

Experiences with the Development and Use of Poverty Maps

Case Study Note for BRAZIL*

1. Background information on the poverty mapping initiative

Since the late 1990s, Brazil, like many other countries, has been in the process of decentralization. Such decentralization has led to an increased demand for highly disaggregated data, especially at a municipal level.¹ Two highly respected government think tanks—the Ministry of Planning’s Institute of Applied Economic Research (IPEA) and Fundação João Pinheiro (a Minas Gerais State Government research center)—along with the United Nations Development Programme (UNDP) recognized this growing demand for high-resolution data. Discussions were held between IPEA, Fundação João Pinheiro, and UNDP on the possibilities of developing high-resolution information that would be easily accessible, reliable, and usable for different audiences. UNDP had recently completed a *Human Development Report* (UNDP et al. 1996) and considered the development of an *Atlas of Human Development* (UNDP et al. 1998) as an effective extension to make data and information more readily available.

2. Process of poverty mapping

IPEA and Fundação João Pinheiro, with UNDP support, initiated the development of the *Atlas of Human Development* for Brazil in 1995 (UNDP et al. 1998). Two versions of the atlas have been developed. The first version of the atlas—*Conditions of Life in Minas Gerais State, 1970, 1980, 1991*—was published in 1997 and consisted of a series of municipal-level human development indicator maps for Minas Gerais, the largest state in Brazil.² Subsequently, in 1998, a second version of the atlas was published, containing human development indicators for all 4,491 municipalities, 558 micro regions, 27 states, and five macro regions in Brazil. Two individuals from IPEA, five individuals from Fundação João Pinheiro, one individual from UNDP, and one private consultant were involved in developing the atlas. While UNDP funds covered production costs and the consultant fees, IPEA and Fundação João Pinheiro staff time were covered by their respective institutions.

* This case study note includes contributions from Maria Luiza de Aguiar Marques, Fundação João Pinheiro (mluizamarques@globo.com) and José Carlos Libânio, UNDP (libanio@undp.org.br) and was edited by Mathilde Snel and Norbert Henninger. A summary of all case studies can be found at: <http://population.wri.org/> or <http://www.povertymap.net/pub.htm>

¹ Municipalities have been given substantial power under decentralization.

² Minas Gerais, at the time, had 721 municipalities and a population of approximately 50 million.

Both versions of the atlas contained and mapped indicators in five sectors: education (literacy and enrollment rates), health (life expectancy), housing (water supply and sewage facilities), income (inequality and population under the poverty line), and infant mortality. In total, 38 simple and transparent indicators, easy to understand and reproduce, were developed. Data from the 1970, 1980, and 1991 censuses were used to create a time series for each of these 38 indicators (e.g., municipal-level maps for school enrollment for 1970, 1980, and 1991). While most of the indicators used disaggregated data (e.g., on education), two of the 38 indicators were composite indices: the Human Development Index (HDI), containing aggregated data on income, education, and longevity, and a Living Conditions Index (LCI), based on education, health, childhood, income, and housing data. The HDI map, in particular, has been widely used (see Section 3). The availability of aggregated and disaggregated data sets (especially the HDI) at different spatial and temporal scales is thought to have helped encourage the widespread use of these data. Results of the atlas demonstrate that Brazil's poverty pockets are concentrated in the northeastern part of the country. Furthermore, the atlas results indicate that poverty is found throughout Brazil, even in Brazil's richest state of São Paulo. IPEA, Fundação João Pinheiro, and UNDP are planning to update the atlas using data from the 2000 census.

More recently, Brazil developed even more highly disaggregated atlases (at a neighborhood level) for three large, densely populated cities: Belo Horizonte, Rio de Janeiro, and Recife. The development of these neighborhood-level maps was sparked by the recognition that municipal-level maps inadequately captured the varied levels of poverty *within* urban areas. (Results of this analysis indicated that areas within the city of Recife have lower HDI levels than even the least developed municipality in all of Brazil.) The development of the neighborhood-level city maps relied on both survey³ and census (1970, 1980, and 1991) data. The Rio de Janeiro neighborhood atlas further relied on comprehensive qualitative surveys (i.e., focus groups) and other data sources, such as police records.

Brazil has been especially active in disseminating its *Atlas of Human Development*. A digital copy of the atlas on CD was developed and widely distributed. The CD provides the largest database ever assembled at the municipal level for Brazil and includes software that allows individuals to make user-defined maps, indices, and thematic indicators.⁴ The software was designed to be user friendly, so that even novice users can easily access, display, and use the CD's geographic and tabular data. The software's open architecture allows users to easily export spreadsheet tables, maps, graphics, and texts to other compatible software. Development of the software emphasized supporting the widest possible access to the atlas information. The software was intentionally created to run on IBM 486-compatible computers (then the most commonly available in Brazil)

³ Survey data were obtained from yearly surveys resembling the World Bank's Living Standards Measurement Survey (LSMS). Aggregated indicators, based on LSMS data for 1980-85 and 1995-99, were developed.

