Experiences with the Development and Use of Poverty Maps

Case Study Note for NICARAGUA*

1. Background information on the poverty mapping initiative

Nicaragua's first poverty map was developed in 1992 by the Emergency Social Investment Fund (*Fondo de Inversión Social de Emergencia*, or FISE). The FISE was established as a social fund to construct infrastructure (such as schools and health centers) nationwide.[1] When the FISE was created in 1991, the Nicaraguan civil war had recently ended and the country was highly polarized politically. Various groups, particularly the Sandinistas, increasingly criticized the government for bias towards developing projects in non-Sandinista municipalities. Consequently, the FISE recognized the need for more transparent allocation of its funds. FISE staff were aware of the development of poverty maps elsewhere (in Bolivia and Honduras) and proposed the development of a similar map to help allocate FISE funds.

FISE's first poverty map was based on indicators of Unsatisfied Basic Needs (UBN), such as access to water and sanitation, nutrition, and displaced people. This UBN map, initially used in 1993 to allocate FISE funds, was looked upon very favorably (see Section 3). Through a national association of mayors (AMUNIC), most of the country's mayors publicly stated that the FISE was, at the time, the only Nicaraguan organization using a transparent mechanism to distribute its funds. Such statements put substantial pressure on other institutions to increase the transparency of their decision-making and allocation of funds (see Section 3).

In 1996, the FISE updated its poverty map with data available from the 1995 census and 1993 Living Standards Measurement Survey (LSMS). Nicaragua's poverty map was again updated in 2000 using 1998 LSMS data and the Hentschel et al. (2000) methodology (see Section 2).

FISE's successful use of the poverty map is thought to have encouraged heavy reliance on the map in Nicaragua's recent Strengthened Growth and Poverty Reduction Strategy (SGPRS). The text of the SGPRS notes: "A major component of the SGPRS is its concentration of actions and assistance upon the poor and extreme poor…The [poverty]

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[1] The FISE has been supported primarily by donor funding, including from the World Bank, the Inter-American Development Bank, the United Nations Development Programme, the European Community, the Organization of Petroleum Exporting Countries, and the governments of Germany (KFW), the United States (USAID), Sweden (SIDA), Canada (CIDA), Switzerland (COSUDE), and Japan (GRANTS).

map has proved to be an excellent tool for designing policies and programs aimed at poverty groups, and for making the most efficient assignment of poverty reduction resources among competing targets. It will be equally useful in guiding and monitoring the SGPRS" (Government of Nicaragua 2001a, 59).

The SGPRS was developed as a condition of World Bank and International Monetary Fund (IMF) debt relief under the Highly Indebted Poor Countries (HIPC) initiative.[2] The SGPRS strategy is focused on developing an in-country participatory program on poverty reduction. Use of the map of extreme poverty, together with participatory consultations, is expected to affect the allocation of approximately US$1.1 billion in SGPRS funding over a five-year period (2001-05) (see Section 3).

2. Process of poverty mapping

FISE's 1992 poverty map was based on data collected from various agencies. Few data were available at the time: the last Nicaraguan census had been conducted in 1974. Data on access to water and sanitation were obtained from the water authority; data on nutrition were collected from UNICEF and on displaced persons from the UN peace mission. The poverty map was developed at a municipal level[3] using internal FISE funds.[4] Though initially useful, the UBN indicator forming the basis of the 1992 poverty map tended to overstate poverty; i.e., it included some non-poor households. Results of the UBN poverty map were presented to various government agencies.

In 1996, a second FISE poverty map was developed using data from the 1995 census and 1993 LSMS.[5] The new map relied on a different, more accurate method—small area estimation—to calculate the poverty gap at a municipal-level. The development of this second poverty map was contracted out to a U.S.-based consulting agency, the Research Triangle Institute (RTI). Based on the most recent data, the 1996 map provided the best analysis then available of the distribution of poverty. However, there were some problems; in particular, the sampling framework used in the 1993 LSMS did not match the 1995 census. FISE gave several presentations on and distributed several copies of the 1996 map. The map was used primarily by the FISE itself and by various donor and government institutions (see Section 3).

