Experiences with the Development and Use of Poverty Maps

Case Study Note for ECUADOR*

1. Background information on the poverty mapping initiative

Ecuador's first poverty index and map was developed in 1989 using a methodology originally developed by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) based on an unsatisfied basic needs indicator. The poverty index relied on 1982 census data and was based on such indicators as access to safe drinking water and electricity. While the ECLAC indicator was initially developed for Chile, it was adjusted for specific circumstances in Ecuador. This indicator nonetheless did not adequately reflect poverty in Ecuador and it was minimally used.

In the early to mid-1990s, various uncoordinated efforts to develop poverty maps—at different institutions using different methodologies—were underway. Among these institutions was the National Statistics Institute of Ecuador (*Instituto Nacional de Estadistica y Censos*, or INEC). The government was considering eliminating a fossil fuel subsidy and needed information on poor households to help target a compensatory transfer. Under tight time constraints, INEC developed a basic needs indicator. Five variables were selected ad hoc to capture, at a household level, access to safe water, sanitation, and waste disposal services as well as education (of the household head) and housing (a crowding index based on the number of people per bedroom). The selection and weighting of the variables was considered by many to be subjective and biased.

While the government eventually decided against removing the subsidy, the development of the INEC basic needs indicator did spark discussion of how best to develop information on the location of poor households. Two World Bank staffers, Jesko Hentschel and Peter Lanjouw reviewed the methodology and suggested to the director of INEC that, rather than weighting variables ad hoc (e.g., assigning access to safe water a possible total of 20 points out of 100), it would be preferable to use an analytically rigorous method (such as regression analysis of survey data) to determine these relative weights. Hentschel and Lanjouw noted that such a methodology should take advantage of the wealth of data available in the 1994 Ecuador *Encuesta sobre las Condiciones de Vida* (ECV)—a nationally representative household survey modeled closely on the World

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Bank's Living Standards Measurement Study (LSMS)—as well as the 1990 census. INEC took on this challenge and provided the World Bank with the required data (i.e., full access to Ecuadorian census data). The World Bank collaborated closely with the National Institute of Labor to develop the methodology.

2. Process of poverty mapping

Soon after the discussions between INEC and the World Bank, Carlos Larrea, a well-respected consultant in Ecuador, and a member of a team in the Technical Secretariat for Social Planning (under the Ministry of Social Welfare), with technical assistance from the Bank, began constructing a poverty map using the proposed methodology. In 1995, a poverty map was developed based on *expenditures*, a refinement of the World Bank methodology. This effort culminated in the publication of the *Geography of Poverty in Ecuador* (Larrea et al. 1996).

At the same time, World Bank staff used Ecuadorian data to develop and refine their methodology, demonstrating how sample survey data can be combined with broader census data to yield predicted poverty rates for the entire population covered by the census. The methodology went through a number of iterations (Hentschel and Lanjouw 1996a); most recently, a refined methodology has been developed combining census and survey data to produce highly disaggregated poverty maps (see Hentschel et al. 2000). In the case of Ecuador, the methodology can be used to estimate poverty rates at a canton or parish level.[1] The Hentschel et al. (2000) methodology is still a work in progress: the World Bank is currently exploring ways to expand the methodology using GIS (geographic information systems) data to further analyze the spatial dimensions of poverty.[2]

In 1998, Ecuador's planning agency (*Oficina de Planificación de la Presidencia de Ecuador*, or ODEPLAN)[3] developed canton- and parish-level poverty maps. These poverty maps were clearly anchored in the World Bank methodology while further exploring the use and integration of GIS. These poverty maps were based on the 1990 census and an updated ECV survey for 1995.[4] The poverty maps and data were published in hardcopy and CD versions of the 1998 INFOPLAN (Larrea et al. 1999). The INFOPLAN provides poverty data and disaggregated indicators on health, education,

[1] Note that, in principle, the methodology can even be used to estimate poverty rates at a household level (although with increased standard error). In the case of Ecuador, the standard errors of poverty rates estimated at a parish level do not compromise analyses unless parish populations fall well below 500 households. Note that in Ecuador there are approximately 400 cantons and 1,000 *parroquias* (parishes).
[2] While Hentschel and Lanjouw were originally involved in developing the poverty mapping methodology (Hentschel and Lanjouw 1996a), the work is currently conducted by a small team of poverty mapping experts at the World Bank.
[3] In an effort to downsize government, ODEPLAN subsumed responsibilities of the previous National Council of Development (*Consejo National de Desarollo*, or CONADE). Note that Carlos Larrea was then working for ODEPLAN.
[4] In part due to time constraints, the development of the 1998 poverty map did not incorporate extensive statistical error estimations as conducted by Hentschel and Lanjouw (1996b).

malnutrition, and employment. The INFOPLAN CD includes a simple mapping program that allows for the spatial analysis of poverty and related indicators at various levels of disaggregation (e.g., at the canton and parish levels). Using principal components analysis and comparing different themes, the INFOPLAN describes the social and biophysical conditions conducive to poverty. The INFOPLAN, for example, indicates that poverty in the Ecuadorian highlands is strongly associated with malnutrition, while poverty along the coast is associated with poor infrastructure (e.g., lack of roads and educational facilities). Funding for the development of the INFOPLAN was provided under the World Bank's Modernization and State Technical Assistance Program and the Swiss Agency for Development and Cooperation (SDC).

