Experiences with the Development and Use of Poverty Maps

Case Study Note for PERU*

1. Background information on the poverty mapping initiative

Peru has a long history of developing poverty maps, particularly based on Unmet Basic Needs (UBN) indices. Webb (1977) developed the first UBN poverty map in Peru using data from the 1961 census (Schady 2000). This poverty map was subsequently updated in 1972, 1981, and 1993 (Amat y León n.d., Banco Central de Reserva 1981, INEI 1994, Schady 2000). These initial poverty maps were developed primarily to help stimulate investment, although their ultimate use was restricted to academic circles.

With the creation of the Peruvian Social Fund (*Fondo Nacional de Compensación y Desarrollo Social*, or FONCODES) in 1991, there was increased demand for information on the distribution of poverty. The main objectives of FONCODES are to alleviate poverty, generate employment, and improve access to social services (Schady 2000a).[1] Specifically, FONCODES was established to ensure that social expenditure in Peru, which traditionally had favored the urban middle class, was redirected to poor areas and households (Paxson and Schady 1999). Since 1991, FONCODES has developed several district-level UBN poverty maps (see Section 2).[2] The use of the UBN poverty maps at FONCODES helped allocate approximately US$564 million between 1992 and 1998 (Schady 2000b) (see Section 3).

More recently, Peru has relied on imputed poverty maps based on census and survey data. An imputed district-level poverty map was developed in 1996 by INEI (*Instituto Nacional de Estadística e Informática*) using the 1993 census and 1995 INEI household survey. The Ministry of Economy and Finance (MEF) updated this map in 1999 using 1993 census and 1997 INEI household survey data (see Section 2). The MEF is putting substantial pressure on various agencies, including FONCODES, to use the updated map (see Section 3). The INEI is currently coordinating the development of a new poverty map that will be based on 1993 census and 2001 INEI household survey data.

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A summary of all case studies can be found at: http://population.wri.org/ or http://www.povertymap.net/pub.htm

[1] FONCODES was created during a severe recession that followed the adoption of stringent stabilization and structural adjustments by the Fujimori government.

[2] There are 1,812 districts in Peru.

2. Process of poverty mapping

The majority of poverty maps in Peru have been developed by FONCODES and have relied primarily on census data. FONCODES has produced district-level estimates of poverty for 1994 and 2000.[3] The most recent FONCODES poverty map used eight indicators: the rate of chronic malnutrition, illiteracy, school-aged children not in school, overcrowded housing, inadequate roofing, and the proportion of the population without access to water, sewerage, and electricity. Technical assistance for developing the FONCODES maps was provided by the Inter-American Development Bank, the German government (GTZ), and the World Bank.

Peru's first imputed poverty map was developed in 1996 by INEI with technical assistance from CEPAR, the population agency of CEPAL (Economic Commission for Latin America and the Caribbean). First, income in each of Peru's 24 departments (rather than for each individual household) was estimated. Income was imputed based on numerous variables in the 1995 INEI household survey, including household composition, education levels, access to basic services such as water sewerage and electricity, and ownership of durable goods such as televisions, radios, and refrigerators. The regression coefficients from each of the 24 departments were subsequently applied to the 1993 census to impute district-level income and poverty measures for the country's 1,812 districts. Using department-level data to estimate district-level poverty raises concerns, as the distribution of variables may not be identical across all districts in a given department.

In 1999, a new district-level imputed poverty map was developed by *Direccion de Asuntos Economicos y Sociales*, a division of the MEF, based on the Hentschel et al. (2000) methodology.[4] The map combined 1993 census and 1997 INEI household survey data to impute consumption at a district level. As in the case of the 1996 map, the use of coarse, regional- and department-level survey data to estimate district-level poverty raises concerns. Other concerns about the 1999 map included the:

- lack of standard-error estimation to verify the robustness of imputed consumption;
- use of two different, non-comparable household surveys to derive estimates of income and consumption measures;
- use of a national model only, rather than subnational models with greater predictive power; and
- composite nature of the final poverty indicator.