The Nicaraguan poverty map was most recently updated in 2000 using the 1998 LSMS and 1995 census. This latest map used the Hentschel et al. methodology (2000) to predict consumption. Variables in the 1998 LSMS that corresponded with 1995 census data were selected to develop a prediction model of consumption. The predicted parameter

[2] Created in response to concern that there was a stalemate in the fight against poverty, the HIPC initiative prompted an intense reexamination of development and debt strategies. The World Bank, International Monetary Fund (IMF), United Nations agencies, regional development banks, NGOs, and church groups have been actively involved in developing the HIPC initiative. In 1999, the World Bank and IMF agreed to link debt relief with the establishment of poverty reduction strategies.

[3] Note that Nicaragua contains seven regions, 17 departments, and 151 municipalities.

[4] At the time, FISE was supported by the Inter-American Development Bank and the governments of Germany (KFW) and the United States (USAID).

[5] Funding for the development of Nicaragua's second poverty map was provided by the IDB.

estimates were then applied to census data to derive nationwide statistics on household-level consumption and poverty. Poverty maps showing the percentage poverty, percentage extreme poverty, severity of poverty, severity of extreme poverty, poverty gap, and extreme poverty gap were constructed. These maps were disaggregated to the regional, departmental, and municipal levels. Data were tested for normality, heteroscedasticity, and fixed effects. Current use of the maps, especially the map of extreme poverty, is widespread (see Section 3). Funding for this poverty mapping effort was provided by the Government of Nicaragua through support from FISE, IDB, the Program for the Improvement of Living Standards Measurement Surveys (MECOVI-Nicaragua), the United Nations Development Programme, the United Nations Population Fund, the World Bank and the governments of Denmark (DANIDA), Norway (NORAD), and Sweden (Sida).

The 2000 imputed poverty maps were developed using a collaborative approach involving staff from the National Statistics and Census Institute (INEC), MECOVI, the Technical Secretariat of the President (SETEC), and FISE.[6] Technical assistance was provided by the World Bank.[7] The effort took approximately 10 months to complete (1999-2000).

The use of a collaborative, multi-institution approach is thought to have substantially encouraged the use of the poverty maps (see Section 3). However, the process of collaboration proved difficult at times. A lack of staff resources necessitated the hiring of two full-time consultants to complete the maps. Hence, mechanisms for encouraging future institutional collaboration should emphasize the need for experienced full-time staff at key local institutions.

In addition, the 2000 poverty mapping effort faced some data constraints. In general, the use of 1995 census and 1998 LSMS data was considered sufficient, especially in a context in which few data have historically been collected.[8] However, there have been some concerns. For example, Hurricane Mitch (1999)—which caused the deaths of approximately 3,000 persons and the displacement of 870,000—did change the profile of poverty in Nicaragua, albeit not significantly, according to a study conducted by the INEC.[9]

Publications incorporating the 2000 Nicaragua poverty map results include the SGPRS (Government of Nicaragua 2001a), a technical report on the poverty mapping effort (Government of Nicaragua 2001b), and a guideline publication describing steps for using the most recent poverty maps to help allocate public expenditures (Government of

[6] Individuals involved in conducting the statistical estimations and developing the poverty mapping initiative were Juan Rocha Nuñez, Dulce María Mayorga, Marta Vargas, Tránsito Gomez, Maria Fernanda Muñiz, Joaquin Murillo, Luis Alaniz, Florencia T. Castro-Leal, Gabriel Demombynes, Carlos Lacayo, Carlos Sobrado, Peter Lanjouw, and Berk Özler.

[7] In-country technical assistance was provided primarily by Carlos Sobrado.

[8] Note that a census had not been conducted for more than 20 years prior to 1995.

[9] This assessment indicated that there have been some changes since Hurricane Mitch. For example, extreme poverty increased by approximately 2.9% in the Central Rural region and declined by 3.6% in the Pacific Rural region. However, the poverty rates observed in 1998 were not significantly affected.

