Poverty Impact Assessment of Programs and Projects

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Abstract

This paper presents a methodology for poverty impact assessment that is feasible at the local level under severe data constraints. The approach will be based on the experience built through CBMS systems and will be illustrated with a case study taken from a poverty reduction project in the Northern part of Vietnam.

The analyses show that CBMS work can play a key role in the methodology presented but with a condition: CBMS should share a core subset of simple primary poverty indicators, aggregated in a composite indicator that allows poverty comparisons across space and time.

Introduction

This paper aims to identify a methodology for poverty impact assessment that is feasible at the local level under severe data constraints. Local level here refers to the project level. The emphasis will thus be on operationalization instead of conceptually sophisticated modeling. In the development community, the need for poverty impact measurement is regularly expressed in assessing the effectiveness of development policies. All practitioners know that the main problem is not with the theory but with feasible methodology, data collection and processing costs as in sociologically acceptable practices.

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The approach will be based on the experience built through CBMS systems and will be illustrated with a case study taken from a poverty reduction project in the Northern part of Vietnam.

From a Result Base Management (RBM) perspective, the terminology poverty "impact" is particularly appropriate at the project level, identified here as the "micro" level. In the hierarchical structure of the Logical Framework, a poverty reduction policy or strategy (PRS) or the "macro level", is composed of different programs usually sectoral ("meso" level), themselves implemented as numerous projects ("micro" level). Poverty reduction is an expected output of the national PRS, an effect looked for by any constituent program, and the impact that should come from any development project implemented under the PRS.

The case study: ILMC project in Vietnam, Thanh Hoa province

The Canadian International Development Agency (CIDA)-supported Vietnam Rural Poverty Reduction Program focuses on poverty alleviation in two Vietnamese provinces: Thanh-Hoa and Soc-Trang.

The program in Thanh-Hoa includes three inter-related projects:

a) The Capacity Development and Enabling Environment Project, which will be implemented at provincial and district levels and involves strengthening the participatory development and management skills of officials and organizations;
b) The Small-Scale Infrastructure Development and Services Project, which is based on a counterpart fund that has been set up and will provide financial resources for the construction, upgrading and rehabilitation of small-scale infrastructure in 50 communes designated for assistance by the PPC; and
c) The Improved Livelihood for Mountainous Communities (ILMC) Project which will be implemented at district and commune levels in 2001-2005.

The third project will first operate in two districts and later be expanded to two other districts in Thanh-Hoa province with the objective of improving the quality life and incomes of households in poor communes. The project will be the subject of this paper's case study. It will be broken down into several activity components, including poverty monitoring.

The project's expected outcomes are:

- Increased income of selected households and a decline in the number of households classified as poor;
- Improved ability of the poor to satisfy their basic human needs through increased access to food and nutrition, education, primary health care, and water and sanitation facilities; and
- Greater decentralization and involvement of selected rural households and communities in identifying, planning and implementing appropriate development activities and projects, including small scale social and productive infrastructure works.

Two poor mountainous districts – Nhu-Xuan and Ba-Thuoc – which have high poverty rates but good potentials for development, have been selected for the implementation of the project in the first stage. Their locations are shown in Map 1 and the characteristics of Tran Hoa Province and the 2 districts are outline in Table 1.

Minimal data requirements

Poverty indicator

The basic data requirement is a poverty indicator. It will be assumed that this indicator is to be considered at the household level. The classical moneymetric poverty measure based on household total expenditure is not used here, though, because it is very difficult and costly measure, with the well-known difficulties regarding price issues and poverty-line setting and the heavy data processing involved. Such measure is not seen as locally feasible.

