

MULTIDIMENSIONAL POVERTY MONITORING: A METHODOLOGY AND IMPLEMENTATION IN VIETNAM

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1. INTRODUCTION

Moneymetric analysis of poverty can be proud of its achievements since twenty-five years. Methodologies have been developed to better describe the difficult situation of families marginalized within their communities in regard of the general level of welfare and to better tackle the problems they are facing. But change has happened, thanks to this pioneering work on poverty. The concept of poverty has evolved to a multidimensional view. A eight-year old child not going to school is individually poor even if he is living in a family not monetary poor: he is lacking an essential good, education. This a normative assertion, no discussion about that. And his family has a poverty problem, because some of his members are poor. The same if the mother, in this family, usually gives birth without any skilled assistance. This raises new technical challenges: how to measure poverty now? By multiple indicators? But then, how to define the relevant indicators? How to weight these multiple measurements to get a composite (integrated) measurement of a family welfare, in view of identifying the poorest?

In addition to this conceptual extension, an operational issue has become more and more acute: the limitations in the analytical power of standard household surveys designed to measure as accurately their standard of living, i.e. their monetary poverty. Can we capture the multidimensional face of poverty through a small set of reliable indicators, light and easy to measure?

Policy makers ask for reliable poverty measurements with a very high level of disaggregation as well geographically as in socioeconomic groups, and regularly updated, annually or quarterly if possible. Developing countries cannot meet these policy requirements with the high costs of standard household surveys.

These are the issues addressed by several national groups of researchers (a Vietnamese group included) working within the Micro Impacts of Macroeconomic Adjustment Policies Network (MIMAP)¹ supported since fifteen years by the International Development Research Center of Canada (IDRC).

One of the key objectives of the research work conducted by the Vietnamese research group since 1998 is to describe multidimensional poverty in Vietnam² and its change across time, with a specific tool developed. This tool consists of two parts :

- a) A small set of light household poverty indicators identified through community-based surveys;
- b) A methodology to build a composite indicator.

The present paper aims to produce three outputs:

- A relevant and significant multidimensional poverty profile of Vietnam, static and dynamic (1993 and 1998)³, including a composite poverty indicator;

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¹ Micro Impacts of Macroeconomic Adjustment and Policy. A large part of the program is now implemented through the PEP (Poverty and Economic Policy) network, including a CBMS (Community Based Monitoring System) sub-network.

² From now on, the word "poverty", without any qualifier, will implicitly mean "multidimensional poverty", and there will be eventually a qualification like "income (monetary) poverty", "health poverty", etc.

- An assessment of the analytical capacity of the MIMAP methodology developed in Vietnam, by a comparison with the standard income poverty analysis;
- Some recommendations to improve the methodology of identifying who are the poor in Vietnam, as a tool for better designed and targeted poverty alleviation policies.

We won't go extensively into the policy area, and the paper will be essentially methodological.

2. METHODOLOGY

2.1. Steps of analysis

The analysis goes through the five steps.

Step 1: to identify among the community-based surveys in Vietnam a set of poverty indicators whose equivalent can be extracted from large scale national surveys ⁴.

Step 2: to construct the MIMAP indicators from the large database provided by each of the two national surveys.

Step 3: to estimate a national multidimensional poverty profile for 1993 and 1998. These profiles will be accompanied by precision estimates and significance tests integrating the complex survey designs probabilistic structures. Results will be compared with the analysis of income poverty as published in official reports on VLSS-1993 and VLSS-1998.

Step 4: To refine the analysis by building a composite poverty indicator integrating the set of MIMAP indicators, and, on the basis of this unique indicator, to develop a static and dynamic poverty analysis compared to the moneymetric analysis.

Step 5: To apply the composite indicator to the MIMAP 1999 survey data, to get an aggregated poverty profile from this survey.

Basing on analysis results, the final activity is to produce proposals for improving the poverty measurement methodology in Vietnam.

2.2. Set of indicators

By a comparative analysis of our community-based poverty monitoring survey (CBMS) and VLSS questionnaires, in view of identifying a small set of indicators for which equivalent indicators can be extracted from the large VLSS databases, it has been possible to identify eight such indicators. They are described in Table 1.

³ These two years are determined by the availability of nationally representative data sets. The methodology developed here will obviously be applied to subsequent years (e.g. 2002) as soon as data sets are available.

⁴ Essentially, we consider a MIMAP survey conducted in year 1999 in four provinces, twenty communes and 22770 households. All households have been surveyed in each selected commune, which explains the large sample size. Indicators are taken from the one-page questionnaire used in this survey. (This survey is described in Vu Tuan Anh (2000), *Poverty Monitoring in Vietnam*, Annual MIMAP meeting held in Palawan, Philippines, Sept. 2000. IDRC, Ottawa, mimeo). One additional indicator, sanitation, is identified in an extended MIMAP questionnaire used in the baseline survey of a poverty alleviation project implemented in the province of Thanh Hoa province.

Two large scale national household surveys are used to assess the relevance of these MIMAP indicators: the Vietnam Living Standard Survey conducted in 1993 (VLSS-1), with a nationally representative sample of 4800 households, and the similar VNLSS-2 survey conducted in 1998, with a sample of 6002 households.

Table 1: The set of eight CBMS indicators

Indicator no.	Title	Description
#1	Underemployment	A worker is considered as underemployed if he is missing job for 3 months or more in last year. At household level, at least one main worker is underemployed.
#2	Chronic sickness	For a person, to be sick for at least one-month a year. At household level, at least one household member is a chronic sick.
#3	Adult illiteracy	Is illiterate a person 15 year+ who cannot read, write and do simple calculations. At household level, at least one adult member is illiterate.
#4	Underschooling	A child 6-15 not attending school. At household level, at least one child is not going to school.
#5	Without radio, TV	There is no radio nor TV set owned by the household.
#6	Type of dwelling	Category of house.
#7	Drinking water	Type of main source for drinking water.
#8	Sanitation	Type of toilet used by the household.

