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Population, Vulnerability and Poverty: A Methodological Exploration Based on Iquitos, Peru

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1. Introduction

In recent years the theme of global poverty has come to take on ever increasing importance, as the World Bank and other multilateral and bilateral donors have come to focus more on how its development assistance can better contribute to poverty reduction in low-income countries. The focus on poverty also coincides with the UN-system focus on the Millennium Development Goals (MDGs), with Goal number 1 being that of reducing poverty to half the 1990 levels in each country by 2015.[1]

On the other hand, it has come to be recognized that monetary poverty, whether based on income or consumption data, does not capture key aspects of the lives of the poor, in particular, factors they are particularly exposed to that may drop them before the poverty line, even if they are not poor. These aspects can be considered to be embodied in another term that has come to take on its own popularity, *vulnerability*. This term has come to be widely used in the international community in recent years (e.g., UN DESA 1999), though its origins can perhaps be traced to the promotion of the satisfaction of "basic needs" by the International Labour Office in the 1970's-1980's, and Amartya Sen's focus (1981) on "endowments" (e.g., physical, human, and social capital of persons and households). Similarly, Chambers (1988) noted that poverty and vulnerability are not the same, that vulnerability does not reflect scarcity per se but rather impotence, insecurity and exposure to risk, along with the difficulty of confronting that risk. Hence it refers more to assets than income. Those assets or endowments help low-income (and other) households confront economic and other crises without falling into poverty or starving.

A review of the concept of vulnerability in the literature finds no clear theoretical constructs and often confusion regarding its meaning, such as whether it refers to the risks or shocks that could be faced by a person or household, the actual shocks

[1] New estimates of poverty based on new consumption price data and purchasing power parity comparisons in fact just came out from the World Bank on September 8, 2008, but are not available for individual countries on the web as yet.

encountered, the different types of dimensions of vulnerability, or the ability of the household to cope with the shock. Indeed, the concept of vulnerability has come to be applied to many types of situations, including economic vulnerability due to losing one's job; environmental due to having one's land or house flooded or burned; health due to the risk of serious illness and consequent high medical expenses; political due to the risk of being jailed or deported by dictatorial regimes or those with whom one is publicly at odds; physical vulnerability due to the risk of being in an accident or beaten, robbed, or abused due to one's age, size, gender or where one lives, works or travels; etc. Concepts of external vulnerability are sometimes used to reflect the wide range of "shocks" to which someone may be exposed (Kalibwani, 2005), reflecting their exposure to various kinds of risks. A useful approach is that of Eakin (2007) that mentions three components of vulnerability: (1) the risk of the population, or exposure, to a threat or shock; (2) the sensitivity of the population to the shock; and (3) its capacity to resist the impacts of the shock and restore its situation to the previous state.

Up to now the focus of vulnerability discussions has generally been at a macro level, such as the vulnerability of populations to HIV/AIDS, of different places/countries on the planet to global warming (viz., coastal areas, island states), or to natural disasters due to their location near geologic faults or monsoon/hurricane prone areas. But in most such situations, some people are more vulnerability that others to physical risks, and moreover are exposed to a wide range of non-environmental factors. What is missing thus are studies that examine the vulnerability of individuals and households in real world contexts (Dercon, 2001; Turner et al, 2003, p. 8076; Eakin, 2007, p.3). The study here is an attempt to respond in a preliminary fashion to such an expressed need.

This will be achieved by examining a number of distinct *dimensions* of vulnerability, which will involve, first, postulating a typology of those dimensions, and second, using data collected from a modest household survey to measure the levels of vulnerability in a real-world population. We will then also study the extent to which different types of households are vulnerable according to the different dimensions and overall, and determine prevalence levels of vulnerability by demographic characteristics of the household and location, for example. The results will be compared with those resulting from using the traditional monetary income-based measure of poverty for the Iquitos-area population. The concluding section will discuss needs for further research and policy implications.

This paper and research also relates directly to recent research on the intergenerational transmission of poverty and vulnerability, since it shows how vulnerabililty can be realistically measured at the household level using questions commonly used in household surveys. Then children in those households can be identified as likely victims of the intergenerational transmission of vulnerability, in the absence of policies to address the problem.