Map 1. Project area

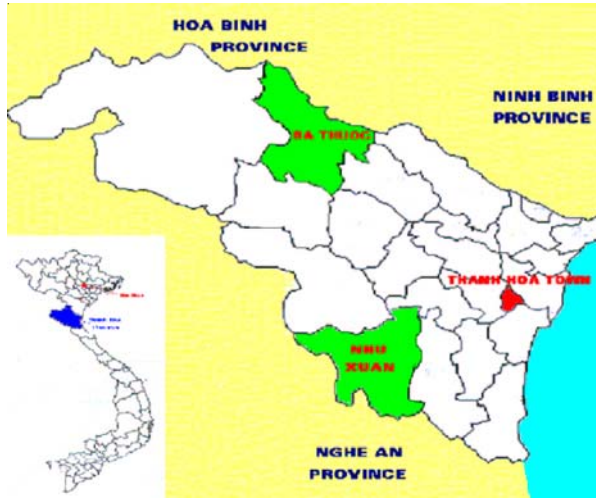

Table 1. Characteristics of case study sites

	Thanh Hoa Province	Nhu Xuan District	Ba Thuoc District
Area (km^2)	11168	731.4	747.4
Administrative units	24 districts, 3 towns, 625 communes	15 communes, 2 urban centers	22 communes, 1 urban center
Population (persons, Census 1/1/1999)	3,467,609	55,415	97,720
	Male: 48.87	Male: 50.16	Male: 49.22%
	Female: 51.13	Female: 49.84	Female: 50.78%
Population density (person/km^2)	385	77	
Population growth rate (%, average 1989-1999)	1.471	1.822	1.335
Number of households (1/4/1999)	772,203	10,735	19,312
Ethnicity		Thai 30%, Tho 30%, Kinh 28%, Muong 12%	Muong 47.5%, Thai, 37.5%, Kinh 15%
Poverty rate (MOLISA 1998)	18.1%	40.9	30.6%

An alternative being proposed here therefore is to consider a small set of light non-monetary indicators that cover the various usual dimensions of poverty seen from a basic needs perspective. This set includes: (1) income; (2) education; (3) health; (4) nutrition (food security); (5) water/sanitation; (6) employment/labor; (7) housing; (8) productive assets; (9) access to markets; and (10) peace/social inclusion and participation.

Which are the good poverty indicators that are locally measurable? This is the main subject of CBMS work. Experience indicates that even if they are frequently quite similar, an operational set of such indicators is country-specific, especially in the way they are formulated in a household questionnaire. Thus, in any country where a CBMS has been at least pilot tested, the CBMS indicators are being recommended to be the ones as the principal reference. For the purpose of poverty impact assessment, however, these CBMS indicators (at least some of them) should be consistent with similar indicators regularly measured in different national household surveys.

In this case study, poverty is measured with eight indicators originating from the Vietnam CBMS work, especially the one from a large scale pilot test conducted in 1999 with a very short one-page questionnaire.[1] These indicators are presented in Table 2.

Based on the list, the eight CBMS indicators can be considered as presenting a concept of human (#1 to #4) and physical (#5 to #8) aspects of household poverty.

It will be interesting to compare this set of indicators with the set recommended by a research work with a similar objective as this study – the Zeller et al. study (2001) from the Institute of Food Policy Research Institute (IFPRI). The IFPRI study's indicators are shown in Table 3.

[1] See Vu Tuan Anh (2000). In fact, more than eight indicators have been developed and tested by the CBMS-Vietnam Project. The reasons why these eight indicators were retained are given in the Section about the issue of the control group.

Table 2. The eight Vietnam CBMS indicators

#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, based on roof, walls and floor material.
#7	Drinking water	Type of main source for drinking water.
#8	Sanitation	Type of toilet used by the household.

A quick comparison of Tables 2 and 3 reveals that three of this study's four physical assets are also found in the IFPRI list of 26 indicators[2]. The IFPRI study, though, does not look at human assets the same way as this study.

With a set of poverty indicators, an additional requirement to operationalize the measurement of impact is to find a way of constructing a composite poverty indicator. The methodology used, following Asselin L. M. (2002), is a variant of factorial analysis, the Multiple Correspondence Analysis (MCA), the composite indicator being then provided by the first factorial component, once its poverty consistency has been checked. It will be noted that the IFPRI methodology uses another variant of factorial analysis, the Principal Component Analysis (PCA).

The composite poverty indicator will be referred to simply as the poverty indicator in the subsequent sections.

[2] In fact, in the four countries where these indicators were tested, the number of indicators retained varies from 15 to 20.

Table 3. IFPRI poverty indicators

Human resources	Dwelling	Food security vulnerabiltiy	Assets	Others
• Age and sex of adult household members • Level of education of adult household members • Occupation of adult household members • Number of children below 15 years of age in household • Annual clothing/ footwear expenditure for all household members	• Number of rooms • Type of roofing • Type flooring • Observed structural condition of dwelling • Type of electric connection • Type of cooking fuel used • Source of drinking water • Type of latrine	• Number of meals served in last two days • Serving frequency (weekly) of one inferior food • Hunger episodes in last one month • Hunger episodes in last 12 months • Frequency of purchase of staple goods • Size of stock of local staple in dwelling	• Area and value of land owned • Number of value of selected livestock resources • Value of transportation-related assets • Value of electric appliances	• Non-client's assess-ment of poverty outreach of MFI

The four-point basic design for social impact assessment

For which population groups should the poverty indicator be measured? The social impact literature has, for a long time, focused on a basic and very intuitive design, involving minimum four measurements.[3]

[3] Among others, Bamberger M.