Due to extremely different questionnaires used in our community-based poverty surveys and VLSS, for some indicators, adaptations have been required to extract from VLSS an acceptable proxy:

- #1 underemployment: due to the complexity of the employment section in VLSS (main job, secondary job, self-employment, etc.), and to differences in the 1993 and 1998 questionnaires, many questions have been required to approximate the CBMS definition,
- #2 chronic sickness: we have considered persons having been sick for at least 15 days in the last 4 weeks,
- #3 adult illiteracy: due to the lack of detail in the CBMS questionnaire, and to the different questionnaires for VLSS 1993 and 1998, for reliable comparisons we have retained the three capacities "read", "write" and "calculate". The requirement is higher than in many standard studies. On the other hand, it could be closer to the expected results of functional literacy programs.
- #4 underschooling: we have taken the range 6-15 to include the end of the upper secondary level.
- the treatment was quite easier for indicators #5 to #8.

There are different ways of looking at these indicators. First, we immediately distinguish two classes of indicators, #1 to #4, which refer to individual characteristics, and #5 to #8, which refer to household characteristics. We can talk here of two types of poverty. But the individual indicators are transformed into household level indicators essentially because this is the case in the standard one-page CBMS questionnaire, where there is no household member roster. Thus, all the eight are computed at the household level, but they convey a multidimensional concept of poverty which integrate as well individual poverty within the household as global household poverty. In some sense, we can see the four household indicators (#5 to #8) as referring to the dwelling infrastructure and equipment, part of these (#5 radio, TV and #6 type of dwelling) depending directly on household income level (permanent income), another part depending also, but not exclusively, on community infrastructure.

We can also look at these eight indicators according to their association with some areas of basic needs: income (#1 underemployment and #6 type of dwelling), education (#3 adult illiteracy, #4 underschooling and #5 without radio, TV) and health (#2 chronic sickness, #7 drinking water and #8 sanitation). From this angle, the eight indicators can be seen as reflecting three basic human capabilities: capability to generate

income, capability to access learning and to communicate, capability to live a healthy and long life. We will refer to them as expressing three forms of poverty. If we look more carefully at the income dimension reflected in #6 type of dwelling, #5 radio/TV, #8 sanitation, we can see that it is more the investment component of income, rather than the consumption component, which is found in our set of indicators.

To summarize, we can say that our eight indicators present a concept of human (#1 to #4) and physical (#5 to #8) assets household poverty.

From this way of reading the indicators, we should bear in mind the different facets of poverty thus integrated in our multidimensional measurement when analysing the poverty profiles presented below.

3. MEASUREMENT OF MULTIDIMENSIONAL POVERTY

3.1. A multidimensional poverty profile for the base-year 1993

We first produce a disaggregated profile based on the specific distribution of each indicator, and then compute a composite indicator to understand more clearly and analyse more deeply the distribution of multidimensional poverty in Vietnam. Disaggregations are according to :

- a) geographical location:
 - rural/urban;
 - seven regions: Northern Uplands (1), Red River Delta (2), North Central (3), Central Coast (4), Central Highlands (5), South East (6), Mekong River Delta (7);
 - North (regions 1 and 2), Center (regions 3, 4 and 5), South (regions 6 and 7).
- b) social characteristics:
 - ethnicity (Kinh, minorities)
 - household size
 - gender of household head
 - main activity (farm, non-farm)
- c) moneymetric poverty:
 - relative income poverty: relatively poor household are those below half the median income per capita,
 - expenditure quintile.

On the basis of the sampling weights determined by the sample design, two estimators are provided in each household category coming out of cross-classifying the eight indicators with the nine disaggregation factors, which gives 72 two-way tables. The two indicators are the total number and the percentage of households in each category. The total number of households is not usually presented in other poverty profiles, but we believe it is important to view the population size of different type of poverty (targeting, program costs, etc.), as well as to integrate the population dynamics into the poverty dynamic analysis. A significance test has been runned for the distribution differences in each of the 72 two-way tables. This test is the Pearson chi-squared test adjusted to take into account the effects of the complex sample design on this well-known test in the i.i.d. case ⁵.

⁵ The statistic then follows a *F*-distribution. See Rao J.N.K. and Scott A.J., *On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data*, The Annals of Statistics, 1984, Vol. 12, No.1, 46-60. We use the test as implemented in the Stata procedure **svytab**.

3.1.1. The profile with eight CBMS indicators

Table 2 below presents the poverty status in 1993, according to the distribution of the eight indicators. We see that the major forms of poverty faced by the Vietnamese households are the lack of communication facilities (53%), dwelling infrastructure with 36,5% living in a temporary house and 47,5% not having at least a simple toilet, underemployment (44%) and adult functional illiteracy (37,5%). Unsafe water (19,3%), chronic sickness (18,1%) and underschooling (15,1%) are less critical problems. Income (economic) poverty appears more acute than social poverty.

What is more interesting is how this poverty is distributed across household geographic and socio-economic groups. A first observation can easily be done: almost all disaggregations (61 over 72) are significant at least at the $p_{.05}$ level, most of them at the $p_{.001}$ level. Chronic sickness alone accounts for 6 of the 11 non significant cases, the regional distribution of sickness being here an exception.

Table 2: Multidimensional poverty in 1993

Indicator		%	Confidence interval 95%	Design effect deft
Underemployment	No underemployment	56.0	2.8	2.0
	Underemployment	44.0	2.8	2.0
Chronic sickness	No chronic sick	81.9	1.7	1.5
	With chronic sick	18.1	1.7	1.5
Adult illiteracy	Adults literate	62.5	2.5	1.8
	Adults illiterate	37.5	2.5	1.8
Underschooling	Children going to school	84.9	1.4	1.4
	Children not going to school	15.1	1.4	1.4
Without radio, TV	Withour radio, TV	53.0	2.4	1.7
	With radio, TV	47.0	2.4	1.7
Type of dwelling	Permanent house	16.5	2.8	2.7
	Semi-permanent house	47.0	3.8	2.5
	Temporary house	36.5	3.6	2.6
Drinking water	Piped, rain, drilled well	26.2	4.0	3.3
	Dug well	52.7	4.6	3.2
	Pond, lake, river	19.3	4.2	3.8
	Others	1.8	1.5	4.0
Sanitation (Types of toilet used)	Flush toilet	10.4	1.8	2.1
	Double vault compost latrine	8.4	1.9	2.4
	Simple toilet	33.8	3.4	2.6
	Other types	20.8	3.2	2.8
	No toilet	26.6	3.7	2.9
TOTAL	14,104,261 households	100.0		

Geographically, all types and forms of poverty, except chronic sickness, are more acute in rural than in urban area. The level of sickness is the same in both areas. Regionally, from North to South, there are significant differences in all types and forms of poverty, except for underemployment. All other forms of poverty dominate in the South, except chronic sickness which is more acute in the Center. But if we refine the regional analysis within the North-Center-South main division, all eight indicators are significantly distributed. In the North, education and health poverty, as well as temporary housing, are stronger in the Northern Mountains than in the Red River Delta. On the other hand, underemployment largely dominates in the Red River Delta, where it reaches the highest rate (53,5%) in the country due to high population density, while the lowest rate is observed in the Northern Uplands. In the South, all types and forms of poverty are more acute in the Mekong River Delta than in the Southeast region. In fact four of the eight poverty indicators take their country highest value in the Mekong River Delta .

