Community-Based Monitoring System (CBMS) Network

Poverty Impact Assessment of Programs and Projects

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1. Introduction

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

Our approach will rely 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.

Let's also notice that, from a RBM (Result Base Management) perspective, the terminology poverty "impact" is particularly appropriate at the project level, identified here as the "micro" level, since, in the hierarchical structure of the Logical Framework, a poverty reduction policy or strategy (PRS) ("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.

2. The case study: ILMC project in Vietnam, ThanH Hoa province

CIDA's Vietnam Rural Poverty Reduction Program supports poverty alleviation in two Vietnamese provinces: Thanh-Ho and Soc-Trang. The program in Thanh-Ho 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 organisations.

b) The Small Scale Infrastructure Development and Services Project 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 fifty communes designated for assistance by the PPC.

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 operate firstly in two districts and should be later expanded to two other districts of Thanh-Ho province with aims to improve the quality of life and incomes of households in poor communes. The expected outcomes of the project are:

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1 Canadian International Development Agency.
• 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;
• Greater decentralisation 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 implementation of the project in the first stage.

The project will be broken down into several discrete activity components including poverty monitoring.

Map 1 Project Area
### Minimal data requirements

#### 3.1 Poverty indicator

The basic data requirement is for a poverty indicator. We will assume that this indicator is looked for at household level. Beyond theoretical views and preferences on the concept of poverty, we don't use here the classical money metric poverty measure based on household total expenditure. It's a very difficult and costly measure, with the well-known difficulties relative to prices issues and poverty line setting for reliable poverty comparisons across space and time, and the heavy data processing involved. Such an indicator is not seen as locally feasible, inasmuch as we are demanding on data quality.

An alternative, the one proposed here, is to consider a small set of light non monetary indicators, covering the most usual dimensions of poverty, seen from a basic needs perspective:

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
10. Peace/Social Inclusion, participation
Which are the good poverty indicators, locally measurable? This is the main subject of CBMS work. What tells the experience is 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, we would recommend that the CBMS indicators be considered as the principal reference. But here a reservation must be mentioned: for the purpose of poverty impact assessment, these CBMS indicators, at least some of them, should be consistent with similar indicators regularly measured in different national household surveys.

In our case study, poverty is measured with eight indicators originating from the Vietnam CBMS work, especially from a large scale pilot-test runned in 1999, with a very short one-page questionnaire\(^2\). These indicators are presented in Table 1 below.

### Table 1 The eight Vietnam-CBMS indicators

<table>
<thead>
<tr>
<th>Indicator no.</th>
<th>Title</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Underemployment</td>
<td>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.</td>
</tr>
<tr>
<td>#2</td>
<td>Chronic sickness</td>
<td>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.</td>
</tr>
<tr>
<td>#3</td>
<td>Adult illiteracy</td>
<td>Is illiterate a person 15 year+ who cannot read, write and do simple calculations. At household level, at least one adult member is illiterate.</td>
</tr>
<tr>
<td>#4</td>
<td>Underschooling</td>
<td>A child 6-15 not attending school. At household level, at least one child is not going to school.</td>
</tr>
<tr>
<td>#5</td>
<td>Without radio, tv.</td>
<td>There is no radio nor tv set owned by the household.</td>
</tr>
<tr>
<td>#6</td>
<td>Type of dwelling</td>
<td>Category of house, based on roof, walls and floor material.</td>
</tr>
<tr>
<td>#7</td>
<td>Drinking water</td>
<td>Type of main source for drinking water.</td>
</tr>
<tr>
<td>#8</td>
<td>Sanitation</td>
<td>Type of toilet used by the household.</td>
</tr>
</tbody>
</table>

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

It can be interesting to compare this set of indicators with the set recommended by a research work with similar aim than ours, Zeller and al. (2001), from IFPRI. They are given in Table 2 below.

\(^2\) See Vu Tuan Anh (2000). In fact, more than eight indicators have been developed and tested by Vietnam-CBMS. We will see in section 4 why we retain these eight indicators.
A quick comparison of Tables 1 and 2 reveals that three of our four physical assets are also found in IFPRI list of 26 indicators\(^3\), but this one does not look at human assets the same way than us.

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 we use, following Asselin L.-M. (2002), is a variant of factorial analysis, the Multiple Correspondance Analysis (MCA), the composite indicator being then provided by the first factorial component, once its poverty consistency has been checked. We can notice that the IFPRI methodology uses rather another variant of factorial analysis, the Principal Component Analysis (PCA).

In what follows, this composite poverty indicator is referred to simply as the poverty indicator.

### 3.2 The four-point basic design for social impact assessment

For which population groups should the poverty indicator be measured? The social impact literature has since a long time focussed on a basic and very intuitive design, involving minimally four measurements\(^4\).

a) 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 realizes before finalising 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...

