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Proposal submitted:

MONITORING POVERTY AND VULNERABILITY IN AN URBAN AFRICAN SETTING: LESSONS FROM THE OUAGADOUGOU DEMOGRAPHIC SURVEILLANCE SYSTEM

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Background

The first objective of the Millennium Development Goals is "To eradicate extreme poverty and hunger" in the world. While the incidence of poverty has decreased in some parts of the developing world, particularly in Asia, in sub-Saharan Africa, many people have fallen into poverty and the poor are getting poorer (United Nations 2005).

In order to eradicate poverty, we need to know how to measure it and how its affect the life of human beings, namely how poverty affect the access to other resources like social services (e.g. health and education). When talking about poverty, another important dimension to take into account is *vulnerability*. While poverty is a static concept, vulnerability is dynamic, it is "both an *ex ante* and *ex post* state associated with the probability of falling below a minimum threshold of well-being" (Vatsa 2004:11). Actually, an individual or a household can be non-poor at a specific point in time, and then, due to external events or shocks, fall into poverty. Poor people are particularly vulnerable to adverse events outside their control, and this vulnerability is sometimes more painful than the fact to be poor at a specific point in time.

However, vulnerability is difficult to measure: "… since the concept is dynamic, it cannot be measured merely by observing households once. Only with household panel data – that is, household surveys that follow the same households over several years – can the basic information be gathered to capture and quantify the volatility and vulnerability that poor households say is so important" (World Bank, 2001, p. 19).

Data and Research Methods

As part of the "Urban Health and Equity Initiative", the Higher Institute of Population Sciences (ISSP[1]) from University of Ouagadougou and its partners have established since 2001 a Demographic Surveillance System (DSS) in two pilot sites of Ouagadougou the capital city: Taabtenga, a spontaneous and undeveloped settlement and Wemtenga a more planned area. A main objective of the Ouagadougou DSS is "to improve the scientific foundation for evidence-based health and population policies in West Africa, with a special emphasis placed on problems of poverty and inequality". Thus, the DSS seeks to examine how poverty affect social and demographic outcomes such as health and education, and reversely in what extent social and demographic issues can have an impact on poverty and vulnerability.

The DSS collects information on the characteristics of the dwelling and the ownership of some assets at the household level, and this is updated annually. The information was collected at the baseline in 2002 (1,149 households were concerned) and then updated three times in 2003, 2004, and 2005.

The objective is to construct and monitor, in a longitudinal framework, a proxy of household wealth based on some selective assets. We assume that a periodical update of some main assets owned by households can reveal important variations depicting changes in the households' economic status. After applying different scenarios, we finally considered the ownership of the following assets: TV, phone, video-tap, refrigerator, car, motorcycle, and bicycle. The three last dummy variables were then replaced by a new variable, "main mean of transportation" with four categories.

We wanted the wealth proxy to be a linear combination of the assets. So, for a household j, we have:

$$Index_j = w_1 \times a_{1j} + w_2 \times a_{2j} + ... + w_N \times a_{Nj} + C$$

Where the w_i are the weights, the a_i the different assets, and C is a constant.

We have used a Principal Components Analysis (PCA) to determine the weights, a method which has been already used by other authors (see Montgomery *et al.* 2000 ; Filmer and Pritchett 2001). Then we have adopted a relative approach to poverty using the quintiles (5 groups). The data used to determine the weights come from a survey representative at the city level (The survey on Reproductive Health in Ouagadougou conducted in 2002).

Preliminary Results

Table 1 presents the weights we found for each asset: the video-tap ownership is the one which has the more important impact on the wealth index, and the mean of transportation has the lowest.

Table 1: Weights for the different assets involved in the construction of the wealth proxy

Assets	Weights
TV	0,86
Phone	1,04
Video-tap	1,16
Refrigerator	1,05
Main mean of transportation	0,50
Constant *C*	-2,05

[1] Institut Supérieur des Sciences de la Population (formerly known as Unité d'Enseignement et de Recherche en Démographie)

Table 2 gives the wealth profile in the two neighbourhoods at the baseline (2002) and at the last update (2005): we can see that in 2002 as well as in 2005, households in Taabtenga the unplanned settlement are more likely to be poor regarding the standards of the city while the households in Wemtenga, the planned area, are more likely to be non-poor.

Table 2: Distribution of households by wealth status in the two neighbourhoods

	Taabtenga		Wemtenga	
Wealth Quintiles	2002	2005	2002	2005
Quintile 1 (Poorest)	**18.9**	**9.5**	**14.0**	**6.8**
Quintile 2	40.6	31.3	13.5	5.4
Quintile 3	32.6	28.2	24.4	15.4
Quintile 4	6.8	25.5	24.2	29.5
Quintile 5 (Least poor)	**1.2**	**5.6**	**23.9**	**42.8**
N	*688*	*792*	*385*	*369*

Table 3 presents the changes in term of quintiles other time. When we consider those households which assets were updated during two successive years, 19.6 % have declined (i.e. have passed from a higher quintile to a smaller one) between 2002 and 2003, 15.1 % between 2003 and 2004, and 11.6 % between 2004 and 2005. Reversely, 21.5 %, 29.6 %, and 36.9 % of these households have progressed (i.e. passed from a smaller quintile to a higher one) respectively between 2002-2003, 2003-2004, and 2004-2005. Most of the changes are one quintile increment change: they represent 74.9 %, 82.1 %, and 79.6 % of the declines, respectively in 2002-2003, 2003-2004, and 2004-2005. For the increases, they represent respectively 82.8 %, 74.6 %, and 75.1 % at the same dates.

Table 3: Changes of quintiles for successive years

Quintiles	2002-2003		2003-2004		2004-2005	
Changes	%	n	%	n	%	N
- 4	0.2	2	0.0	0	0.0	0
- 3	1.0	9	0.8	8	0.5	5
- 2	3.3	31	1.9	18	1.9	18
- 1	15.1	143	12.4	119	9.3	90
Stable	**58.9**	**556**	**55.2**	**529**	**51.5**	**500**
+ 1	17.8	168	22.1	212	27.7	269
+ 2	3.1	29	5.8	56	6.6	64
+ 3	0.5	5	1.0	10	2.5	24
+ 4	0.1	1	0.6	6	0.1	1
Total	100.0	944	100.0	958	100.0	971

An important proportion of households have been changing quintiles over time. In addition, within the DSS, most of the analysis which has been already done on the link between the wealth index and social outcomes like education and health are closed to what could be expected: for instance, the more wealthily the household, the more likely are children to be attending school. More importantly, in term of ongoing further analysis, we are assessing how these *changes* in the economic status of the household affect educational and health outcomes. Also we are planning to improve the method of analysis: longitudinal data have a two-level hierarchical structure, with repeated measurements (level 1) nested within individuals (level 2), and may therefore be analyzed using multilevel models (Goldstein 2003; Steele *et al.* 2004; Steele *et al.* 1996).