The MEF presented the poverty map results to various government agencies and civil society in December 2000. It also published a report (*Un Nuevo Instrumento de Focalización para la Asignación de Recursos Destinados a la Inversión Social en el*

[3] In 1997, Peru was divided into 13 administrative regions, 24 departments, 194 provinces, and 1,812 districts.

[4] Individuals involved in developing the first edition of the 1999 MEF poverty map were Juvenal Díaz Alvarez and Nelson Shack Yalta. Patricia Vásques Sotero was involved in developing the updated MEF document.

Marco de la Lucha Contra la Pobraza) on these results. Funding for the development of the 1999 map was provided internally by the MEF.

While there have not been any major efforts to link the poverty maps with other Peruvian data, Escobal and Torero (1999) compared the FONCODES poverty map with various geographic variables (e.g., altitude, rainfall, and temperature). The study assessed whether geographic variables help explain per capita expenditure. Results indicate that there is no clear evidence that expenditure is highly correlated with geographic variables. Rather, non-geographic characteristics—namely, public and private assets—were shown to almost fully explain differences in expenditure. In Peru, as in many other countries, the full potential of linking poverty map results with other data has yet to be explored.

3. Use and impact

The use of poverty maps in Peru has been limited mostly to FONCODES. The FONCODES poverty maps helped to allocate approximately US$564 million in FONCODES funds between 1992 and 1998.[5] Specifically, the maps, in conjunction with community poverty assessments,[6] were used to help target 32,000 community-based projects totaling approximately US$285 million. Such projects included: the construction and renovation of classrooms; the distribution of educational material to students; the development of nutrition and family planning projects; micro-financing; and the construction or rehabilitation of sports facilities, health posts, water and sanitation systems, rural roads, electrification, and small-scale irrigation. In addition to community-based projects, poverty maps have been used to help allocate US$98 million in funds for FONCODES "special projects," including the development of school breakfast programs and the distribution of uniforms to school children, shovels to farmers, and motorized canoes for isolated jungle communities.

The use of poverty maps has resulted in better targeting of FONCODES initiatives. Schady (2000b) provides evidence that FONCODES funds have flowed to poor provinces and that infrastructure constructed by the FONCODES has benefited poor households. Specifically, the use of poverty maps is thought to have helped ensure that FONCODES educational funding, accounting for one-quarter of total FONCODES expenditure between 1992 and 1998, has reached poor districts (Paxson and Schady 1999). One indication of the success of FONCODES targeting is the fact that, by 1996, households in the wealthiest quartile of districts were receiving virtually no FONCODES

[5] This is based on the December 1992 exchange rate of 1.63 soles to the U.S. dollar. While government revenue initially financed FONCODES projects, since 1994 loans of US$100 million and US$94 million have been obtained from the World Bank and Inter-American Development Bank, respectively.

[6] Qualitative community poverty assessments were also used to help verify poverty levels in identified communities. These communities were asked to select projects from a menu and prepare proposals for funding. FONCODES regional offices subsequently reviewed the community-based proposals and, upon approval, released funds to designated *núcleo ejectuors*, i.e., community members responsible for allocating funds within the specified communities. While this approach is targeted and "demand driven," it should be noted that, given the learning curve for communities to develop a good proposal, this system may be biased toward those communities that have already prepared a successful proposal; i.e., communities that have been turned down might decide that developing a new proposal is not worth their effort.

educational funding. Moreover, better targeting of FONCODES educational expenditures is thought to have resulted in greater school attendance for *all* younger children (Schady 2000a, Paxson and Schady 2000).[7]

While FONCODES has been hailed by the government and donors as an important program to reduce Peruvian poverty, various concerns have been expressed. Schady (2000b) provides evidence that political considerations as well as poverty criteria have played a role in distribution of FONCODES funds. Spikes in the allocation of FONCODES funds, especially for "special projects," were found to be highly correlated with the November 1992, October 1993, and April 1995 elections. Furthermore, FONCODES funding disproportionately benefited areas of core support for the government of then president Alberto Fujimori: the study shows a high degree of correlation between FONCODES funding and 1990 Fujimori voters. Such politically biased distribution of funds was possible due in part to lax record-keeping and a lack of restrictions on FONCODES "special projects."