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\(^3\) In fact, in the four countries where these indicators were tested, the number of indicators retained varies from 15 to 20.

\(^4\) Among others, Bamberger M. (???).
implemented at the community level, all households being potential users of the project services. This is the case for the ILMC project, where the first targeted beneficiaries are the mountainous and middle-uplands communes of two districts, Ba Thuoc and Nhu Xuan, of the Than Hoa province. This geographical area will be referred to as the "project (intervention) zone".

It is then expected that the baseline study will include a household survey representative of the project zone.

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

c) 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 from this group the same information than for the beneficiaries, in priority the poverty indicator.

According to how we have defined the group of beneficiaries above, 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 runned in the control zone at the same time than the baseline survey (point 1).

d) point 4: the control group, at time 2, after the project intervention.

Again, in principle, the final evaluation household survey should have a sub-sample 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, corresponds in fact to measuring the poverty outreach of the project.

But this evaluation design is usually impracticable, due to well-known ethical issues. On which grounds a project team is it justified to survey a population which 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 and this is precisely the subject of this note.

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5 A different situation is met in projects like micro-finance projects, the case of the IFPRI study we refer 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.
4. The issue of the control group (zone)

4.1 A three step approach exploiting national household surveys

What has been done in the case study and that we propose 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 across time:

- 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. Taking into account the national sample size of the household survey closest in time to the implementation of the project, 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 which in fact 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 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 dependant on the climatic and ecological characteristics of the environment, as well as to cultural factors. Let's think especially to indicators like health, housing, safe water, sanitation.

APPLICATION TO THE CASE STUDY

Step 1: The eight CBMS indicators used for ILMC project can in fact be found in the series of the three VNLS available until now: VNLS-1 (1993), VNLS-2 (1998) and VNLS-3 (2002). Thus, it has been decided to try to use these databases for impact assessment of ILMC.

Step 2: VLSS-3 not being available when processing the ILMC baseline, VLSS-2 was the most recent survey available and was 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

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6 Census should not be excluded from this analysis, especially in countries where a quinquennal light census is held, often on a sampling basis.
minority groups, two important poverty determinants also characteristics 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 VLSS-3 and his 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 the Map 2 below. For the province of Thanh Hoa, it is understood that the two project districts, Ba Thuoc and Nhu Xuan are excluded.

Map 2 The control zone for the ILMC project
4.2 Two issues: timing and residual differentials between project and control zones.

TIMING

We must expect to find some asynchronism between the sequence of national surveys and the project cycle. Year 1 of project implementation will not necessarily coincide with an appropriate national survey. Then, obviously for the points 1 (project zone, baseline) and 3 (control zone) poverty measurements, a compromise is needed and we will define a "period 1" including more than one year: the smallest time interval including the baseline year and the year of the nearest relevant national household survey. In our case study, VNLSS-2 (1998) was the most recent available at the time the baseline survey was completed in 2001. Period 1 is thus presently defined as 1998-2001.

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

RESIDUAL DIFFERENTIALS BETWEEN PROJECT AND CONTROL ZONES

Since we are working here with a quasi-experimental design, differences subsist between the project and control zones, and this is worrying for characteristics which 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 too much difficulties in many national household surveys and should then be included in the household database built for poverty impact assessment.

In our case study, ethnicity is a standard variable measured in Vietnam household surveys, and the main relevant classification is between the Kinh group and the Minorities (all other ethnic group). In 2001-2002, the Minorities represent 12.5 % of the Vietnamese population, but this percentage is 35.4% in the control zone and 81.3 % 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, plain land. This variable is not present in the VNLSS databases. But it could 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

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7 In the case study, the definition of Period 1 and Period 2 could be modified depending of the national databases available at the time of completing the poverty impact report. VNLSS-2 could become the national survey used for point 3, which would imply to define Period 1 as 2001-2002.
three categories above. In case of the very large sample of VNLSS3, it means to classify 133 districts in the control zone, which is certainly feasible. For VNLSS2, 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, main occupation (basically farmer/non-farmer).

5. 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:

\[ y_{ijk} = m + a_i + b_j + (ab)_{ij} + e_{ijk} \] (1)

Where
- the first factor \( a \) is the zone: \( i = 1 \) for the project zone, \( i = 2 \) for the control zone,
- the second factor \( b \) is the period (\( j = 1 \) or \( j = 2 \)),
- \((ab)\) is the interaction between the two factors,
- \( e_{ijk} \) is the error term supposed \( N(0, s^2) \),
- \( y_{ijk} \) is the observed value of the composite poverty indicator for household (ijk).

We usually write \( m_i = m + a_i + b_i + (ab)_{ij} \) (2).