Point 1: the project's beneficiaries, at time 1, before the project intervention

This is obvious and is usually provided by the baseline study, which any development project completes before finalizing its operational plan. What varies from one project to another is the way the population of beneficiaries is defined. A frequent situation is that the targeted population is geographically defined because most of the interventions will be implemented at the community level, all households being potential users of the project services.[4] This is the case for the ILMC project where the first targeted beneficiaries are the mountainous and middle-uplands communes of the two districts of the Than Hoa province: Ba Thuoc and Nhu Xuan. This geographical area will be referred to as the "project (intervention) zone". The baseline study is expected to include a household survey representative of the project zone.

Point 2: the project's beneficiaries, at time 2, after the project intervention

A household survey, the final evaluation survey, is then realized once the project is completed, measuring the same poverty indicator.

Points 1 and 2 constitute the most minimal requirement called simply the "before/after" design. It is clearly insufficient because it does not really allow the isolation of the effect of specific impact on poverty attributable to the project, the specific impact. This is the well-known causality problem.

Point 3: the control group, at time 1, before the project intervention

To have some possibility to isolate the impact specific to the project, evaluation specialists in social sciences look for a population group as similar as possible to the group of beneficiaries and try to obtain

[4] A different situation is met in projects like micro-finance projects, the case of the IFPRI study referred to in this paper. A beneficiary is a household (or individual) receiving a loan under the project provisions. The beneficiary is then named a "client" of the project.

from this group the same information of the beneficiaries in terms of the poverty indicator.

According to how the group of beneficiaries above has been defined, as a project zone, then the control group will be defined as a "control zone" where the project is not implemented. A household survey should then, in principle, be conducted in the control zone at the same time of the baseline survey (point 1).

Point 4: the control group, at time 2, after the project intervention

Again, in principle, the final evaluation household survey should include a sample of households taken in the control zone.

This simple design belongs to the category of the quasi-experimental designs used in social sciences, inspired by the rigorously experimental designs practiced in physical sciences. The measurement points 1 and 3, before the project intervention, correspond to the measuring of the poverty outreach of the project.

This evaluation design is usually impracticable, however, due to well-known ethical issues. On which grounds is a project team justified to survey a population that is deliberately excluded from the project intervention? In any population, especially a poor population, such surveys generate legitimate expectations that something will come out of their participation.

Thus, ways have to be explored to overcome this major social problem. This is precisely the subject of this paper.

The issue of the control group (zone)

A three-step approach exploiting national household surveys

What has been done in the case study wherein it was proposed to solve the problems (ethical, cost) related to the control zone is a three-step analysis of existing national household surveys, especially those which are planned to be repetitive over time[5]:

[5] Census should not be excluded from this analysis, especially in countries where a quinquennal light census is held, often on a sampling basis.

- step 1: to look carefully at the questionnaires used in these surveys to check if some, even all, of the primary poverty indicators can be constructed from the databases provided by these official surveys;
- step 2: if step 1 is positive, to take into account the national sample size of the household survey closest in time to the implementation of the project, and to design a geographical area (domain of study) reflecting the basic characteristics of the project zone and sufficiently sampled to provide significant estimates of the primary poverty indicators. If again this is possible, then this geographical area will be designated as the control zone for the project impact assessment;
- step 3: using factorial methods, to compute from the national household surveys the categorical weights for the set of poverty indicators, weights allowing for any multidimensional poverty comparisons, especially for comparisons between the project zone and the control zone.

This approach will result in a control zone that will correspond to a specific region of the country, region defined by using the different geographical (administrative) codes integrated in the database. With the general development of surveys in most developing countries, it is not rare to see nowadays that survey estimators are significant at a quite disaggregated regional level.

To define a control zone smaller than the whole country is important not only because we want to control some factors influencing the primary poverty indicators but also because the intrinsic meaning of some of these indicators, for the population can be dependent on the climatic and ecological characteristics of the environment as well as to cultural factors. Indicators like health, housing, safe water, and sanitation can be especially mentioned.

Application to the case study

Step 1

The eight CBMS indicators used for the ILMC project can in fact be found in the series of the three Vietnam National Living Standards Survey (VNLSS) available: VNLSS-1 (1993), VNLSS-2 (1998) and VNLSS-3 (2002). Thus, it has been decided to use these databases for impact assessment of the ILMC project.