Socially, we observe that the ethnic minority groups are less literate and have lower quality dwelling and sanitation facilities than the Kinh. On the other hand, the Kinh are much more underemployed. Female headed households are better off relative to underemployment, schooling, safe water and sanitation, while male headed households are better off in terms of literacy and communication means. Except for chronic sickness where they do not differ, farming households are significantly poorer than non farming ones in all other forms of poverty. Large household size means more individual poverty, no surprise with that, according to the nature of the indicators. On the other hand, larger households are better equipped in terms of communication means, while their sanitation facilities seem to be less satisfactory.

Economically, income poverty is directly associated with illiteracy, no communication facilities, temporary housing, unsafe water and bad sanitation facilities. Relative income poverty does not affect children schooling significantly, but there is a significant drop in underschooling for the richest households. The same is observed regarding underemployment: it drops significantly only for the richest. Income poverty has no significant effect on chronic sickness.

From this analysis of multidimensional poverty as represented in the eight indicators, we see that it is difficult to draw a clear view of the socioeconomic distribution of poverty without an aggregate measure of the human and physical asset poverty. To this end, we need a composite indicator.

3.1.2. The profile with a composite indicator and comparative analysis with the moneymetric approach

To build a composite indicator from the eight categorical indicators here used to describe multidimensional poverty, a factorial analysis technique is used, more precisely, the multiple correspondence analysis (MCA). Here, all eight indicators are consistent with the first factorial axis, and thus, the household score on this axis is taken as the composite poverty indicator. A translation using the average of the minimal category negative weights is used to make the poverty indicator positive, which is equivalent to giving a zero weight to the minimal category of each primary indicator⁶. The category weights obtained from this technique are presented in Table 3. The composite poverty score of any household is then given by its average weight over the eight primary indicators.

The 8 indicators and their 21 categories allow theoretically a possibility of 1536 different individual household poverty profiles, or poverty groups. With the sample of 4800 households in VLSS-1993, we observe that there are in fact 699 different poverty groups, which means 7 households/group in average.

⁶ See Asselin (2002).

Table 3: Category weights according to Multiple Correspondence Analysis

Indicator	Category	Weight	Poverty threshold
Underemployment	Underemployment	0	
	No underemployment	575	←
Households with chronic sick 15 days	With chronic sick	0	
	No chronic sick	626	←
Households with adult illiteracy	Adults illiterate	0	
	Adults literate	1544	←
Households with children of 6-15 not schooling	Children not going to school	0	
	Children going to school	1059	←
Households without radio, TV	Without radio, TV	0	
	With radio, TV	1988	←
Type of dwelling	Temporary house	0	
	Semi-permanent house	1845	←
	Permanent house	4302	
Drinking water	Pond, lake, river	0	
	Other water sources	348	←
	Dug well	1534	
	Piped, rain, drilled well	3667	
Sanitation (Types of toilet used)	No toilet, other types	0	
	Simple toilet	1315	←
	Double vault compost latrine	2559	
	Flush toilet	5098	

(a) Multidimensional welfare level comparisons

A first composite poverty analysis consists in comparing the mean of the composite indicator across the different socioeconomic groups analysed precedently. This is done with Table 4 below, where in addition the mean expenditure per capita is also given to check if both concepts of poverty sustain the same analytical results. Since a higher value of the composite poverty indicator means a higher welfare level, Table 4 compares in fact the welfare level across different socioeconomic groups.

The composite indicator can be seen as the mean of two sub-indicators, the first one relative to human assets as represented in the first four indicators (employment, sickness, literacy, schooling), the second one relative to physical assets (radio/tv, dwelling, drinking water, toilet).

Geographically, Table 4 reveals interesting facts. Urban areas are always better off, as well in terms of assets as of consumption welfare. The dominance of the Southeast region, with Ho Chi Minh City, is much less striking in assets than in consumption welfare. The Red River Delta, with Hanoi, and even the North Central are equivalent to the Southeast in terms of human assets. On the other hand, the Mekong River Delta, ranking second in consumption welfare, is the poorest region in terms of assets, as well human as physical assets. Inversely, the Northern Mountains, the poorest region in terms of consumption, ranks fourth and just over the average in assets welfare. Globally, combining the urban and the rural parts both in the North and in the South, the striking difference between the moneymetric and the multidimensional analysis is that the North is significantly better off than the South and the Central region in terms of assets welfare, while the South is significantly better off in terms of consumption welfare.

Socially, the Kinh dominate the minorities in both type of welfare. But a finer analysis, with the F-statistic⁷, shows that the most significant difference between both groups is observed with the human assets indicator. In terms of gender, while the female headed households significantly dominate the male

⁷ The F-test has been runned on all the parts of Table 4, taking into account the design effect.

headed ones in consumption welfare, the gap disappears in terms of assets welfare, especially for human assets. Non farming households are better off than farming households in both type of welfare, as expected.

Economically, the last three rows of Table 4 show that there is a positive correlation between assets and consumption welfare. In fact, the correlation between the composite poverty indicator and the per capita expenditure takes the value 0.49.