2. The Study Area--Iquitos, Peru

Iquitos is a city of about 400,000 people in the northern Peruvian Amazon, far from the rest of Peru and probably unique in the world in one sense: It is likely the largest interior (non-coastal) city without any land (road or rail) connection to the rest of the country. It is thus quite isolated, with all goods (and people too!) coming to and leaving the city by slow boat or expensive air travel. It is also the capital of the second poorest *departamento* of Peru, Loreto, in terms of monetary poverty, and many areas are subject to flooding due to its location at the nexus of three or more large rivers that form the river called locally the Amazon precisely at Iquitos. Peru itself is country with fairly high levels of poverty (10% in extreme poverty, 31% in poverty, using the $1/day and $2/day measures) at the national level (World Bank, 2007). These levels are certainly higher in Loreto, but lower in the city of Iquitos than surrounding areas. The research here is thus based on data collected in three distinct types of habitats: a. urban areas, in central Iquitos; the *periferia,* or communities on the edge of Iquitos, usually located on a river; and rural riverine communities, called *caseríos* in the Peruvian Amazon. Dimensions of vulnerability appeared likely *a priori* to vary significantly across these three types of communities.

3. Data Collection and Content

A small household survey was carried out in July, 2005, on a shoe-string budget, using research seed funds of the Carolina Population Center of UNC-CH provided by the Mellon Foundation. The Instituto de Investigaciones de la Amazonía Peruana (IIAP) provided office space, computer access, training space, and lists of communities and rough out-of-date estimates of population sizes for (b) and (c) above, and maps for (a)-(c). Interviewers and a supervisor were recruited by IIAP and trained by the authors, who carried out a pretest to test out both the questionnaire and the interviewers. Based on the extremely limited resources available, we determined that the survey could cover only 3 urban communities (city block clusters) and 6 communities each in strata (b) and (c). Communities were selected from lists randomly but taking into account their location on the map, to ensure a broad geographic distribution. In the absence of any recent census or of resources for conducting complete listings of blocks and occupied dwellings in the sample communities, sample dwellings were selected for interview in each sample community using *rapid assessment survey* methods (described in detail in Bilsborrow et al, 1998, and derived from the World Health Organization´s Expanded Program of Immunization survey methodology). Essentially, the procedure is to go to a central place in the community, select a direction randomly, walk in that direction to the end of the community numbering every occupied dwelling, and conducting interviews in every xth dwelling. In a small community, more than one random start could be selected. The resulting sample is close to random and comprises 48 completed interviews in the three urban block clusters, 96 in the peri-urban areas, and 72 in the rural communities, for a total of 216 households in 15 communities.

The small sample size is evidently a limitation, so it should be borne in mind that the results presented here must be considered preliminary, and indeed intended mainly to stimulate further research.

The questionnaire covers a full range of data on household composition, migration, housing conditions, household durable assets, land, agricultural production and market sales, wage income, assets and income from an individual or family business, health problems of any family member and treatment, basic fertility and family planning, whether have enough food to eat always, whether ever robbed in home or away, accidents, exposure to flooding and effects on household, borrowing and indebtedness, whether have anyone or institution to whom to turn in the event of a household economic or health or other crisis, etc.

Before getting into the data on vulnerability, a few stylized facts about the composition of the sample may be useful to present. 51% of the household heads lived in the community for over 15 years, but 36% are fairly recent migrants, arriving within the previous 10 years. 32% of the dwellings have dirt floors and 40% thatch or palm leaf roofs; 32% have piped water in their dwellings, 47% a toilet, and 61% electricity. 84% do not have a separate kitchen, and 64% cook with fuel wood. While only 1% of all household members were disabled, 19% of the households had someone sufficiently sick in the previous 4 weeks that he/she could not do his/her usual activities some days. The education dispersion of the population is considerable, with 29% not having completed primary education but 26% completing secondary education. Only 14% of those working work for wages or salaries, with 36% having a family business and another 36% having land. Overall, 26% of the households have someone in debt, and most report having problems paying off their debt. 20% report flooding problems, 28% that their house was robbed within the past 2 years, and a quarter that someone had a serious accident or illness.

4. Dimensions of Vulnerability

Vulnerability is tied to shocks, and in turn to risks. Among the risks of interest at the household level in Loreto are those associated with tropical diseases such as malaria and dengue fever; other sources of illness, including gastrointestinal and respiratory; flooding of the house or agricultural fields; losing a job or failure of the family business; price declines of agricultural products produced by the household; accidents; and theft and assault. Among the factors that help the household respond to these shocks are human capital (education level); household income (of persons other than the person losing a job, in case of job loss or business failure or decline in crop prices); household assets (including their liquidity, or ease of selling for cash close to market value); quality of housing; business capital and liquidity of assets; location capital (living in a safe neighborhood); and social capital (if have relatives, neighbors, friends you can turn to in case of need). These reflect a range of factors that determine, collectively, the capacity of the household to successfully confront a shock without lapsing into or falling into poverty, or if poor, into extreme poverty, serious deprivation and illness, and ultimately even death.