Nicaragua 2001c). The last publication, *Nicaragua Poverty Map to Target the Extreme Poor*, contains: a copy of the map of extreme poverty map; statistics on the extent of extreme poverty by region, department, and municipality; estimated numbers of the extremely poor; proportion of the extremely poor in rural areas; the extreme poverty gap; and proportion of the national extreme-poverty gap. The report recommends that the national extreme poverty gap map, which defines the proportion of resources necessary to close the extreme poverty gap, be used to help allocate public expenditure.

Awareness has also been built through a series of SGPRS presentations and trainings conducted by the SETEC since mid-2000. Presentations and trainings on the poverty map results (especially the map of extreme poverty), combined with other social indicators, have been given to staff at planning divisions in various ministries (e.g., the Ministry of Health, Ministry of Education, and Ministry of Transport) and international and national NGOs. These trainings are raising decision-makers' awareness of the availability of information tools such as poverty maps to improve decisions[10] as well as educating them on the use and weighting of poverty mapping data and sector-specific indicators.[11]

The Government of Nicaragua plans to update the poverty map based on 2001 LSMS data in the near future. To ensure future availability of data, the Government has committed itself to conducting a census every 10 years and a LSMS every four years.

3. Use and impact

Nicaragua's poverty reduction strategy, the SGPRS, relies heavily on the LSMS and poverty map results. The SGPRS commits Nicaragua to the use of the extreme poverty map to better target the allocation of government resources: "[I]t is vital to focus more resources on programs related to poverty reduction and the improved efficiency of public expenditures. This process will be facilitated by the application of the law of Public Contracts, the assimilation of the Integrated System of Financial Management and Audits (SIGFA) by all government institutions, the establishment of priorities from the Poverty Map, and the inputs from the international community and civil society" (Government of Nicaragua 2001a, 41).

Ample reference is made throughout the SGPRS to the 2000 extreme-poverty map and the need to improve targeting of programs. The use of the poverty map is expected to help affect the allocation of US$1.1 billion in capital spending under the SGPRS during a

[10] Specifically, training in the health sector has included presentations at the Ministry of Health to all senior staff at the national level (November 2000) and the departmental level (December 2000 and October 2001). Four training sessions for technical-level staff (both national and departmental) have also been held.

[11] Social indicators included in the SGPRS are being combined with the poverty map. For example, education indicators (such as enrollment and drop-out rates) or health indicators (such as access to prenatal care, institutional births, and access to reproductive services) can be overlaid with the poverty map to affect allocation of the education or health budget. Furthermore, data on natural threats and on critical environmental areas—developed by the Territorial Studies Institute and the Ministry of the Environment and Natural Resources, respectively—could be overlaid with the poverty maps to improve natural disaster preparedness and environmental management.

five-year period (2001-05). The Strategy notes: "The SGPRS is not only a series of government actions and reforms, it includes a major improvement in the targeting and expansion of fiscal resources directed towards the poor" (Government of Nicaragua 2001a, xiv).

The SGPRS has drastically changed how resources are allocated in Nicaragua and is expected to improve targeting of the vast majority of government-funded programs. Improved targeting has and/or will affect the following programs, to name but two:

* *Development of a health strategy*. The Government of Nicaragua is developing a strategy to provide expanded health care coverage to very poor areas. The map of extreme poverty map has already been used to: develop nine new health posts; better equip two hospitals on the Atlantic coast; and rehabilitate a hospital in Rio San Juan.[12] Basic health services—such as improved nutritional services and prenatal care, family planning methods, basic and emergency obstetric care, and access to safe water and basic sanitation—will be provided in selected poor areas, based on the poverty map and key health indicators. The poverty map has also recently been used to help target departments for a reproductive health services initiative focused on providing community-based training for midwives and family planning.

**Development of an education strategy*. SETEC is working with the Ministry of Education to use the poverty map and data to expand coverage of basic education, modernize and decentralize schools, and improve education in poor areas. The poverty map and data are being used to target direct support to rural poor areas. Under this strategy, 300,000 rural students, particularly in poor areas, will receive a free package of supplementary material.

Aside from the SGPRS, the FISE has also relied heavily on the 2000 poverty map, in conjunction with community and neighborhood consultations, to help target its expenditures. The FISE has invested in the development of various social infrastructure, including school and health center construction, in extremely poor areas. The 2000 poverty map is expected to influence the distribution of approximately $140 million in FISE funds during the 2002-04 period.[13] In particular, the FISE plans to use the map to help select poor municipalities for cash transfers under the IDB-funded Social Safety Net program (*Red de Protección Social*, or RPS).