⁴ The software includes tools that allow the user to create 121,220 maps, 6,612 tables, 5,081 profiles, 159,042 charts, and 32 spreadsheets.

and to require little memory. To avoid having to pay costly royalty fees to GIS software companies, the software was developed in country from scratch (in Delphi language).

The atlas' CD has been widely distributed at no charge to all Brazilian libraries and various federal and state government agencies, think tanks, and research institutes. Furthermore, numerous national-, state-, and municipal-level government, donor, and private agencies have purchased the CD (see Section 3). UNDP-Brazil used its existing marketing agreement with IPEA to sell the CD.⁵ Demand for the CD has been so strong that the CDs are currently sold out. UNDP is looking for a commercial partner to continue distribution of the CD.

The atlas obtained widespread publicity through newspaper and television coverage. The 1998 CD launch of the *Atlas of Human Development*, for example, received two hours of primetime television as well as front-page newspaper coverage, thought to have reached 16 million viewers. More recently, the Rio de Janeiro neighborhood atlas received 80 pages of coverage in a special supplement of a major newspaper over a 10-week period. Widespread coverage triggered rich debate on the atlas findings; more than 50 newspapers from every region in the country published extensive stories and editorials on the results. Continued annual coverage of the HDI indicates ongoing interest in such data among Brazil's major newspapers and TV stations.

Familiarity with the HDI has become so widespread in Brazil that it is routinely referred to in political speeches and within civil society at large (see Section 3). Fundação João Pinheiro even received an inquiry concerning which areas, based on the HDI, would be most suitable for retirement. Geography curricula in secondary schools now incorporate background on the HDI, the results for Brazil, and use of the digital atlas. Furthermore, university entrance exams currently include questions on the HDI.

3. Use and impact

By providing high-resolution data on key simple indicators and by emphasizing widespread distribution of the atlas, the developers of Brazil's *Atlas of Human Development* have caught the attention of government, NGO, donor, and private users. Foremost, the federal government is currently using the atlas to target its social expenditure under the "Alvorada's Program."⁶ This program was developed under the current administration amidst opposition criticism that the government was focusing too intensely on economic conditions and not devoting sufficient attention to social issues. The program supports initiatives to reduce poverty and to improve the quality of life in extremely poor municipalities.

⁵ Note that IPEA currently sells UNDP's *Human Development Report* and other publications.

⁶ The "Alvorada's Program" is administered by the Secretariat of Social Assistance, which is linked to the Ministry of Welfare. A detailed description can be found at <http://www.presidencia.gov.br/projetoalvorada>.

Over a three-year period (2000-2002), the Alvorada's Program will, through various line ministries, distribute R\$11.6 billion (approximately US\$4.2 billion)⁷ to support poverty reduction initiatives. The program relies fundamentally on the atlas' HDI indicator information to help allocate its funding, based on the HDI's reputation as an "internationally accepted indicator" of social development levels. The targeting procedures used by the program focus on municipalities nationwide with an HDI of less than 0.5.⁸ Specifically, the program will provide the following support to Brazil's poorest municipalities:

- provide literacy training for 1,050,000 people aged 15-29;
- provide remedial courses for 525,000 students;
- create facilitating conditions to educate 1,000,000 new students;
- provide scholarships to poor families to keep their children (aged 7 to 14) in school;
- assist 627,000 children and young people in an effort to eradicate child labor;
- improve water and sanitary facilities in approximately 16,000 schools;
- provide 1,350,000 families with water supplies, sewage facilities, and sanitary improvements;
- provide the poorest municipalities with approximately 6,000 new family health care teams (this will serve an estimated 31 million individuals);
- assist approximately 2 million pregnant women and newborns;
- supplement tourism infrastructure;
- fight poverty, especially in northeastern Brazil;
- support family farms in the poorest municipalities;
- install approximately 12,000 solar energy kits at schools and health care posts; and
- transfer R\$300 million (approximately US\$108 million)⁹ to development and infrastructure programs.

In addition to its application in the Alvorada's Program, the federal government used the HDI as one guideline affecting social development expenditure in the 2001 national budget (estimated at R\$42.3 billion, or about US\$15.2 billion).¹⁰ The Ministry of Communications used the HDI maps to select poor municipalities that will receive

⁷ Based on an exchange rate of US\$1.00 = R\$ 2.788 (September 24, 2001).

⁸ Initially, the program selected the 12 poorest states based on HDI rankings (the program was referred to as "HDI 12"). Subsequently, using updated atlas results, the program added another two states ("HDI 14"). Under the "HDI 14" program, all municipalities with an HDI of less than 0.5 in the selected 14 poorest states would be eligible. When more disaggregated HDI results were made available, politicians from the richer states lobbied the central government to extend the program to poor communities within richer states. In response to such pressure, the government refined the targeting strategy to select municipalities *nationwide* with a HDI of less than 0.5.

⁹ Based on an exchange rate of US\$1 = R\$ 2.788 (September 24, 2001).