However, it is a challenge to classify households as vulnerable or not on various dimensions in the very different urban and rural environments of this study. For example, one cannot expect, in the Peruvian Amazonian (and many other) rural context that a

house will have an indoor toilet and plumbing, or a metal roof, or a wide range of consumer durable goods. Education levels that would be considered low in urban areas (such as completed primary education) may be appropriately viewed as quite sufficient, and evidence of high human capital endowments in a rural context. Therefore, in the empirical study below, we attempt to take into account such considerations in classifying rural and urban households as vulnerable when possible, though of course it is straight-forward to make direct comparisons using the same identical criteria across the three geographic types of communities.

One of the goals of the project is, once all households are classified according to vulnerability in its various and joint dimensions, is to determine the degree of vulnerability (prevalence, or percent vulnerable of those in a group) according to:

a. type of human settlement (urban, peri-urban, rural);
b. household size
c. household composition (presence of children under 5, sex-ratio, female vs. male headship, nuclear vs. extended family, etc.);
d. education of household head
e. education of spouse
f. years of residence of head

This will be done after the work is carried out in the next section to classify all households and members by vulnerability in it manifold dimensions.

5. Application of Methodology: Measurement of Vulnerability

The following are the dimensions of vulnerability to be investigated with data from the survey, that is, for which questions exist that can be considered to cast light on that aspect or dimension of vulnerability. These are only outlined here, in the full paper, the full questionnaire will be provided as an Appendix and questions identified that we map onto each dimension. This will be done for the population as a whole, then refined to illustrate how the criteria could reasonably be changed for rural and urban populations separately.

It is not always clear which aspects of households best provide evidence of having been exposed to shocks and which show their capacity to confront shocks. Even conceptually it is not always clear, and is most confusing in the literature, which has as yet not confronted how to operationalize and measure shocks (and vulnerability) from survey data and how to operationalize households' ability to confront those shocks. Thus, low education of the head both *causes* vulnerability (low income, poor location of dwelling, poor knowledge of health and where to get health care, failure to boil water, etc.), and also can *alleviate* the effects of shocks when they occur: by providing access to higher income jobs, or easier to get another if one is lost; better knowledge of when/where to go for health care, etc. Below we indicate 4 categories of shocks, if low education is excluded.

A. Health--vulnerability as reflected in recent illnesses in the household, plus disability; whether dwelling has indoor plumbing, water; whether household always boils drinking water, usually cooks with firewood.

B. Environment--whether dwelling or farmland has been flooded.

C. Security--whether house has been robbed, whether some member has been robbed away from the house, whether anyone has had serious accident.

D. Unemployment/loss of job, business decline, decline in prices of crops grown/animals sold

Thus other aspects of the household, measurable in a household survey, are not so much indicators of vulnerability as reflections of the household's ability to confront shocks. These are designated with C prefixes below. Note household assets can be sold (or pawned) when cash is needed, and even the house (if owned!) can be sold, rented or mortgaged, if absolutely necessary, though not as quickly as certain other assets. Some assets in the dwelling also inherently reduce vulnerability, for example, a refrigerator reduces health vulnerability, as do electricity and indoor toilets and plumbing. Land and business assets can also often be sold in time of crisis.

C1. Household assets--ownership of dwelling; in rural areas, ownership of less than one ha per person; having fewer than 8 assets from a list which is location-neutral would provide evidence of vulnerability.

C2. Housing quality--quality of dwelling as function of number of rooms, material of roof and floor (non-dirt); in urban areas, not having electricity, indoor water or toilet lowers ability to cope since house is of lower value for selling; in rural context, lack of an improved latrine, cement walls, wood floor would indicate low dwelling sale value.

C3. Household income, business assets, amount of land owned. Higher income facilitates confronting any crisis in short run without resorting to selling assets, but those assets provide a crucial second-level cushion.

C4. Human capital--ability to confront shocks depends on not having a low education of household head (e.g., in urban context, no secondary education; in rural, less than complete primary school). With more education, can find solution more easily, whether to health problem, finding a new job, living in or moving to less-flood prone setting, etc.

C5. Social capital--whether the members of the household have relatives or neighbors that could help in a crisis, or know of a government agency that could.

After A1-4 and C1-5 has been measured for each household, an overall identification of those households that are "vulnerable" (both marginally and highly) and those not vulnerable will be determined, and the results analyzed.

Finally, households delineated as vulnerable will be compared with households considered poor using traditional monetary income from the same survey. The differences will be analyzed.

6. Further Research Needs and Policy Implications

Gaps in research will be delineated, beginning with the content of the questionnaire for collecting the appropriate data.

A clearer conceptual model of vulnerability will be developed, with dimensions or types of risks or shocks, on the one hand, and dimensions of the household's ability to confront the shocks, on the other.

Policy implications follow from noting the frequency of different types of shocks, who is subjected to them and where, and how they could be addressed by policies in local communities. Advantages over the simplistic use of monetary poverty will be highlighted.

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