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

\[ (H) : m_2 - m_1 > m_2 - m_1, \text{ equivalent to } (ab)_{12} - (ab)_{11} > (ab)_{22} - (ab)_{21}. \]

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

As we said in section 4, 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:

\[ y_{ijkl} = m + a_i + b_j + g_k + d_l + (ab)_{ij} + e_{ijkl} \] (3)

In model (3), only main effects of the two new poverty determinants are explicitly stated, but obviously 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 mentioned precedentely. But we preferably stand with model (3), for simplicity of analysis as we are looking for here, since feasibility at the micro level (project) has been specified as a requirement.
For the same reason of extended feasibility, we discard here a similar model formulation based on the poverty status as dependent variable instead of the value of the poverty indicator, which would take us in the complexities of probit-logit models, presumably less familiar to project staff than a standard variance analysis model.

6. Some available results for the case study

As explained before, we can have available now three of the four point required by the basic quasi-experimental design for poverty impact measurement. The main estimates for testing hypothesis (H) above are given in Table 1a. 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 1b.

Table 1a Composite poverty indicator

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th>Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Zone ILMC</td>
<td>1068</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>1142</td>
<td>1255</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1234</td>
<td>1379</td>
</tr>
</tbody>
</table>

Table 1b Multidimensional poverty rate

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th>Period 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Zone ILMC</td>
<td>49,3 %</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>38,2 %</td>
<td>32,0 %</td>
</tr>
<tr>
<td>Vietnam</td>
<td>38,8 %</td>
<td>28,8 %</td>
</tr>
</tbody>
</table>

From Tables 1a and 1b, we observed that in period 1 the project zone is poorer than the control zone, and that this one has performed 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? Let's wait for the final evaluation survey.

The weighting used for the composite indicator are those computed from the survey VNLSS-1 in a more global dynamic analysis of poverty in Vietnam covering the period 1993-2002. See Asselin L.-M. and Vu Tuan Anh (2005). The multidimensional poverty line is also the same computed in this paper. This explains numerical differences with Asselin M. (2005), where weights were computed from VNLSS-2.
From Tables 2a and 2b, we can infer 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.

Table 2a Composite poverty indicator by ethnic group

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th></th>
<th>Period 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kinh</td>
<td>Minorities</td>
<td>Kinh</td>
<td>Minorities</td>
</tr>
<tr>
<td>Project Zone ILMC</td>
<td>1114</td>
<td>1056</td>
<td>Forthcoming</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>1238</td>
<td>905</td>
<td>1377</td>
<td>992</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1279</td>
<td>965</td>
<td>1430</td>
<td>926</td>
</tr>
</tbody>
</table>

Table 2b Multidimensional poverty rate by ethnic group

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th></th>
<th>Period 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kinh</td>
<td>Minorities</td>
<td>Kinh</td>
<td>Minorities</td>
</tr>
<tr>
<td>Project Zone ILMC</td>
<td>40,6 %</td>
<td>51,3 %</td>
<td>Forthcoming</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>24,8 %</td>
<td>66,6 %</td>
<td>18,0 %</td>
<td>57,7 %</td>
</tr>
<tr>
<td>Vietnam</td>
<td>34,0 %</td>
<td>63,3 %</td>
<td>23,7 %</td>
<td>64,0 %</td>
</tr>
</tbody>
</table>

The two last tables, for the type of area, could eventually be completed, as said before, by identifying the mountainous districts, if not for the whole country, at least for the control zone.

Table 3a Composite poverty indicator by type of area

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th></th>
<th>Period 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mountainous</td>
<td>Middle Uplands</td>
<td>Mountainous</td>
<td>Middle Uplands</td>
</tr>
<tr>
<td>Project Zone ILMC</td>
<td>1047</td>
<td>1078</td>
<td>Forthcoming</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Vietnam</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Table 3b Multidimensional poverty rate by type of area

<table>
<thead>
<tr>
<th></th>
<th>Period 1</th>
<th></th>
<th>Period 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mountainous</td>
<td>Middle Uplands</td>
<td>Mountainous</td>
<td>Middle Uplands</td>
</tr>
<tr>
<td>Project Zone ILMC</td>
<td>52,7 %</td>
<td>47,4 %</td>
<td>Forthcoming</td>
<td>Forthcoming</td>
</tr>
<tr>
<td>Control Zone</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Vietnam</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>
7. Conclusion

Relevant and reliable poverty impact assessment seems feasible at the micro level, i.e. at the project level, with an approach overcoming as well the ethical as the cost issues associated to the necessary control group. It appears that the CBMS work can play a key role in the methodology presented here, but there is a condition: CBMS must 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 allowing poverty comparisons across space and time.
References


