A PRACTICAL METHODOLOGY FOR IDENTIFYING POOR AND NON-POOR TRAVELLERS IN ROADSIDE SURVEYS IN DEVELOPING COUNTRIES

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Abstract

In order to assess the effects of rural transport infrastructure investments and policies on poverty and its alleviation, it is necessary to distinguish between poor and non-poor users of the infrastructure. It is impractical to obtain such information from detailed roadside interviews. This paper reports on a rapid appraisal methodology (developed as a part of a study to estimate the travel time saving values in rural Bangladesh) for estimating the expenditure levels of households of road users indirectly from more readily available information on a selection of socio-economic characteristics. Focus groups identified possible socio-economic indicators of standards of living, followed by a sample survey of households and econometric analysis to estimate the relationship between a small selection of socio-economic indicators and household expenditure. In the linear equation derived as the predictor of household per capita expenditure, the independent variables are: (a) land cultivated per head of household; (b) number of household members involved in income earning activities; (c) a household member in "permanent" off-farm employment; (d) a household member engaged in a "permanent" business, and (e) ownership of a motorised vehicle by household. The threshold for distinguishing between poor and non-poor road users in local currency was estimated from the international poverty line equivalent to the 1985 purchasing power parity (PPP) US$1 per person per day.

Keywords: Transport planning; Social groups of travellers; Roadside surveys; Socioeconomic indicators
Topic area: G2 Rural, National and International Transport

1. Introduction

Rural poverty alleviation is an important development objective and therefore assessing the effectiveness of rural infrastructure investments and policies in reducing poverty is important. Such assessment requires information on travel and transport modes of rural travellers and how they are related to their socio-economic characteristics, and especially their income or expenditure levels as indicators of household living standards.

Since interviews at the roadside or in-vehicle have to be completed quickly, it is impractical to collect reliable information on income and expenditure levels from travellers at such interviews. The traveller may be a young member of the household who does not have this information. Even for the rural household head and other adult members, income and expenditure are difficult to quantify in monetary terms because they typically consist of a combination of cash and kind.

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Even if the roadside interviewee can provide information on the household income or expenditure, there will often be reluctance to give such private information to a stranger in a roadside or in-vehicle interview.

The problem outlined above was faced by the authors on a UK Department for International Development (DFID) funded study on the valuation of travel time savings for rural travellers in Bangladesh (I.T. Transport, 2002). The study addressed the issue of whether the values of time savings were different for travellers from poor and non-poor households. This paper reports on the methodology developed for categorising respondents on the basis of their socio-economic conditions and standard of living without directly asking them for their household income or expenditure in roadside surveys.

The premise underlying the methodology is that a rural household's income or expenditure can be estimated with an acceptable level of accuracy from a small number of socio-economic indicators on which information can be easily and quickly collected at roadside interviews. The methodology is a combination of qualitative and quantitative components. Section 2 outlines the qualitative component of the study which consisted of focus group discussions to identify an initial list of possible socio-economic indicators of the standard of living of rural households. The socio-economic indicators identified through focus groups were used to design the questionnaire for the sample survey of households (section 3) which collected data for the quantitative analysis. The survey date were then used to identify the socio-economic variables, using econometric analysis techniques, that provide the best predictions of the expenditure levels of households (section 4). The paper also estimates the threshold expenditure level for distinguishing between poor and non-poor households (section 5).

2. Focus groups

Focus groups are particularly useful for obtaining a broad understanding of socioeconomic conditions (Cummings, 1997 and McAllister, 1999). In this study, the purpose of focus group discussions was to draw on local knowledge and perspectives to obtain an overview of: (i) the main economic activities and socio-economic conditions in the study areas, and (ii) socio-economic characteristics of typical relatively better off, medium-income and poor households. The issues discussed in the groups were:

(a) the main ways in which people make a living;
(b) the relative pay and status of different occupations, and
(c) selected characteristics of "rich", "average", "poor" and "very poor" households (how they earn their living, their homes and other assets, what problems they face and how they cope with them, how often and why they travel).

There were two focus group discussions, one each in the two study locations which are briefly described in Table 1. The first group was formally arranged while the second was an informal impromptu discussion. An advantage of the latter was the more relaxed and informal atmosphere leading to more open discussion. Its limitation was that all participants were men. Ideally, a focus group of women conducted by a woman should have been arranged to complement the above groups. Nevertheless, for the type of information that was required, this limitation was not considered to be serious, especially since the first focus group included women participants.