The INFOPLAN products were disseminated via an extensive outreach program. Indeed, the CD version of the INFOPLAN was intentionally developed to facilitate dissemination of poverty data to a large audience. Various institutions were trained in the use of INFOPLAN data and its mapping software. These trainings emphasized both the value and limitations of the available INFOPLAN data. NGOs (e.g., Ecocienca) and some universities (e.g., the University of Cuenca) conducted INFOPLAN trainings for local-level institutions.

3. Use and impact

Poverty mapping in Ecuador has had two different kinds of impacts: 1) impacts on decision-making in country and 2) facilitating poverty mapping initiatives worldwide.

In particular, the 1998 INFOPLAN poverty maps have had substantial impact on local-level decision-making. The Institute of Ecuadorian Studies used INFOPLAN's data and user-friendly mapping software as a key tool to facilitate the participatory development of 15- to 20-year local plans in the Imbabura province, the Guatamote municipality, and the Saquisilì municipality. Such local plans articulate the need for development and/or strengthening of community facilities and services, ranging from health centers to education. Participatory community discussions were convened, including the participation of mayors, teachers, council members, representatives from indigenous groups, local government, ministries, NGOs, and the tourism, industry, and public transportation sectors. Such discussions were aimed at identifying, verifying, and prioritizing community needs and finding ways to meet these needs.

The INFOPLAN data provided a tool for confirming and further informing community perceptions. For example, if a community identified education as an issue during participatory discussions, INFOPLAN could be used to crosscheck data on education in the database. Mismatches between expressed community needs and INFOPLAN data prompted further discussions with communities and refinement of local development plans. The use of INFOPLAN data was responsible in part for redirecting Guatamote's budget to direct greater support to rural areas. Rural areas are now receiving 75% of the county's budget, compared to the previously allocated 25%. While the use of the INFOPLAN did facilitate the participatory planning process, users voiced concerns about

the need for updated data (the INFOPLAN is based on the 1990 census) and the lack of agricultural data.

Aside from influencing local-level decisions, INFOPLAN maps and data have more recently been used by EcoCiencia (*La Fundación Ecuatoriana de Estudios Ecológicos*) in its Biodiversity Conservation Project, which is developing a biodiversity monitoring system. INFOPLAN socioeconomic data were overlaid with EcoCiencia data on vegetative cover and biodiversity; for example, such overlays have helped highlight the effect of human migration patterns on changes in vegetation cover. Future analysis will include overlaying INFOPLAN data with finer-resolution maps and data (for example, on geomorphology) that will be developed in the second phase of the project .[5] In addition, poverty maps have been used by:

- the Ecuadorian Development Bank, partially supported by the IDB and the World Bank, to determine the distribution of loans to municipalities under a current decentralization program;
- the Fund for Emergency Social Investment, to target and finance small initiatives; and
- the Ministry of Health, to target the poorest 50 parishes in which to develop numerous health initiatives.

The poverty maps were also included in UNDP's Human Development Report.

While poverty maps have been used to influence many decisions, there has been some reluctance to use these data. For example, the Ministry of Social Development has not used poverty maps and data in its malnutrition programs. While the INFOPLAN poverty maps revealed that malnutrition is concentrated in the Ecuadorian highlands, the Ministry has continued to distribute food aid to cities along the coast (where more electoral gains are likely to be made). Further efforts are needed to: 1) encourage and provide incentives for the use of poverty data; 2) strengthen coordination with local-level institutions and NGOs to ensure that programs target the poorest communities; and 3) increase national and local capacity to sustain the production, dissemination, and use of poverty maps, including the use of new methodologies as explored by Hentschel et al. (2000).

Aside from in-country use of the poverty map, the World Bank methodology whose development was based on Ecuadorian data has had tremendous impact on the poverty mapping community worldwide. To date, this methodology has been used in several countries, including Guatemala, Nicaragua, Panama, and South Africa. Moreover, China, Indonesia, Malawi, Mexico, Mozambique, Pakistan, Thailand, and Vietnam are in the process of developing poverty maps based on the Hentschel et al. (2000) methodology. The World Bank has presented its methodology on many occasions, including to Bank task managers as well as academic institutions. It has conducted poverty assessment training and specific training on poverty mapping, and has been invited to give a course in poverty mapping at the African Economic Research Consortium. The Bank is also

[5] The future development of finer-resolution, updated INFOPLAN data (i.e., at a census "block" level rather than the parish level, and based on 2000 census data) would help facilitate such data comparisons.

developing software to facilitate the application of econometric modeling to poverty mapping.

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