



This map is a product of the FAO/CGIAR/UNEP project on poverty and food security mapping. The project aims to analyse the spatial dimension of poverty and food insecurity with a view to improving planning and targeting of poor areas in agricultural development projects. More information, reports and maps are available on [www.poverty-map.net](http://www.poverty-map.net)

## Rich map, poor map

W. Conard Holton

The fact that poverty and environmental health are related is widely understood but often difficult to quantify. Recognising this, researchers, activists, and policy makers are beginning to combine “poverty maps” that locate the poor, with maps that identify environmental conditions, creating a tool that helps guide policy decisions and remedial actions. For example, a region’s highway infrastructure, forest cover, building locations, airborne toxins, and infant mortality can be displayed, manipulated, and analysed for a particular time period.

Poverty mapping with GIS is being sponsored by governmental and non-governmental organisations (NGOs) on every continent. To promote the use of poverty maps, particularly in the areas of food security and environmental management, the government of Norway has funded the Poverty Mapping initiative ([www.poverty-map.net](http://www.poverty-map.net)), run by the Food and Agriculture Organization of the UN (Rome, Italy), the UN Environment Programme (UNEP)/Global Resource Information Database (GRID)-Arendal (Norway), and the International Center for Tropical Agriculture CIAT (Cali, Colombia). Similarly, the World Bank has sponsored the creation of numerous national and regional poverty maps as policy tools.

The most useful maps show poverty at a district or community level, rather than on a national scale. These higher-resolution maps can reveal poor regions and communities that may dis-

appear among wealthier areas at lower resolution. Higher-resolution maps can more closely tie population to specific spatial information like roads, health clinics, and factories.

Still, no methodology has been standardised to produce poverty maps, and there are tradeoffs and limitations with each technique. The so-called “small-area estimation method” combines census and household survey data. Another method combines census data with composite indices of poverty indicators. For example, the Human Development Index was created by the UN Development Programme and compiles the poverty indicators of life expectancy, education, and income for each country.

“These maps have the potential to greatly influence public decisions or to make the decisions more transparent,” says Norbert Henninger, deputy director of the Information Programme at the World Resources Institute. “When maps get in the public domain, you can raise public awareness – it becomes crystal clear when you see on a map that resources aren’t going into poor neighborhoods.”

Maps can be tools to link poverty and environmental health in developed countries as well. The environmental justice movement has focused attention in the US and Europe on adverse health effects associated with pollution-intensive industries and hazardous-waste sites in low-income and minority communities. The movement was sparked in the US by a 1987

study by the United Church of Christ, which concluded that hazardous waste sites were disproportionately located in minority neighborhoods.

“That study was really the first national study, and it laid out the framework for examining the issues,” says Robert Bullard, director of the Environmental Justice Resource Center at Clark Atlanta University. “When you map out the environmental characteristics of a place and the population, you can dispel a lot of misinformation about disparities.” He says that poverty mapping is still in its infancy, but it is helping advance the concept of environmental justice into international discussions on development, trade, and human rights. He is concerned that after September 11, security issues have made it harder to get important information on infrastructure such as pipelines, factories, and power plants.

In the UK, the Environment Agency has recently published a research report from Staffordshire University and The University of Leeds showing that the poorest communities bear the greatest burden of poor air quality. In addition, pollution sources are seven times more likely to be located in the poorest communities. According to Simon Bullock, environmental justice research officer at Friends of the Earth, this research is one result of a map created in 1998 by his organisation linking the location of polluting factories in England and Wales to average income by postal code. “This new report is promising because there has been a real lack of relevant academic research in the UK,” says Bullock.

Bullock notes that the fact that poor people live in poor conditions is considered “common knowledge” in the UK, and so had attracted little interest in the press or research. “Since the prevailing winds come from the west, the rich have always lived on the west side of cities and the poor on the east,” he says. “At one point, the environmentalists were attacked as pushing policies that would hurt the poor, such as raising gasoline prices. Now our tactics have shifted to relating environmental issues to poverty, and maps have played an important role in making the case.” Bullock says that even Prime Minister Tony Blair has changed his rhetoric to declare that local environmental problems hit the poor the hardest.