Table 1: Brief description of study roads, localities and focus groups

Study roads	**Description of locality**	**Focus group arrangement and composition**
Poolerhat – Goalda Bazar (Feeder Road Type B or FRB*(a)*, paved, 10 km)	In Chanchra Union, Jessore Sadar Upazila. Jessore town is about 4 km to the north-east of one end of the road. The road locality represents a rural road in a relatively well developed area with good communications links and urban influence because of proximity to Jessore, the District HQ.	Arranged through the Union Chief. Group consisting of men and women and members of well-off, average and poor households requested. Group consisted of 8 persons (5 men, 8 women).
Bagharpara – Naricalbaria (Feeder Road Type B or FRB, paved, 8 km) and Naricalbaria – Gadghat via Khanpur (Rural Road Type 1 or R1*(a)*, earth, 8.6 km)	This locality represents an area with lower urban influence than Chanchra Union. The roads pass through 4 Unions in Bagharpara Upazila. They provide links for a rural growth centre and the population along the road (a) to the Upazila and (b) the district centre through national highway.	Impromptu gathering of local people at the end of a market day in Bandbilla Union. A social gathering of 8 to 10 local farmers and traders (all men) relaxing at the end of the day.

Note: (a) The classified rural road hierarchy in Bangladesh in order of importance is FRB, RR1, RR2 and RR3.

The focus group participants' perceptions of the characteristics of typical better-off, medium income and poor households are summarised in Box 1. In a rural agriculture based economy, the importance of land ownership per capita as an indicator of economic status and wellbeing is understandable. Complementary economic activities in the forms of businesses and permanent formal sector employment were also identified as important. The better-off households often own more land and either operate a well established business and/or have a family member in permanent formal employment. Less well-off households may also supplement their farm production but from smaller businesses. The poorest households may have no land and/or lower paid jobs. The size and construction of house and ownership of a motorised vehicle, in most cases a motorcycle, were identified as visible indicators of economic status.

Box 1: Features of typical better-off, medium income and poor households as perceived by the focus groups

- **Land ownership**: Better-off households own or cultivate 1.5 acres* or more of land per person. Average income households typically have less land per person (between 0.5 to 0.6 acres per head). Poorer households have much less land (0.25 acres or less) or even no land and their members need to look for casual work. Some poorer households with land (for example female headed or elderly households) may have to hire workers for farming during harvesting.
- **Businesses and jobs**: Better-off households have more profitable businesses such as fish hatcheries or members of households with permanent well paid formal employment. An average income household may run a small business earning about 50 to 60 Taka* per day. Operators of rickshaws and rickshaw-vans on rural roads were often from poorer households.
- **Size of houses and house construction material**: Richer households typically have relatively large houses of permanent construction with brick walls and a tin roof). However, houses are not always good indicators of wealth. There were examples of families who had sold their land to raise funds to build better houses for social reasons (for example, to raise their status to improve marriage prospects for daughters).
- **Vehicle ownership**: Ownership of a motorised vehicle, typically a motorcycle, is identified as an indicator of the wealth of a household.

3. Sample household survey

Since the objective of the study was to establish a quantitative relationship between selected socio-economic indicators and the standard of living of a household and in particular, whether the household could be categorised as poor or non-poor, a sample survey of households was carried out to collect information on household income and expenditure levels and the socio-economic indicators identified by focus groups.

Household surveys were conducted alongside three roads. A form of cluster sampling was used for selecting households in villages near the middle of roads. The questionnaire included questions on: (i) household size and age and sex composition; (ii) type and size of household dwellings (whether owned or rented, type of construction and number of rooms); (iii) amount of land owned, leased or rented; (iv) types and amounts of crops produced; (v) ownership of vehicles; (vi) occupation of the household's main earner; (vii) household's cash income sources and number of earners, and (viii) household income and expenditure.

To improve the reliability of data on income and expenditure, the questionnaire included detailed lists of possible sources of income and types of expenditure. In addition, information on agricultural items produced and sold by the households was used to estimate the value of sales and produce consumed by the household. Collection of income and expenditure data at the same time enabled enumerators to check for any inconsistencies in reporting and to make corrections if necessary. Seeking this information in a less exposed environment at the home of respondents made it more likely that the respondents would be willing to provide the information. Data were collected from a sample of 100 households. However, 9 completed questionnaires were excluded because of poor quality of responses leaving a total of 91 questionnaires available for analysis.

