Experiences with the Development and Use of Poverty Maps

Case Study Note for VIETNAM*

1. Background information on the poverty mapping initiative

The development of the first poverty map in Vietnam was initiated in 1997 under a United Nations Development Programme (UNDP)-funded project focused on strengthening capacity for rural development. Implemented primarily by the Ministry of Agriculture and Rural Development (MARD), the project aimed to: 1) increase understanding of agricultural potential; and 2) identify poor communes and districts based on objective criteria and measurable indicators. To address the second goal, Nicolas Minot (a full-time staff member of the International Food Policy Research Institute who was working with MARD) developed a methodology using clear, objective criteria to estimate poverty at a disaggregated, district level.[1] This poverty map was based on the 1992-93 Vietnam Living Standard Survey (VLSS) and 1994 agricultural census data (see Section 2). This approach was developed concurrently with and similar to the work of Hentschel and Lanjouw (1996) examining the geographic distribution of poverty in Ecuador.[2]

Interest in an updated poverty map, particularly on the part of the World Bank, led to the creation of a province-level map in 2000 based on data from the 1998 VLSS and 1999 census.[3] It is hoped that the availability of the updated map will encourage the use of poverty maps in Vietnam, especially by the government (see Section 3). The 2000 poverty map examines the geographic distribution of poverty in both urban and rural areas and calculates standard error (see Section 2).

In addition to the poverty maps, commune-level poverty indicators were developed since 1998 by the Ministry of Labor, Invalids, and Social Assistance (MOLISA) and the Committee for Ethnic Minorities in Mountainous Areas (CEMMA).[4] Specifically,

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[1] At the time, Vietnam had 545 rural districts. Since data were missing for two of the rural districts, poverty rates were calculated for 543 rural districts.

[2] The approach used by Hentschel and Lanjouw (1996) is more accurate but requires household-level census data. Minot's (1998) approach uses aggregated census data and may be useful when household-level data are not available.

[3] Vietnam currently has 61 provinces. This study estimated the incidence of poverty for urban and rural areas in each province, yielding poverty estimates for a total of 122 geographic areas.

[4] The number of communes changes frequently. For example, there were 10,477 communes in 1999 and 10,551 communes in 2000 (GSO 2001, GSO 2000).

MOLISA maintains a list of poor communes, most of which are in coastal and lowland areas, while CEMMA is responsible for identifying poor communes in mountainous and remote areas. The commune-level indicators have been used to help target poor communes for poverty reduction programs (e.g., subsidy programs, exemption from social service fees, and credit programs; see Section 3). One concern about the commune-level indicators is that the criteria used to identify poor communes vary widely. These indicators are collected from a system of commune- and district-level agencies and are based on different welfare estimates, different poverty lines, and different units of analysis. The development of the poverty maps is intended to provide a more objective measure of poverty in Vietnam. However, bureaucratic inertia concerning the use of existing, home-grown, commune-level indicators seems to have limited use of the new imputed 1998 and 2000 poverty maps (see Section 3).

2. Process of poverty mapping

The first imputed poverty map in Vietnam was developed in 1998 using probit regressions based on 1992-93 VLSS data and district-level means for comparable variables in the 1994 agricultural census.[5] First, the relationship between poverty and 25 household-level variables was estimated, using data from the VLSS for which there were equivalent variables in the census data. Then, the average values of these same 25 variables were calculated for each rural district based on the 1994 agricultural census. (Mean district values were calculated because household-level agricultural census data were not available.) The regression parameters were then applied to the census variables to estimate district-level poverty rates.

Statistical estimations for this district-level poverty map were developed by Nicholas Minot and two individuals from the General Statistics Office (GSO). The poverty map itself was developed by a GIS (geographic information systems) specialist at the National Institute for Agricultural Planning and Projection (NIAPP). Funded by UNDP, development of the statistical estimations and poverty map took approximately five months. Without access to the household-level census data, it was not possible to estimate standard error for the district-level poverty estimates (Minot 1998).

The 1998 poverty map results indicated that the poorest districts are concentrated in the North, in hilly areas far from large cities and the coast, such as the northern and western edges of the Northern Uplands, the western edges of the North Central Coast, and in the northern part of the Central Highlands. Generally, these areas have large ethnic minority populations. Results of the 1998 poverty map were presented to various ministries (e.g.,

[5] The 1992-93 VLSS was developed using a stratified random sample of 4,800 households, including 3,840 rural households and 960 urban households. The survey involved collecting information on household members, housing, fertility, assets, employment, agricultural production, income, and expenditure (Minot 2000, Minot 1998). The VLSS was conducted by the Vietnamese State Planning Committee (SPC) and the General Statistical Office (GSO). The 1994 agricultural census covered 11.5 million rural households (including nonagricultural households). The census was developed by the GSO and included questions on household members, housing, land use, animal ownership, and assets (GSO 1995, Minot 2000, Minot 1998).