Table 4: Welfare level comparisons VLSS 1993

		Composite indicator human assets	Composite indicator physical assets	Composite indicator	Expenditure per capita
Rural / Urban	Rural	652	1136	894	1162
	Urban	763	2290	1526	2286
Large regions	North	708	1539	1123	1201
	Central	675	1264	970	1233
	South	632	1236	934	1754
Seven geographical regions	Northern Mountains	684	1382	1033	1000
	Red River Delta	722	1634	177	1323
	North Central	721	1122	921	1027
	South Central	643	1517	1081	1507
	Central Highlands	584	893	740	1094
	Southeast	728	1896	1312	2076
	Mekong River Delta	579	875	727	1577
Ethnic group	Kinh	686	1406	1046	1432
	Minorities	600	1120	861	1098
Gender of household's head	Male	675	1340	1007	1304
	Female	673	1441	1057	1613
Type of household	Farm	746	1946	1346	2034
	Non-farm	643	1115	879	1105
Relative income poverty status	Not relative poor	681	1420	1050	1456
	Relative poor	589	637	614	431
Expenditure quintile	E Quintile 1	618	844	730	555
	E Quintile 2	653	1071	862	808
	E Quintile 3	659	1252	955	1050
	E Quintile 4	666	1411	1038	1419
	E Quintile 5	761	2111	1436	2834
Quintile with composite indicator	C Quintile 1	479	305	394	978
	C Quintile 2	640	794	717	1098
	C Quintile 3	695	1222	958	1202
	C Quintile 4	747	1679	1212	1341
	C Quintile 5	808	2834	1820	2306
TOTAL	Mean	674	1367	1020	1387

(b) Multidimensional poverty and inequality analysis

Two poverty lines have been defined for the composite poverty indicator. The first one, which could be qualified a *relative* poverty line, is defined from the moneymetric poverty rate officially established for the VLSS-1993. This poverty rate of 58,1% is based on a poverty line of 1,160 thousand VND ⁸. The

⁸ Government-Donor-NGO Working Group (1999), p. 5.

value of the composite indicator giving the same poverty rate 58,1% is 1062, and this is the *relative* poverty line used for poverty comparisons between socioeconomic groups. The second poverty line, a kind of *absolute* poverty line, is built by choosing a poverty threshold for each primary poverty indicator, as indicated in Table 3 above. The choice is not obvious only in the case of a multinomial indicator, and then requires a social consensus. Let W^* be the mean of the weights corresponding to these primary thresholds. Then W^* is taken as the poverty line: an household is considered as poor if and only if the value of his composite indicator is *strictly* below W^* ⁹. Here, this poverty line takes the value 1163.

Table 5: Poverty incidence comparisons VLSS 1993

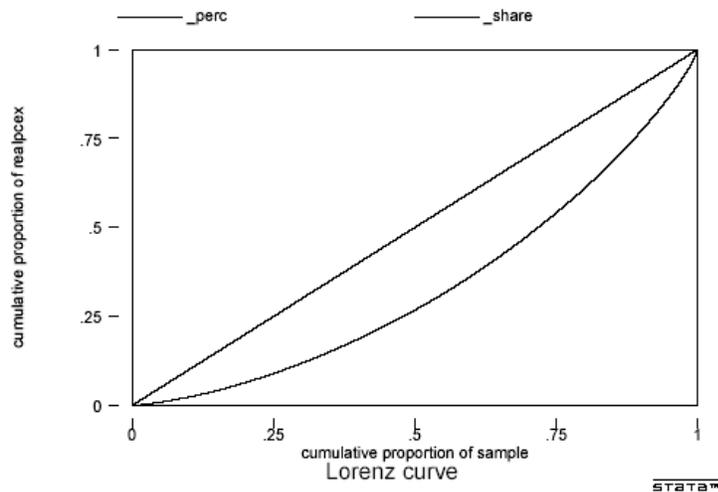
		Poverty composite indicator with absolute line = 1163		Poverty composite indicator based on 58.1% line = 1062		Poverty moneymetric indicator according to line = 1160 thds VND (58.1%)	
		%	Rank	%	Rank	%	Rank
Rural / Urban	Rural	77.1	2	66.5	2	66.4	2
	Urban	29.6	1	24.1	1	24.9	1
Large regions	North	57.7	1	45.5	1	69.4	3
	Central	73.5	2	62.5	2	63.4	2
	South	73.6	3	67.9	3	41.9	1
Seven geographical regions	Northern Mountains	63.8	4	51.3	3	78.6	7
	Red River Delta	53.3	2	41.3	1	62.8	4
	North Central	78.4	5	62.5	5	74.5	6
	South Central	63.4	3	57.1	4	49.6	3
	Central Highlands	91.3	7	82.1	6	70.0	5
	Southeast	49.5	1	41.4	2	32.7	1
	Mekong River Delta	87.3	6	82.8	7	47.1	2
Ethnic group	Kinh	65.5	1	55.6	1	55.1	1
	Minorities	79.6	2	71.1	2	74.7	2
Gender of household's head	Male	69.4	2	59.4	2	61.0	2
	Female	61.8	1	53.5	1	48.2	1
Type of household	Farm	42.6	1	34.6	2	30.8	1
	Non-farm	78.2	2	67.9	1	69.6	2
Relative income poverty status	Not relative poor	65.4	1	55.3	1	54.6	1
	Relative poor	95.4	2	90.9	2	100.0	2
Expenditure quintile	E Quintile 1	90.0	5	82.3	5	100.0	3
	E Quintile 2	79.7	4	69.0	4	100.0	3
	E Quintile 3	70.8	3	58.6	3	90.6	2
	E Quintile 4	62.2	2	52.1	2	0	1
	E Quintile 5	35.6	1	28.3	1	0	1
Quintile with composite indicator	C Quintile 1	100.0	3	100.0	3	76.4	5
	C Quintile 2	100.0	3	100.0	3	71.1	4
	C Quintile 3	100.0	3	88.4	2	63.7	3
	C Quintile 4	38.4	2	0	1	55.0	2
	C Quintile 5	0	1	0	1	23.8	1
TOTAL		67.7		58.0		58.1	

⁹ See Asselin (2002) for some properties of this type of poverty line.