Step 2

VNLSS-3 not being available when processing the ILMC baseline was made, then the VNLSS-2 was the latest survey used for point 3 observation, to at least have something on the poverty outreach. The design of the control zone considered 11 provinces in the northern part of Vietnam, with an important part being mountainous and presenting a high percentage of minority groups, two important poverty determinants also characteristic of the project zone. From the total sample of 6002 households, 728 have been found in the control zone, which is sufficient for significant results. With VNLSS-3 and a much larger sample, 3718 households have been found in the control zone, and this sub-sample is the one used for point 4 estimates.

The control zone is presented in Map 2. For the province of Thanh Hoa, it is understood that the two project districts, Ba Thuoc and Nhu Xuan, are excluded.

Two issues: timing and residual differentials between project and control zones.

Timing

Some a synchronism between the sequence of national surveys and the project cycle should be expected. Year 1 of project implementation will not necessarily coincide with an appropriate national survey. Obviously, then, for points 1 (project zone and baseline) and 3 (control zone) poverty measurements, a compromise is needed and a "period 1", including more than one year, will be defined. This is the smallest

Map 2. The control zone for the ILMC project

time interval including the baseline year and the year of the nearest relevant national household survey. In the case study, VNLSS-2 (1998) was the most recent survey available at the time the baseline survey was completed in 2001. Period 1 is thus defined as 1998-2001.

In the same way, period 2 will be a time interval including Year 2, the year of the final evaluation survey, and the year of the national household survey realized after (Year 2 – Year 1) years. The important element here is that the time span between the national surveys (points 3 and 4) is as equal as possible to the time span between the baseline and the final evaluation surveys. In the case study, if the final evaluation survey was completed in 2005, the VNLSS-3 (2002) would be the one used for point 4, coming approximately four years after VNLSS-2. Thus, period 2 is defined as 2002-2005[6].

[6] In the case study, the definition of Period 1 and Period2 could be modified, depending on the national databases available at the time of completing the poverty impact report. VNS\LSS-2 could become the national survey used for point 3, which would imply that period 1 is to be defined as 2001-2002.

Residual differentials between project and control zones

Since this study is working with a quasi-experimental design, differences subsist between the project and control zones. This is bothersome for characteristics that can be seen as important poverty determinants. Two such determinants are regularly met in developing countries: remoteness of the community (road accessibility) and ethnicity (minorities). In urban areas, instead of remoteness, cadastral status of the city block (shanty area) is more relevant. These poverty determinants could be found without much difficulty in many national household surveys and should then be included in the household database built for poverty impact assessment.

In the case study, ethnicity is a standard variable measured in Vietnam household surveys. The main relevant classification is between the Kinh group and the Minorities (all other ethnic groups). In 2001-2002, the Minorities represented 12.5 percent of the Vietnamese population but this percentage is 35.4 percent in the control zone and 81.3 percent in the project zone. Regarding remoteness or accessibility (and at the same time, economic potential), the classification used in the ILMC project, as in most Vietnamese poverty studies, is according to the topographic characteristics of the area: high mountainous land, middle upland, and plain land. This variable is not present in the VNLSS databases. It could nevertheless be introduced without too much difficulties by going through the list of districts for the control zone and then classifying each of these districts in one of the three categories above. In case of the very large sample of VNLSS-3, it means to classify 133 districts in the control zone, which is certainly feasible. For VNLSS-2, it would mean much less work due to a much smaller sample size.

In addition to these two poverty determinants, some household head characteristics found in any standard survey could be controlled for, like gender, age group, and main occupation (basically farmer/non-farmer).

The statistical model for the 4-point design analysis

Basically, the 4-point design can be formulated as a classical linear model, the two-factor variance analysis model:

$$Y_{ijk} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij} + \varepsilon_{ijk} \quad (1)$$

Where

- the first factor α is the zone: i = 1 for the project zone, i =2 for the control zone,
- the second factor β is the period (j = 1 or 2),
- $(\alpha\beta)$ is the interaction between the two factors,
- ε_{ijk} is the error term supposed N(0, s2),
- Y_{ijk} is the observed value of the composite poverty indicator for household (ijk).

We usually write $\mu_{ij} = \mu + \alpha_i + \beta_j + (\alpha\beta)_{ij}$ (2).

The hypothesis to be tested for a positive impact of the project on poverty reduction is:

(H) : $\mu_{12} - \mu_{11} > \mu_{22} - \mu_{21}$, equivalent to
$(\alpha\beta)12 - (\alpha\beta)11 > (\alpha\beta)22 - (\alpha\beta)21$.

When testing such a linear hypothesis, the survey design effect – which is different in the four surveys involved – should be taken into account for variance estimation, which is possible with some well-known softwares.