MOLISA and MARD), international agencies (e.g., UNDP, the Food and Agriculture Organization of the United Nations, and the World Bank), and NGOs (e.g., Oxfam and CARE).

The Vietnamese poverty map was updated in 2000 using the Hentschel et al. (2000) methodology and relying on data from the 1998 VLSS and 1999 census.[6] A 3% sample of household-level census data was used;[7] thus, the analysis was restricted to estimating poverty in rural and urban areas at the province level (a total of 122 geographic areas). First, the VLSS data were used to estimate expenditure as a function of household characteristics, such as household composition, education, occupation, housing characteristics, and asset ownership. A regression equation was developed based on the relationship between expenditure and the household characteristics and then applied to census data on these same household characteristics. Nicholas Minot, Bob Baulch, and three GSO staff (two from the Population and Labor Statistics Division and one from the Social and Environmental Statistics Division) conducted the statistical estimations. Three consultants (two Vietnamese and one expatriate) from a local GIS firm were hired to arrange the poverty headcount data in map format. Funding for the development of 2000 poverty map was provided by the United Kingdom's Department for International Development (DFID) Poverty Trust Fund and the World Bank Development Economics Research Group.

Though disaggregated only to the province level, the 2000 imputed map provides a broader view of poverty in Vietnam by distinguishing between rural and urban areas and by calculating the standard error of the poverty headcount. Like the 1998 version, this map indicates that poverty is less severe in the southern regions and is concentrated in Vietnam's Northern Uplands (especially the six provinces bordering China and Laos), the North Central Coast, and the Central Highlands (Kon Tum and Gia Lai provinces). Rural poverty is shown to be particularly high in several northern provinces, including clusters in the North Central Coast and Red River Delta. As before, these are areas with high concentrations of ethnic minorities. Furthermore, the map indicates that the incidence of poverty in urban areas is consistently lower than in rural areas.

In addition to presenting the poverty map results, Minot and Baulch (2001) identified key variables that may be used as "quick and dirty" indicators of household-level poverty. Such indicators may provide MOLISA, CEMMA, and other initiatives with a cost-effective method to help target anti-poverty programs (see Section 3). Using Receiver Operator Characteristic (ROC) curves to portray graphically the accuracy of classification (i.e., as poor or non-poor) based on sensitivity and specificity tests, a diagnostic can be

[6] The 1998 VLSS used a stratified random sample of 6,000 households, including 4,270 in rural and 1,730 in urban areas. The GSO developed the VLSS with funding from the Swedish International Development Cooperation Agency and UNDP. The 3% sample of the 1999 census used a stratified sample of 5,287 enumeration areas, containing 534,139 households. The GSO conducted the census with financial and technical support provided by the United Nations Population Fund (UNFPA) and UNDP.

[7] The GSO is reluctant to release the entire household-level census data set—an unusual request in Vietnam, as in many other countries. Access to a 3% sample of the census was instead obtained; i.e., the data were extracted from a CD disseminated by the GSO). This 3% sample is representative at the provincial level.

performed to determine which variable most strongly targets the poor. Based on the ROC curve results, ownership of consumer durables, particularly televisions and radios, is one of the strongest predictors of per capita expenditure in both rural and urban areas of Vietnam. Other variables that may help improve targeting of the poor include demographic and housing characteristics (e.g., floor type).

Initial results of the 2000 imputed poverty map were summarized in a short draft paper for a three-day poverty strategy workshop (July 2000) and also presented to a joint Government-Donor-NGO poverty working group in early October 2000. Subsequently, these results were included in the *2001 Vietnam Development Report* (both Vietnamese and English versions), a widely disseminated report that attracts a great deal of interest, and in an article in the *Vietnam Investment Review*, an English-language newspaper. Minot and Baulch's draft paper (2001) has been accepted for publication in the World Bank's Policy Research Working Paper Series and will be included in a book/monograph (Dollar and Glewwe, forthcoming). Presentations on the 2000 poverty maps were given to approximately 100 individuals, some quite senior, at a Ministry of Planning and Investment (MPI)-World Bank workshop on economic growth and to about 30 participants at a DFID-funded training program on policy analysis using the VLSS.