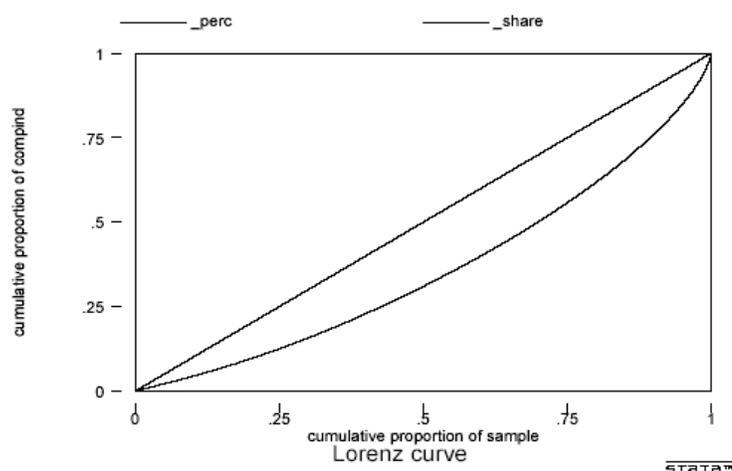
From Table 5, with the relative poverty line 1062, we observe that:

- a) in rural and urban areas, the poverty incidence is the same for asset poverty than for consumption poverty.
- b) for the seven regions, the poverty rate is quite different for asset and consumption poverty. In terms of consumption, Northern Mountains is the poorest region (78,6%), while Mekong River Delta is the poorest in terms of assets (82,8%). While we observe a large difference in consumption poverty between Red River Delta (62,8%) and Southeast (32,7%), both regions are the less poor in assets with the same rate of 41%.
- c) globally, the North is significantly less poor in assets than the South and the Central region, while the situation is reverse for the consumption poverty: the South is significantly less poor than the rest of the country.
- d) the gap between male and female headed households is lessened in assets poverty, in comparison with consumption poverty.
- e) the substantial poverty rates in quintiles 4 and 5 show clearly that the two concepts of poverty revealed respectively by the composite indicator (assets) and the moneymetric one (consumption) are not equivalent.
- f) similar conclusions are obtained from the absolute poverty line of 1163, which gives a national poverty rate of 67,7 %.

Graph 1a : Lorenz curve of expenditure per capita, 1993



Graph 1b Lorenz curve of composite poverty indicator, 1993



From the Lorenz curve given in Graphs 1a and 1b above, we can observe that at the country level, there is less inequality in assets than in consumption. In fact the Gini coefficient is 0,284 for the composite poverty indicator and 0,329 for the expenditure per capita. The inequality analysis is developed with Table 6, where the Gini coefficient is computed for different socioeconomic groups, as well for consumption as for assets.

Table 6: Gini coefficient for consumption and composite poverty indicator VLSS 1993

	Expenditure per capita	Composite poverty indicator
Vietnam	0.329	0.284
Urban	0.337	0.226
Rural	0.278	0.254
North	0.292	0.213
Central	0.306	0.268
South	0.341	0.356
Kinh	0.319	0.273
Minorities	0.364	0.332
Non-farm	0.337	0.263
Farm	0.267	0.251

From this table, the most striking fact is that inequality increases from North to South, but this inequality differential is much larger in assets than in consumption: the Gini coefficient for the composite indicator is 0,356 in the South, compared to 0,213 in the North. It can be noticed also that consumption inequality is stronger in urban area, while it is reverse for assets inequality, a few stronger in rural area. For both type of welfare, there is more inequality within the minorities than within the majority group, the Kinh. While there is a stronger consumption inequality in the non farm sector, such a differential does not exist in terms of assets.

Conclusion for 1993: The most remarkable fact resulting from the preceding analysis of a multidimensional poverty concept measured in terms of human and physical assets is that it gives a picture of welfare, poverty and inequality different from the unidimensional consumption

approach. It means that both concepts are complementary, even if there is an expected correlation between them.

3.2. A multidimensional poverty profile for 1998 and dynamic analysis

As for the profile of 1993, for the same eight indicators, we first produce a disaggregated profile based on the specific distribution of each indicator. The change from 1993 to 1998 is computed. A summary is given in Table 7 below. Then a composite indicator is computed at the household level, based on the weights computed for 1993 and given in Table 3.

3.2.1. The 1998 profile with eight CBMS indicator

Table 7: Multidimensional poverty in 1998 and variation 93-98 (%)

Indicator		1998	Variation 1993 - 1998
Underemployment	No underemployment	71.1	15.1
	Underemployment	28.9	-15.5
Chronic sickness	No chronic sick	79.4	-2.5
	With chronic sick	20.6	2.5
Adult illiteracy	Adults literate	60.8	2.3
	Adults illiterate	35.2	-2.3
Underschooling	Children going to school	91.6	6.7
	Children not going to school	8.4	-6.7
Without radio, TV	Without radio, TV	28.8	-24.2
	With radio, TV	71.2	24.2
Type of dwelling	Permanent house	15.7	-0.8
	Semi-permanent house	59.2	12.2
	Temporary house	25.0	-11.5
Drinking water	Piped, rain, drilled well	41.0	14.8
	Dug well	43.2	-9.5
	Pond, lake, river	11.4	-7.9
	Others	4.4	2.6
Sanitation (Types of toilet used)	Flush toilet	17.0	6.6
	Double vault compost latrine	9.8	1.4
	Simple toilet	39.7	5.9
	Other types	13.6	-7.2
	No toilet	19.8	-6.8
TOTAL	16,128,313 households	100.0	0

We observe that over the period 1993-1998, six of the eight poverty indicators have improved in percentage, the other two, chronic sickness and adult illiteracy, having not changed significantly. The most important changes are with the lack of communication facilities (-24,2%), underemployment (-15,1%), no simple toilet (-14%) and temporary house (-11,5%). Due to the population growth (+14,4% households), there are more households suffering from functional illiteracy (+7,2%) and especially from chronic sickness (+29,8%).

Analysing these changes more deeply, we observe that:

- the improvement in communication facilities has occurred more in Central Highlands (-35,8%) and less in Northern Mountains (-14,8%) as well as among the minorities (-12,6%);

- underemployment has decreased at a high rate in two of the three regions having the highest rates, North Central (-27,2%) and Red River Delta (-23,8%), the third one, Mekong River Delta, remaining high with a small decrease of only - 4,1%;
- sanitation has improved strongly in North Central, but less than the average in Mekong River Delta, where it was and remains the most deficient. Minorities have been particularly performant on this aspect;
- reduction of temporary housing has been particularly spectacular in Central Highland (- 30,8%), but very low in Mekong River Delta (- 6,2%), which remains by far the most deficient region on this regard;
- adult illiteracy have decreased significantly in Central Highlands (- 17%), where it had the highest rate in 1993, and which is at the same level in 1998 than Mekong River Delta, whose improvement has been only -3,7%;
- chronic sickness has decreased spectacularly in Southern Central region (- 15,2%), but more than doubled in Southeast region (+ 9,9%) and almost doubled in Red River Delta (+9,6%).