In addition to the SGPRS and FISE, the 2000 poverty map and data have been used by various ministries to prepare Nicaragua's 2001 national budget. Within committees at the Ministry of Finance, the maps have been used to approve various line ministry projects. Nicaragua's National Investment System (SNIP) database now includes data on

[12] Based on data from the extreme poverty map, the Atlantic and Rio San Juan areas were found to be the poorest in the country.

[13] The FISE currently solicits and finances projects proposed by communities. In accordance with a decentralization scheme begun in 1999, future FISE funding will be transferred directly to municipalities. However, poverty maps and data will still be used to determine the amount of money that will be allocated to each municipality.

poverty; it automatically classifies each municipality and provides decision-makers with data on poverty reduction initiatives.

Besides the 2000 poverty map, the earlier 1992 and 1996 UBN maps (see Section 2) have also been extensively used in Nicaragua. FISE used these maps to target poor areas in its initiatives: it used the 1992 map to help allocate approximately US$200 million in funds (1992-97) and the 1996 map to influence the allocation of approximately $160 million (1998–2001).

Numerous NGOs have also relied on Nicaragua's early poverty maps. Save the Children used the 1996 poverty map to target several of its food security, disaster relief, infant survival, rural roads, and basic sanitation projects—influencing the allocation of approximately US$8 million of organizational funds during 2000. Similarly, Catholic Relief Services (CRS) used the 1996 map to target its projects in agriculture, health, microfinancing, and civil society development, affecting the allocation of approximately US$7.5 million of its funds since 1999. One specific CRS use of the FISE poverty map is in a microfinance project that has provided community banking to over 14,000 clients, most of whom are located in extremely poor areas. The World Food Program (WFP), International Fund for Agricultural Development (IFAD), and several donors have also used the 1996 FISE poverty maps to help identify poor municipalities for their program activities. Government institutions have used the FISE maps to help endorse several government social-policy documents prepared between 1994 and 1999.

The use of poverty map and data has had tremendous impact on Nicaragua's growing commitment to good governance, accountability, and transparency. First, the use of poverty maps has encouraged broader participation among and within government and civil society in Nicaragua. The poverty maps helped identify regions and communities previously neglected by the government. For example, poverty maps identified the Atlantic Coast department, inhabited by Nicaragua's ethnic and indigenous groups (including *miskitos, mayagnas*, *ramas*, and Creoles), as amongst the poorest in Nicaragua. Allocating increased public expenditure to the poorest areas is expected to promote increased participation in civil society by these communities.

Second, better targeting is helping ensure synergy between programs. A major challenge for the FISE has been the discontinuity between its mandate to provide infrastructure support (e.g., school building and health center development) and the responsibility of other government agencies to provide operational services (e.g., teachers and hospital personnel). Using the same poverty map to target both FISE and SGPRS initiatives should help direct support to the same poor communities, helping to ensure that the government will provide operational services (e.g., teachers and school supplies) for new infrastructure developed by FISE.[14]

[14] In the interim, a Supplementary Social Fund (FSS) program was established by the government to provide temporary support for key social sector programs including those of line ministries. The FSS is providing administrative and logistical support for the expansion of education and health programs in areas of extreme poverty, including by supporting the salaries of teachers, nurses, and doctors, and by providing school and hospital equipment.

Third, the use of the poverty map and data has increased FISE's institutional credibility. The FISE has been cited as one of the best-run, most efficient, and most accountable programs, not only in Nicaragua, but in all of Central America.[15]

While the use of poverty maps has been favorably received in Nicaragua, there have been some concerns—namely, that the poverty map should not be used as the *only* tool to allocate funds and target projects (e.g., in the SGPRS). For this reason, the SETEC has emphasized (including during its training sessions, as described in Section 2) that decision-makers should rely on sector-specific indicators and community consultations as well as poverty map results.

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[15] See, for example, Government of Nicaragua (2001a), pp. 44 and 51.