More recently, the 1999 MEF poverty map has been increasingly used in Peru (see Section 2). For example, the Ministry of Labor and Social Promotion used the map to improve targeting of its programs in urban areas (e.g., the *A Trabajar* program). In addition, the FONCODES recently started using the MEF poverty map (rather than the previously used FONCODES maps) to target its programs.

Encouraging the use of the 1999 MEF poverty map has been challenging, especially where various government institutions and programs already have their own established poverty targeting procedures (e.g., the FONCODES). Due to the large number of poverty maps in Peru, debate is increasingly focused on which poverty map to use—the FONCODES poverty map or the 1999 MEF imputed poverty map. In some instances, it is thought that this debate has prompted various agencies to avoid outright the use of *any* poverty map. However, Schady (2000a) finds that the use of different poverty indicators does not in fact result in statistically significant differences in outcomes. The study compares results (i.e., differences in poverty rates, leakage rates, and concentration curves) from three sets of poverty indices: the FONCODES poverty map, an imputed poverty map,[8] and an infant mortality index.[9] For highly aggregated regions (i.e., the Lima, other urban", and "rural regions), outcomes are shown to be very similar. The

[7] This study indicates that, while expenditure on educational infrastructure has had an impact on some educational outcomes (e.g., attendance rates), it has not influenced other educational outcomes (e.g., the likelihood that children will be at the appropriate grade for their age).

[8] The study considered Peru's first imputed poverty map, rather than the more recent imputed map developed by the MEF (see Section 2).

[9] Developed by the INEI, the infant mortality rate index relies on information in the 1981 and 1993 census on the total number of children born and those surviving. Because the population of many districts is very small, the INEI first estimated infant mortality rates at the departmental level (enabling a larger sample size), which it regressed with various characteristics (e.g., women's education level, household characteristics, and place of residence). These coefficients were then used with the 1993 census to estimate district-level infant mortality (Schady 2000a).

distributions of poverty generated by each of the three indicators are much the same (i.e., highest in rural areas, followed by urban areas other than Lima, and lowest in Lima).[10]

The current debate should be shifted from an emphasis on which poverty map to use to one focused on determining which programs will benefit most from geographic targeting. In fact, Schady (2000a) indicates that any targeting has the potential to result in substantial savings: expenditures required to close the poverty gap would be reduced by 288-353 million soles (US$82.6-101.3 million)[11] with targeting relative to untargeted expenditures.

Various decision-makers have stated that the FONCODES map and other Peruvian poverty maps do not adequately address economic viability. For example, investment in the poorest areas, with little infrastructure and the greatest need, often carries lower potential returns and is the least economically viable option. According to this view, geographic targeting should strike a balance between poverty and economic viability criteria. Decision-makers have also expressed concerns regarding the use of old data (i.e., 1993 census data) to develop poverty maps. Due in part to such concerns, a Peruvian nutrition program is considering the use of a "measure, height, and age" indicator based on 1999 INEI survey data. The use of such an index is considered simpler and more transparent as well as sector-specific.

The Peruvian example highlights three themes: 1) the use of any poverty map (regardless of methodology) may be preferable to using none at all; 2) effective use of poverty maps requires fiscal accountability; and 3) geographic targeting has the potential to produce substantial savings.

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[10] As noted above, the Schady study considers results for three highly aggregated regions. It would be interesting to see if similar results were obtained for more disaggregated areas.
[11] Based on the exchange rate as of September 26, 2001.

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