

Investigating Health, Biodiversity, and Natural Resource Use on the Amazon Frontier



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Tamsyn Murray

[Photo: Chronic malnutrition affects over 50% of young children in the Ucayali region.]

Researchers from Canada and Latin America are investigating why an apparent abundance of resources isn't generating the income nor providing the nutrients needed to promote a healthier rural population in the Western Amazon Lowlands of Peru. The three-year study, funded by the International Development Research Centre's [Ecosystem Approaches to Human Health](#) program initiative, is led by [Tamsyn Murray](#) of the [International Center for Tropical Agriculture](#) (CIAT). Her partners include the University of Guelph in Canada, the Institute of Research on the Peruvian Amazon (IIAP), and the regional Ministry of Health.

Over the past two decades, the international research agenda in the Peruvian Amazon has evolved from an agricultural focus on pastures, plantain, and rice to an integrated natural resources management approach. In collaboration with the [International Centre for Agroforestry Research](#) (ICRAF) and the [Centre for International Forestry Research](#) (CIFOR), CIAT is examining different land use options that promote economic development while reducing deforestation and land degradation. The current IDRC-funded project is broadening CIAT's focus to include health and nutrition issues. The ultimate aim is to improve local people's health through better management of their natural resources.

AMESH

The research builds on an earlier project supported by the Canadian International Development Agency (CIDA), which involved [David Waltner-Toews](#) of the University of Guelph and Murray, Gilberto Gallopin, and [Ernesto Raez-Luna](#) of CIAT. One of the major outcomes of this study was a new holistic approach to guide research on tropical ecosystems, called AMESH ([Adaptive Methodology for Ecosystem Sustainability and Health](#)). Using the AMESH approach, the researchers generated new insights concerning the complex issues and problems confronting the Ucayali region of Peru. The team found that national research on health and nutrition was weak while international research efforts were nonexistent.

Populated by 370,000 people, the Ucayali region spans 100,000 square kilometres. A road connecting the region's capital city, Pucallpa, with Lima in the 1940s hastened its colonization. Now, about 80 % of its population lives either in Pucallpa or on the Lima road, creating agricultural production and food security challenges. Despite the natural diversity and fertility of this region, rural communities face a range of nutritional and health problems.

Health issues

According to the regional Ministry of Health, chronic malnutrition affects over 50% of rural children below age five; anaemia and vitamin A deficiencies are widespread; and cases of malaria, dengue fever, and persistent diarrhea continue to rise. Moreover, access to health care is restricted because most medical professionals are based in the urban areas, and inadequate infrastructure and seasonal flooding isolate frontier communities. As a result, the population's nutritional status and health is largely dependent on each family's ability to ensure sufficient nutrient intake through different food production activities, their hygiene practices, and their knowledge of how to treat tropical diseases with wild and domesticated medicinal plants.

"In the Amazon lowlands, understanding how the adaptive livelihood strategies of frontier communities relate to and are synchronized with the constantly changing floodplain and upland forests [may] provide insight into the determinants of food security, nutritional status, and human health," states Murray. "The hydrological cycle and the resulting 8-15 metre change in river levels dictate migratory patterns of fish and wild animals, agricultural production cycles, and the seasonal availability of forest foods. In addition, the [resulting] habitat changes affect vector prevalence, disease outbreak, and periodicity."

Complex relationship

For now, the relationship between household production, income levels, and health in the Ucayali region is complex and poorly understood. According to Murray, the exploitation of local resources results in diverse seasonal combinations of farming, fishing, logging, and hunting and gathering activities. But it is not yet known how these different resource strategies affect household health, or whether health and earnings are related — issues that have important implications for agricultural and technology development in the region.

Since launching their study over a year ago, she and her colleagues have employed a variety of methods and tests at the individual, family, community, and landscape levels to identify the most significant factors affecting human health. For example, using landscape spatial mapping techniques, the team has demonstrated the diversity of ecological resources upon which Ucayali communities depend. Extensive household surveys have detailed family and individual consumption and production patterns. The researchers have also gathered a variety of data on health status and water quality in the region. By linking the diversity of food and income sources with an assessment of household food security and individual nutritional status, they expect to improve their understanding of the relationships between nutrition, biodiversity, and natural resource use.

Field work

So far, the team has conducted household surveys and field tests in eight different communities in the Ucayali region, involving a total of 345 families. The researchers selected native and colonist communities in both the floodplain and upland forests, each one differing in its degree of access to and involvement in the market economy, the time of settlement, and dominant land use strategy (slash and burn agriculture, fishing, cattle ranching, and oil palm plantations).

Because of seasonal patterns in agricultural production and the availability of fish, animals, and foods gathered from local forests, the team's field work was conducted on three separate occasions: the dry season (June/July 1999), the start of the rainy season (October/November 1999), and the wet season (February/March 2000). Using these three time periods and data sets, the researchers will analyse the cycles of food availability, disease outbreaks, and nutrient intake. This will help them identify the critical periods when food is most scarce and disease is most prevalent, thereby permitting the development of more targeted and effective interventions.

Participatory research

In addition to quantitative surveys, the team has conducted ethnographic participatory health assessments involving more than two weeks of qualitative research at each site. Murray and her colleagues explored how local beliefs, knowledge, and decision-making processes affect the selection of foods and the treatment of illness. Using participatory methods, they identified community health priorities and from these developed local definitions and indicators of health.

As the research phase draws to a close, the team is now working with each community and the Ministry of Health to determine key areas of intervention. At the community level, community action plans will include dietary guidelines for each community, based on the availability of local nutrient-rich foods; educational programs that target high-risk groups; purification measures to improve water quality; hygiene and sanitation practices to reduce water contamination; and small-scale food production projects, aimed at increasing dietary diversity and food security — such as family gardens, small animals, fruit orchards, and fish ponds.

Positive steps

Some positive steps have already been made as a result of water quality, parasite, and anemia testing in the region. "In several communities, stool and water testing initiated immediate action in cleaning and controlling defecation along stream banks and reducing contamination of wells," notes Murray. "In addition, this early emphasis on action promoted greater interest and local ownership of the information, findings, and solutions."

At the regional level, the research team is helping the Ministry of Health to evaluate and modify their current health and nutrition programs, based on the field studies. They are also developing an interdisciplinary course on Ecosystem Approaches to Human Health for undergraduate students in the Faculties of Health, Forestry, and Agronomy at the National University of Ucayali (UNU).

Tamsyn Murray is the Principal Investigator of the Ecosystem Health Project based in Ucayali. (Photo: T. Murray, CIAT)

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If you have any comments about this article, please contact info@idrc.ca.

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[AMESH: A New Approach to Environmental Health](#), by Keane Shore

[Fishing for Less Mercury in the Amazon](#) by Neale MacMillan

[Adaptive Methodology for Ecosystem Sustainability and Health \(AMESH\): An Introduction](#)

[Ecosystem Approaches to Human Health](#) program initiative