¹⁰ Based on an exchange rate of US\$1 = R\$ 2.788 (September 24, 2001). According to the Brazilian government, social development received the majority of funds in 2001, with 54.1% of total expenditures. Source:

http://www.planejamento.gov.br/orcamento/conteudo/orcamento_2001/integra_mensagem/politica_desen_social.htm. Other information can be found at <http://www.ipeadata.gov.br/>.

computers (4,500), free Internet access, and free access to e-government services and online information. The HDI maps have also been used to choose poor municipalities to receive free medicine in an “essential pharmacy” program. In Rio, a community kitchen project (with a budget is approximately US\$5.2 million) used HDI maps to identify poor households for distribution of free breakfasts.

At the state level, the atlas has been used to help reshape policies. In Minas Gerais, for example, the government used *Conditions of Life in Minas Gerais State, 1970, 1980, and 1991* to formulate a “Robin Hood law,” which changed the criteria for distributing value-added and services tax revenues (ICMS) among the state’s municipalities. Under this new law, a comprehensive set of human development indicators is being used to redistribute the total value of tax revenues among Minas Gerais state counties, benefiting poorer municipalities that are making an effort to invest in health, education, sanitation, food security, environmental conservation, and other social issues. Before the Robin Hood law, only two indicators were used to distribute such funds: size of the population (the larger the population, the greater the revenue, providing an incentive for rapid population growth) and fiscal value added locally (providing an incentive for concentration of economic growth). Approximately US\$1 billion has been redistributed from the richest to the poorest municipalities using the HDI and the Robin Hood law. Moreover, the states of Minas Gerais and São Paulo recently required, under a Social Responsibility Law, the use of an Index of Social Responsibility (ISR) incorporating the HDI (among other indicators) to help identify state development and investment needs.

Unlike most other countries, Brazil’s poverty mapping results have been used by a number of private entities. For example, one of the country’s largest insurance agencies, Atlântica Boavista, used the atlas to help calculate life insurance premiums. General Motors used the Brazilian HDI rankings to select a site for a new automobile manufacturing plant. The company chose Rio Grande do Sul, the state with Brazil’s highest HDI levels, indicating the availability of a relatively well educated, highly skilled labor force in the state. Similarly, the Federation of Industries and Commerce of Industry in the state of Rio Grande do Sul used its favorable HDI results in efforts to attract investment to the state. Brazil’s largest industrial gas firm, White Martins, used HDI data to help administer a social responsibility project in which youngsters (aged 15-17) living in poor areas (i.e., areas of lowest HDI) are given grants to act as community health and human rights agents. This project, undertaken in partnership with the Ministry of Health and Welfare, will invest approximately US\$1.17 million.

Neighborhood-level atlases have also been used by the Brazilian private sector. For instance, Telemar Co., one of Brazil’s largest telecommunication providers, used Rio de Janeiro’s neighborhood atlas to market differentiated telephone services to poor populations within the city. This example illustrates the crucial observation that poverty mapping results can be used for various purposes, not all of them necessarily aligned with improving poor people’s living conditions. In Telemar’s case, while telephone companies are required by law to provide landlines to all communities, companies would often rather market the use of mobile phones, especially to poor individuals and communities. Not only does such technology obviate the need for costly investments in

landline infrastructure, mobile phones require prepayment, unlike the retroactive charges associated with landline service that poor individuals may have more difficulty in paying.

The *Atlas of Human Development in Brazil* has had widespread impacts in the country. Foremost, it has helped to increase the transparency and accountability of decision-making. Prior to the atlas, it was uncommon for programs to geographically target poverty reduction efforts. The atlas ignited media and local policy debates in which references to HDI ranking (e.g., by politicians in their speeches) are common. Installing the atlas on library computers has generated substantial interest among local communities and civil society at large in community HDI rankings.

While the use of the atlas and its impact have been substantial, the misuse of data in the atlas is a concern. Due to the atlas' popularity, its use has been encouraged in a variety of applications, including some for which it is unsuitable. For example, the government's initial selection of 14 states with the lowest HDI for development initiatives was widely criticized. (This program was ultimately revised as the "Alvorada's Program", as described above). The use of older data—based on 1991, 1980, and 1970 census results—raises concerns, especially the use of atlas results to influence the national budget (see above). Awareness of the limitations of the atlas data is as important as awareness on the existence of the data themselves. Due in part to poor knowledge of the limitations of the atlas, one municipality attempted to sue UNDP over its ranking in the HDI, unaware that the indicator was based on 1991 rather than current data.

There is a need to further disaggregate poverty data and especially to update the HDI map. The Federation of Industries of the state of Rio de Janeiro recently decided to launch a \$1 million participatory research project to further evaluate, at a fine resolution, poverty in Rio de Janeiro's 166 neighborhoods. This assessment will be used as a foundation for a large collaborative social responsibility project that will include the participation of private companies, NGOs, universities, and other actors. With increased awareness of the appropriate use of the atlas, these data may be used to continue to empower communities, reshape policy, and create accountable and transparent decision-making.

Bibliography

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