From this analysis, we see again that the dynamics of multidimensional poverty would be easier to observe with a composite poverty indicator.

3.2.2. The 1998 profile with a composite indicator and comparative analysis with the moneymetric approach

As stated above, a multidimensional composite poverty indicator has been computed for 1998 on the basis of the category weights established for 1993. Contrarily to a moneymetric indicator, no price adjustment is required with such a categorical based indicator. The same remark applies for poverty lines built on the basis of the composite indicator.

(a) Multidimensional welfare level comparisons and dynamics from 93 to 98

Table 8 below is similar to Table 4, with an additional component, the variation in percentage from 1993 to 1998. This variation is given for the two components of the composite indicator, the human and physical assets sub-indicators. Regarding the moneymetric analysis, 1998 real expenditure per capita has been deflated taking 1993 as the basis. The deflator takes the value 1,225, as given in the official 1999 report¹⁰.

¹⁰ See Government-Donor-NGO Working Group (1999), annex 2, p. 163.

Table 8: Welfare level comparisons in 1998 and variation 1993-1998

		Composite indicator human assets		Composite indicator physical assets		Composite indicator		Expenditure per capita	
		1998	% 93-98	1998	% 93-98	1998	% 93-98	1998	% 93-98
Rural / Urban	Rural	701	7.4	1452	27.8	1077	20.4	1878	62
	Urban	777	1.8	2689	17.4	1733	13.5	4213	84
Large regions	North	758	7.1	1956	27.1	1357	20.9	2150	79
	Central	721	6.7	1560	23.4	1140	17.6	2038	65
	South	670	6.1	1656	34.0	1163	24.5	3127	78
Seven geographical regions	Northern Mountains	734	7.2	1563	13.1	1148	11.2	1713	71
	Red River Delta	776	7.5	2251	37.7	1514	28.6	2479	87
	North Central	746	3.6	1607	43.2	1176	27.7	1928	88
	South Central	700	8.9	1583	4.3	1142	5.7	2292	52
	Central Highlands	671	14.9	1265	41.7	968	30.8	1684	54
	Southeast	739	1.6	2396	26.4	1568	19.5	4485	116
	Mekong River Delta	628	8.5	1202	37.4	915	25.8	2292	45
Ethnic group	Kinh	733	6.8	1824	29.8	1279	22.3	2150	78
	Minorities	635	5.8	1295	15.7	965	12.2	1766	61
Gender of household's head	Male	724	7.2	1709	27.6	1216	20.8	2268	74
	Female	706	4.8	1863	29.3	1284	21.6	2918	81
Type of household	Farm	743	-0.5	2210	13.6	1476	9.7	3448	70
	Non-farm	704	9.5	1463	31.2	1084	23.3	1812	64
TOTAL		719	6.6	1750	28.0	1234	21.0	2439	76

As can be seen from Table 8, the assets welfare has improved by 21% in the period 1993-98, this improvement being higher for physical than for human assets. During the same period, consumption welfare has increased by 76%. But this general improvement has not been equally distributed among the different socio-economic groups.

The rural area has experimented a higher improvement rate in assets than the urban area. As it was already starting with a lower assets welfare, the gap has not widened. But we observe a reverse situation for the consumption welfare: with a lower improvement rate in rural area, the gap which was of 1,124 thousand VND in 1993 has doubled to 2,335 thousands VND in 1998.

Geographically, in terms of assets, the North has kept its advance over the rest of the country, with approximately the same gap. Nevertheless, some important changes have occurred between the seven regions. The extreme ranks have not changed: Southeast region first, Red River Delta second, Central Highlands sixth and Mekong River Delta seventh. But the gap has been reduced between the first and the second. With a 28,6% increase, Red River Delta has almost caught up with Southeast, whose improvement was only 19,5%. North Central, with a performance over average, especially in physical assets, has climbed from rank 5 to rank 3, while South Central, with a performance largely below the average as well in human as in physical assets, has passed from rank 3 to rank 5.

Geographically, in terms of consumption, it is another story. The gap between the South and the rest of the country has doubled, due to an exceptional performance of Southeast (116%), which compensated the lowest increase experimented by Mekong River Delta (45%), which came down to rank 3, behind Red River Delta, which climbed from rank 4 to rank 2. Nevertheless, the consumption gap between Southeast and Red River Delta has tripled.

Socially, the Kinh have benefited more of the general welfare improvement, and the gap with the minorities has increased, as well in assets, mostly physical, as in consumption.

The gender gap has significantly increased only in terms of consumption in favor of female headed households, remaining very low and not really significant in terms of assets.

Farming households have performed much better than non-farming ones as well in human as in physical assets, so that the assets gap has been reduced. On the other hand, the consumption gap has almost doubled.

(b) Multidimensional poverty and inequality analysis in 1998, and variation from 1993 to 1998

Table 9: Poverty incidence comparisons in 1998 and variation 93-98 (%)

		Poverty composite indicator with absolute line = 1062 (base 1993)		Poverty money metric indicator according to line = 1790 thousands VND	
		1998	% 93-98	1998	% 93-98
Rural / Urban	Rural	46.0	-20.4	45.5	-20.8
	Urban	13.6	-10.4	9.2	-15.8
Large regions	North	26.0	-19.5	42.9	-26.5
	Central	39.4	-23.1	43.8	-19.6
	South	52.3	-15.6	26.0	-15.9
Seven geographical regions	Northern Mountains	42.1	-9.2	58.6	-20.0
	Red River Delta	11.3	-30.0	28.7	-34.1
	North Central	31.6	-30.9	48.1	-26.4
	South Central	44.0	-13.1	35.2	-14.4
	Central Highlands	54.8	-27.3	52.4	-17.6
	Southeast	23.8	-17.6	76.0	-25.1
Ethnic group	Mekong River Delta	69.2	-13.6	36.9	-10.2
	Kinh	34.0	-21.6	31.7	-23.4
Gender of household's head	Minorities	63.3	-7.8	66.9	-7.8
	Male	39.4	-20.0	39.9	-21.1
Type of household	Female	36.6	-16.9	28.2	-20.0
	Farm	28.0	-66.0	19.5	-11.4
TOTAL	Non-farm	45.3	-22.6	48.2	-21.4
		38.8	-19.3	37.4	-20.7

