply water for agriculture.

In Ecuador, a member of the ecological youth club explains the impacts of mining on environment and human health to the community.



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FUTURE ECOHEALTH WORK TO FIGHT ENVIRONMENTAL POLLUTION

Global economic growth encourages rapid industrialization of most developing countries. Worldwide production of environmental pollutants will continue to rise as demand for consumer goods and food increases. Climate change will further add pressure on ecosystems already made vulnerable by environmental pollution. These large-scale forces generate conditions that limit food, livelihood, and health choices for poor households in developing countries. Ecohealth research contributes to identifying sustainable ways to balance economic and environmental trade-offs while seeking to protect human health.

Ecohealth — short for “Ecosystem Approaches to Human Health” — is a research framework that addresses how human health and environmental quality are determined by complex relationships among different components of an ecosystem. It is used to explore how human health can be protected and improved through more sustainable ecosystem management. Researchers work across academic disciplines to develop sustainable solutions that transcend the health sector. Ecohealth approaches help translate research findings into policy and action. For more information about the Ecohealth Program at IDRC, visit www.idrc.ca/ecohealth.

For nearly 40 years, IDRC has worked in close collaboration with researchers from the developing world in their search for the means to build healthier, more equitable, and more prosperous societies.

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