In the broader struggle to improve the quality of life worldwide, poverty maps are being developed to help achieve the Millennium Development Goals adopted by the United Nations member states in September 2000: eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality and empower women; reduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases; ensure environmental sustainability; and develop a global partnership for development.

“We’re taking a global perspective, rather than one country at a time,” says Marc Levy, associate director for science applications at the Earth Institute of Columbia University’s Center for International Earth Science Information Network, who is monitoring progress

towards the goals. “Mapping will allow us to characterise the distribution of the world’s poor. The Goals were set in a vacuum, and now we must identify where and in what conditions people live – is it dry, wet, urban, rural, what are the soil conditions? This information is valuable for understanding the poverty drivers and what interventions might help.” A significant challenge for Levy will be finding comparable measures in different countries. Income, for example, is very difficult to compare because purchasing power varies between regions and exchange rates fluctuate, so it’s better to focus on mapping outcomes of poverty such as food consumption.

Anna Ballance, programme officer for capacity building at UNEP/GRID-Arendal, is coordinating the Poverty Mapping project. She says, “The priority is to expand poverty mapping methodologies to be able to combine socio-economic variables with environmental indicators. This will let us look for causal relationships or synergies that could be used to improve planning and development.” Ballance would also like to see greater comparability between poverty mapping techniques in different countries and at different scales. The wide range of indicators of income and well-being in use impedes comparison between countries and thus allocation of priorities.

W. Conard Holton is a freelance writer from New York. He specialises in scientific articles, particularly in the environment and health field. This article is summarised from the original, printed in the February 2004 edition of *Environmental Health Perspectives*. [www.ehponline.org](http://www.ehponline.org)

## Swedish children discuss water stress

Elisabet Idermark

How do you discuss water stress with children spoiled with never-ending clean water? What do they care about an International Year of Freshwater?

They do care, says Camilla Nilsson, science centre educationalist in Kalmar, Sweden, who spent all of 2003 exploring freshwater issues with Swedish school children aged 6-15. “We have heard the most innovative ideas on water conservation and management during our sessions with the children” she added.

Camilla and her colleagues at XL, a university science centre in Kalmar, set up a programme on freshwater in collaboration with GIWA, Global International Waters Assessment, a UNEP project on the environmental conditions in transboundary waters. School classes were invited to make experiments with

water in the XL laboratories. They were expected to discuss water issues before coming there and were also given exercises to continue working on in the classroom after the visit.

Many teachers took this opportunity to make an interdisciplinary project on water, says Camilla Nilsson. The children have written poems, read novels and designed flags along with the more scientific studies of water.

Marie-Louise Yllenus is head teacher in fifth grade in Torslunda school on the island Öland in the Baltic Sea. She describes how her school opened the water project with a surprise event. “We asked 100 students to stand in a circle, each holding a glass of water. They were asked to taste the water in the glasses. Only three of them were filled with drinkable freshwater, all the others were very salty”. This led the

Torslunda fifth graders into a discussion on the world’s uneven distribution of drinking water.

“The younger children tried to come up with ideas on how to share the Swedish abundance of water” says Camilla Nilsson at XL. “One suggestion was to use salt water for toilets, another was to always take showers and never use bathtubs. The older children understand that what is to be shared is knowledge and that they in the future must get involved in technical development also in other countries.”

Elisabet Idermark is the Information Officer at the Global International Waters Assessment (GIWA). The objective of GIWA is to produce a comprehensive and systematic assessment of the environmental conditions and problems in transboundary waters, to develop scenarios of future conditions, and to present policy options. GIWA is a project funded by the Global Environmental Facility (GEF) and led by the United Nations Environment Programme (UNEP).



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