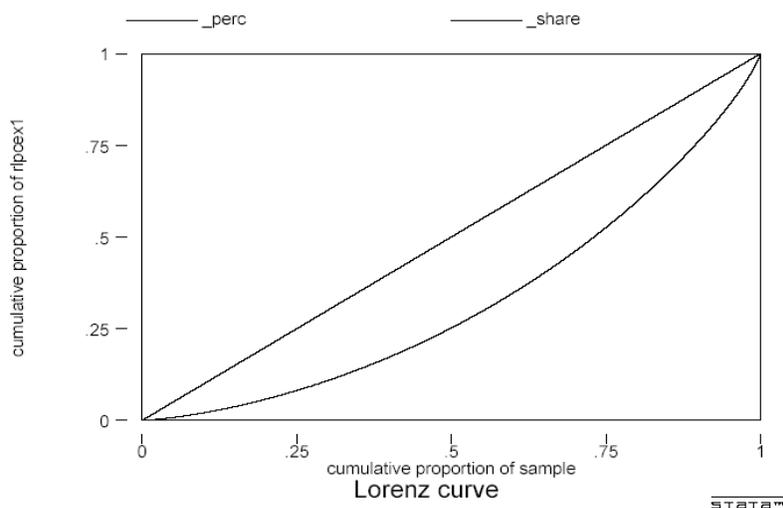
Table 9 has to be analysed in connection with Table 5 above. It shows that the assets poverty rate has decreased by approximately the same percentage points, 20%, as the consumption poverty rate, from 1993 to 1998.

Geographically, not only has the North kept its advance over the South in terms of assets poverty, but the poverty gap between both parts of the country has increased. The Central region, with the best performance, has distanced from the South to become midway between the North and the South. This stronger performance of the North is essentially due to Red River Delta, where the assets poverty rate reduction has almost doubled the one achieved in Southeast. The extreme ranks have not changed, but an important gap has appeared between Red River Delta, by far the first at 11,3%, and Southeast, still second, at 23,8%, while both regions were at the same level in 93. North Central, the best performing region, has passed from rank 5 to rank 3.

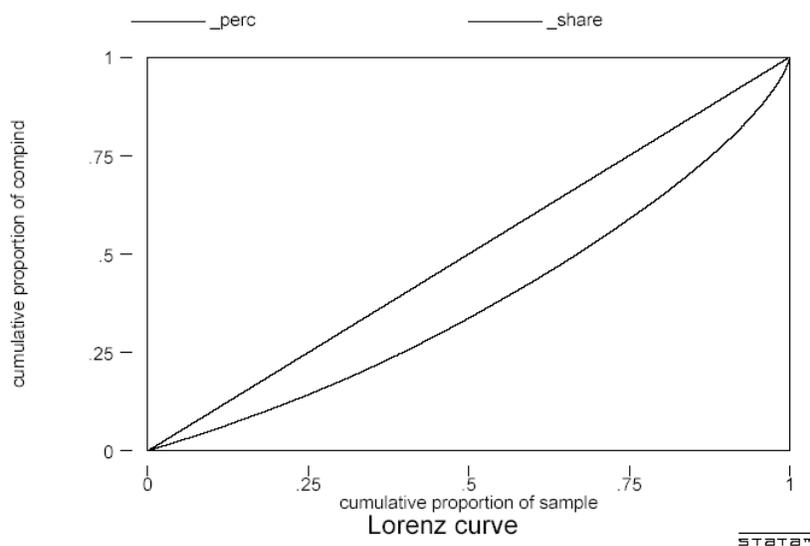
In terms of consumption poverty reduction, we observe a relatively similar pattern. The North has performed better than the South, and the poverty gap has been reduced from 28 to 16 percentage points. Again, Red River Delta has registered the highest performance, passing from rank 4 to rank 2, while the lowest one was in Mekong River Delta, which went from rank 2 to rank 4. The main difference is the very good performance of Southeast, which reduced its consumption poverty rate to a very low 7,6%.

Socially, the Kinh have achieved a poverty reduction rate three times higher than the minorities, as well in assets as in consumption. As already noticed above for the welfare level, the poverty gap between both groups has widened, from twenty percentage points to thirty and more. Male and female headed households have performed almost equally in both types of poverty reduction. Farming households have performed much better than non farming ones in both types of poverty reduction, and the gaps between both categories of household have been cut by 50%.

Graph 2a : Lorenz curve of expenditure per capita, 1998



Graph 2b : Lorenz curve of composite poverty indicator, 1998



From the Lorenz curve given in Graphs 2a and 2b above, and comparing with Graphs 1a and 1b we can observe that from 1993 to 1998, the inequality differential between consumption and assets has increased. Assets inequality has decreased while consumption inequality has increased. In fact, as can be seen from Table 10 below, the Gini coefficient for consumption has increased from 0,329 to 0,350, and for assets, it has decreased from 0,284 to 0,241. Thus, the remarkable improvement since 1993 in both types of

welfare, consumption and assets, has been accompanied by an opposite effect in inequality: more consumption inequality, but less assets inequality.

Table 10: Gini coefficient for consumption and composite poverty indicator VLSS 1993 and 1998

	Expenditure per capita		Composite poverty indicator	
	1993	1998	1993	1998
Vietnam	0.329	0.350	0.284	0.241
Urban	0.337	0.340	0.226	0.173
Rural	0.278	0.270	0.254	0.215
North	0.292	0.321	0.213	0.195
Central	0.306	0.315	0.268	0.210
South	0.341	0.367	0.356	0.299
Kinh	0.319	0.339	0.273	0.229
Minorities	0.364	0.359	0.332	0.268
Non-farm	0.337	0.361	0.263	0.239
Farm	0.267	0.259	0.251	0.207

The increase in consumption inequality did not occur in rural neither in urban area. It occurred as well in North, Center and South, but not within the minorities, neither for the farming households. The reduction of assets inequality has been general across the different socioeconomic groups. Assets inequality is particularly low in the urban area (0,173) and in the North (0,195).