Nicholas Minot and Bob Baulch are developing a proposal to update the 2000 poverty map at a finer scale. Access to a 33% sample of the 1999 census data has been granted, making it possible to extend poverty mapping to the district level and possibly to the commune level. Furthermore, with increased access to census data, incorporating additional variables (e.g., market access) into the econometric model should be possible. The proposal seeks to involve various in-country institutions such as the Information Center for Agricultural and Rural Development (ICARD, under the MARD), GSO, MPI, and MOLISA. Such in-country involvement is intended to build national ownership of the poverty map results and help encourage their ultimate use (see Section 3). There are plans to distribute the proposed new poverty map by conducting workshops and developing reports, posters, and a CD on the poverty map results.

3. Use and impact

Due in large part to bureaucratic inertia favoring the use of existing, home-grown, commune-level poverty indicators, the use of the relatively coarser imputed 1998 and 2000 poverty maps in Vietnam has as yet been limited. While the commune-level poverty indicators have been more extensively applied, the imputed poverty maps have mostly been used to help crosscheck identification of poor areas.

In particular, the commune-level MOLISA poverty indicators have been used by MOLISA's Programme 133 and CEMMA's Programme 135, two of the largest poverty reduction initiatives in Vietnam. These programs provide poor households with free or subsidized primary schooling for children, health cards, and sometimes exemption from local taxes. In addition to MOLISA and CEMMA, the World Bank-funded Northern Mountains Poverty Reduction Project, the Community Based Rural Infrastructure Project, and the Rural Energy Project have also used the commune-level poverty

indicators for geographic targeting. These community-driven development programs are targeting ethnic minorities, which are disproportionately poor (while ethnic minorities make up 15% of the population, they represent nearly 30% of the poor) and the poor in rural areas (most of Vietnam's poor are found in rural areas). The Northern Mountains Poverty Reduction Project used the commune-level indicators to select Vietnam's six poorest provinces,[8] while the Community Based Rural Infrastructure Project used the indicators to select the next 13 poorest provinces. These projects have typically verified targeted poor areas by crosschecking results using the commune-level indicators with results using the imputed poverty map. Over a five-year period (2001-05), an estimated US$120 million is expected to be allocated to the Northern Mountains Poverty Reduction Project,[9] while US$123.4 million will be provided to the Community Based Rural Infrastructure Project.[10]

Despite the more extensive use of the commune-level poverty indicators, there has been some use of the 1998 and 2000 imputed poverty maps, especially in projects for which district- and province-level poverty ranks are sufficient. Several organizations, including the NGOs Oxfam and CARE as well as the Food and Agriculture Organization (FAO) of the United Nations, have requested copies of the poverty maps and are thought to have used the maps to help target their initiatives. FAO, for example, used the 1998 poverty maps to help identify poor districts in need of food security interventions. Furthermore, various donors and international agencies, such as the World Bank, Asian Development Bank, Swedish Rural Mountains Development Program, and UNDP, have requested copies of the 1998 and 2000 poverty maps. As many as five copies of the draft 2000 poverty maps were given every week to various agencies during 2001.

While many users, especially government agencies, continue to rely primarily on the commune-level poverty indicators, there is increasing recognition of their flaws: namely, that they are based on different welfare indicators, different poverty lines, and different units of analysis. With growing awareness of the imputed poverty maps and their basis in objective criteria and measurable indicators, as well as the possible development of a commune-level imputed poverty map, interest in using these maps is expected to rise. It should be noted, however, that even if high-resolution maps were available, there would still likely be some resistance to using them, especially if a uniform poverty standard, as applied in the poverty maps, results in excluding from future poverty alleviation efforts communes in southern areas of the country that currently are eligible for anti-poverty programs.

The use of the commune-level poverty indicators and imputed poverty maps has been looked upon very favorably by numerous government, NGO, and international agencies in Vietnam. The poverty indicators and maps have been especially helpful in

[8] The ratio of the number of poor communes to the total number of communes in a given province was first used to select the 13 poorest provinces in Vietnam. Then, six additional provinces, in which there were few poverty reduction projects, were selected.
[9] The International Development Association (IDA, the World Bank's concessional lending window) will provide US$110 million , while US$10 million will be co-financed by DFID.
[10] Of this amount, US$102.8 million is being provided by IDA.

highlighting the need for poverty reduction interventions in the northern regions and areas with large ethnic minorities. As a result, allocation of funding has been focused on several such areas and a greater share of the population is now participating in poverty-related programs.

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