In the Section on the control groups, the analysis can be improved by controlling two other poverty determinants like ethnicity (2 levels in the case study: Kinh and Minorities) and area remoteness (2 levels also: high mountainous and either uplands or plain). Model (1) will then be developed as a four-factor variance analysis model:

$$Y_{ijkls} = \mu + \alpha_i + \beta_j + \delta_k + \phi_l + (\alpha\beta)_{ij} + \varepsilon_{jkls} \quad (3)$$

In model (3), only the main effects of the two new poverty determinants are explicitly stated. Obviously however, all interactions terms could be introduced. (H) remains the hypothesis to be tested, but now with increased power.

Model (3) could again be developed by introducing covariates like some household head characteristics, as earlier mentioned. It is preferable to stand by Model 3, though, for simplicity of analysis since feasibility at the micro level (project) has been specified as a requirement.

For the same reason of extended feasibility, a similar model formulation based on the poverty status as dependent variable instead of the value of the poverty indicator is hereby discarded. This would bring in the complexities of probit-logit models, presumably less familiar to project staff than a standard variance analysis model.

Some available results for the case study

As explained before, there are now available three of the four points required by the basic quasi-experimental design for poverty impact measurement. It is to be understood that in all these tables, estimates on the line "Project Zone ILMC" originate from CBMS indicators collected by the project while the two other lines "Control Zone" and "Vietnam" are taken from the national VNLSS surveys. The main estimates for testing hypothesis (H) above are given in Table 4a[7]. The total for Vietnam is not required but is given here for an interesting comparison. The multidimensional poverty rate, not necessarily required in the simple linear model recommended above, is nevertheless meaningful and given in Table 4b.

From Tables 4a and 4b, it is observed that in period 1, the project zone is poorer than the control zone, and that this one has performed

[7] The weighting used for the composite indicator are those computed from the VNLSS-1 in a more global dynamic analysis of poverty in Viet Nam covering the period 1993-2002. See Asselin L.-M. and Vu Tuan Anh (2000). The multidimensional poverty line is also the same computed in this paper. This explains the numerical differences with Asselin M. (2005), where weights were computed form VNLSS-2.

less than the whole Vietnam in reducing poverty from period 1 to period 2. What will come out for the performance of the project zone? The final evaluation survey will give the answer to this.

From Tables 5a and 5b, it can be inferred that minorities are systematically worse off and that it is important to introduce this factor as a poverty determinant in the simple analysis model presented above.

The last two tables, Tables 6a and 6b, for the type of area, could eventually be completed by identifying the mountainous districts, if not for the whole country, at least for the control zone.

Table 4a. Composite poverty indicator

	Period 1	Period 2
Project Zone ILMC	1068	Forthcoming
Control Zone	1142	1255
Viet Nam	1234	1379

Table 4b. Multidimensional poverty rate

	Period 1	Period 2
Project Zone ILMC	49.3%	Forthcoming
Control Zone	38.2%	32.0%
Viet Nam	38.8%	28.8%

Table 5a. Composite poverty indicator by ethnic group

	Period 1		Period 2	
	Kinh	Minorities	Kinh	Minorities
Project Zone ILMC	1114	1056	Forthcoming	Forthcoming
Control Zone	1238	905	1377	992
Vietnam	1279	965	1430	926

Table 5b. Multidimensional poverty rate by ethnic group

	Period 1		Period 2	
	Kinh	**Minorities**	**Kinh**	**Minorities**
Project Zone ILMC	40.6%	51.3%	Forthcoming	Forthcoming
Control Zone	24.8%	66.6%	18.0%	57.7%
Vietnam	34.0%	63.3%	23.7%	64.0%

Table 6a. Composite poverty indicator by type of area

	Mountainous	**Middle Uplands**	**Mountainous**	**Middle Uplands**
Project Zone ILMC	1047	1078	Forthcoming	Forthcoming
Control Zone	n.a.	n.a.	n.a.	n.a.
Vietnam	n.a.	n.a.	n.a.	n.a.

Table 6b. Multidimensional poverty rate by type of area

	Mountainous	**Middle Uplands**	**Mountainous**	**Middle Uplands**
Project Zone ILMC	52.7 %	47.4 %	Forthcoming	Forthcoming
Control Zone	n.a.	n.a.	n.a.	n.a.
Vietnam	n.a.	n.a.	n.a.	n.a.

Conclusion

Relevant and reliable poverty impact assessment seems feasible at the micro level, i.e., at the project level, with an approach overcoming both the ethical and cost issues associated with the necessary control group. It appears that the CBMS work can play a key role in the methodology presented here with a condition: that CBMS be developed in a consistent way with national-level information systems

in the sense that these complementary systems share a core subset of simple primary poverty indicators, aggregated in a composite indicator that allows poverty comparisons across space and time.