Conclusion for 1998 : The multidimensional poverty analysis, with a composite indicator based on human and physical assets, confirms the extensively analysed trend, from a moneymetric consumption perspective, of a general remarkable improvement during the period 1993-1998. The global reduction of poverty is approximately of -20%, from both perspective. But the dynamics have been different, according to the two approaches to poverty. A striking fact is that inequality in consumption, already higher in 1993 than assets inequality, has still increased while inequality in assets has decreased. The regional differential in assets poverty has increased in favor of the North, already ahead of the South in 1993, but it has decreased in terms of consumption poverty again in favor of the North, which was far behind the South in 1993. The South nevertheless still leads in terms of the general consumption level and of the rate of consumption poverty.

4. CONCLUSION

Eight simple non-monetary, categorical indicators of human and physical assets developed in CBMS research in Vietnam, have been identified in the VLSS-1993 and 2 survey data sets. They have been analysed and aggregated in a composite indicator using the factorial technique, more precisely the Multiple Correspondance Analysis. Categorical weights have thus been computed for the eight indicators, twenty one categories (Table 3), on which rely the composite indicator, with 1993 as the base-year, and kept the same for 1998.

The comparison of this multidimensional approach to poverty measurement with the moneymetric one base on total household expenditures, we observe the following convergence:

- a) in the base-year 1993, with the 58% global moneymetric poverty rate as a benchmark, poverty rates are comparable for both methodologies across the rural/urban and ethnicity classifications (Table 5);
- b) the female-headed households are less poor than the male-headed ones (Table 5);
- c) the inequality is higher from North to South, as well in 1993 as in 1998 (Tables 6 and 10);

- d) in terms of poverty dynamics, the poverty rate has decreased by the same amount, minus 20% (Table 9), and this is the most striking convergence fact between both measurement methodologies;
- e) the remarkable success in poverty reduction has globally been greater in the North than in the South for both type of poverty (Table 9).

On the other hand, there are many divergence facts:

- a) the regional incidence of poverty is reverse according to the two types of indicators: from North to South, *monetary (consumption) poverty decreases while multidimensional asset poverty increases*, as well in 1993 as in 1998 (Tables 5 and 9). We get a different ranking of the seven regions and significantly different poverty differentials;
- b) as a general result of the performance of the North, the multidimensional asset poverty differential between the North and the South has increased, while the consumption poverty differential has decreased (Tables 5 and 9);
- c) the differential between male and female headed households is larger for consumption poverty in 1993 (Table 5) and still much larger in 1998 (Table 9) than for multidimensional poverty;
- d) while the consumption inequality has globally increased from 1993 to 1998, the multidimensional asset poverty has decreased, particularly in the Central and South regions, where it nevertheless remains higher than in the North part of the country (table 10).

When looked at attentively, taking into account the different concepts of poverty measured by both methodologies, these convergence and divergence facts seem confirmed by the real situation as observed in the field. It must be kept in mind that *the multidimensional composite indicator includes a strong component of human assets (education and health)*, partly built through community facilities, and here the divergence facts can find an explanation. On the other hand, the owning of many of the assets included in this composite indicator is related to income, essentially to permanent income, what the expenditure approach tries to catch, and this can help to explain the convergence facts. In fact, the correlation between both indicators, while highly significant, is not so high at approximately 0,49 in both years 1993 and 1998. From all this it appears that *the multidimensional poverty composite indicator reveals a face of poverty different than the one expressed through the expenditure indicator, not in an opposite but rather in a complementary way.*

This type of *measurement of multidimensional poverty has a great advantage*: being based on a set of categorical or qualitative simple indicators, it avoids the important difficulties of a price based moneymetric indicator, especially for poverty analysis across time and space. But it is not a panacea to the challenge of measuring poverty. There are some major caveats and sensitive issues, among which:

- a) The choice of the primary indicators is not obvious. We must be able to explicit which aspect of poverty each one is supposed to reveal. Also, they must be meaningful across the socio-economic groups we intend to analyse poverty, especially across the rural/urban areas and the different ecological regions. Housing characteristics, safe water, etc., are difficult to measure so that they are comparable across the whole country. But this is true of any analysis variable in a national household survey;
- b) Poverty line determination does not rely on any strong theoretical ground. It does not mean that it is completely arbitrary, but we have to be clear on the rational supporting the choice. The *relative approach* of a quantile exogenously determined, as we have done here in the base year 1993, is interesting to make comparable different methodological and conceptual approaches to poverty. The *absolute approach* of fixing a poverty line for each primary indicator is not to be excluded. With binary indicators, there is no arbitrariness. With non binary ones, the selected threshold can represent a consensual social choice in terms of a standard to achieve in terms of poverty eradication, for example in terms of sanitary facilities,

safe water, housing characteristics, etc. Whatever be the approach, this base poverty line must obviously be kept constant across time for the dynamic analysis of poverty changes;

- c) The base categorical weights are also to be kept constant, as for the computation of a CPI relative to a fixed basket of goods.

This short list is far from being exhaustive.

The research presented here could be pursued in trying to expand the list of basic indicators from the variables available in the sequence of VLSS surveys, including the third one completed in 2002. In particular, some light, non-monetary indicators of poverty dimensions not explicitly represented here, as nutrition, could be looked for. Also, for an annual monitoring of poverty, some more short-term sensitive indicators should be looked for.

To conclude, we think that the CBMS type indicators present a strong analytical potential for multidimensional poverty analysis, being complementary to the more standard moneymetric analysis. In addition, due to their easiness and their low cost, they should be looked at to meet the objective of regularly producing largely disaggregated poverty profiles for a more efficient monitoring of poverty reduction policies and programs. They could also suggest some very simple questions to be integrated in national censuses in view of mapping poverty at the lowest level with a national coverage. This does not preclude these indicators from being useful at the level where they have first been designed, the community level, for poverty targeting through local development interventions. The weights developed at a national level, as done here from a representative survey, can be easily used within small communities to rank the households according to their multidimensional poverty level, to enhance the efficiency of CBMS.

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