The average size of the survey households was 5.5. The distribution of construction type is heavily weighted towards poorer low-cost housing. Less than 8 per cent of households lived in permanent good quality houses while over 47 per cent lived in low-cost nonpermanent houses. Moreover, 55 per cent of houses have one or two rooms only.

For the standard of living of typical farming households, land available for cultivation per member of household is likely to be an important indicator. Landowning households in the sample (i.e. excluding the 22 households who do not own land) on average own 0.47 acres of land per person, the approximate land ownership for an average income household according to focus groups. The total amount of land available to households for farming (owned land, leased land and half of share cropped land) averages 1.07 acres per household for 76 of the 91 households, the remaining 15 having no land to farm. However, the farming households include 3 households that lease and/or sharecrop very large amounts of land (just over 100 acres per household). When these three "outliers" are excluded, the average per capita farming land for the remaining households is 0.46 acres. Less than 53 per cent of households either cultivated no land or less than 0.25 acre per head, which would put them in the poor category according to the focus groups.

As would be expected, paddy is the most important crop. All but three farming households grow paddy. On average, 55 per cent of paddy produced is sold. A substantial proportion of farming households (63 per cent) grew one or more other crops (jute, vegetables, wheat, pulses, oilseed and tobacco) alongside paddy in small quantities in most cases. Farming was by far the most common occupation for heads of households and other members of the household of working age. Other common occupations were agricultural labour, trading and "government or other permanent employment". Heads (or other members) of 10 households had permanent jobs which are typically salaried jobs for central or local government departments, services such as

health and education or large or medium sized businesses. Heads (or other members of) 13 households had well established businesses (mainly trading, transport or fish hatcheries).

Sixty-six of the 91 households in the sample owned at least one vehicle. By far the most common vehicle owned was a bicycle (54 households) followed by an ox cart (24 households). Seventeen households owned more than one vehicles, the most common combination being a bicycle and an ox cart. Only 3 households owned a motorised vehicle (1 household owned a truck and two others owned motorbikes).

Income or expenditure can be used as an indicator of the standard of living or welfare of a household. While there are advantages and disadvantages associated with both indicators, expenditure is preferred by most analysts. The two main reasons for this choice are: (a) expenditure is easier to measure than income, and (b) households smooth their consumption and living standard in the face of income variability by drawing on their savings and wealth in lean times and adding to them when incomes are higher than the "permanent" level (Anand and Harris, 1994; Kanbur and Squire, 1999; Khan and Sen, 2001, and World Bank, 2002).

In line with other authors, expenditure has been used as an indicator of welfare in this study. Table 2 shows the frequency distribution of per capita expenditure of sample households in Taka and the equivalent values in US$s at the nominal exchange rate of 57 Taka (the average expenditure per head for the sample is Taka 7555 or US$132). The expenditure includes cash expenditure and the value of own farm produce consumed. For about 45 per cent of households, per capita expenditure is below Taka 5000 (or about US$88 at the nominal exchange rate) and almost 75 per cent of households have per capita incomes below Taka 10,000 (or about US$175 at the nominal exchange rate). The poverty thresholds to be applied to these data have been estimated in section 5.

Table 2: Annual household expenditure per capita

Taka	**US$ equivalent**	**Number**	**%**
Below 3,000	Below 52.6	5	5.5
3,001 to 5,000	52.7 to 87.7	36	39.6
5,001 to 10,000	87.8 to 175.4	27	29.7
10,001 to 15,000	175.5 to 263.2	14	15.4
15,001 to 20,000	263.3 to 350.9	4	4.4
20,001 to 25,000	351.0 to 438.6	4	4.4
25001 to 30,000	438.7 to 526.3	0	0.0
Above 30,000	Above 526.3	1	1.1
Total		**91**	**100.0**

4. Econometric analysis of household survey data

The study has used econometric techniques to identify the combination of socioeconomic variables that provides a good explanation of levels of household expenditure per capita. The basic linear form of the model is:

$$PERCAPEXP : \sum \alpha_i * X_j + \sum d_m * \beta_m \ldots\ldots (i)$$

where:

PERCAPEXP = Consumption expenditure per capita per year for the household;

Xj = Continuous independent variable j (e.g. amount of land per capita and number of household members involved in income earning activities);

dm = Dummy for independent variable m (e.g. whether any household member is involved in a permanent job etc.; yes = 1 and no = 0), and

αi & βm = Coefficients of the continuous and dummy variables respectively.

Table 3 shows the independent variables tried out in the regression equations. The independent variables are indicators of either the economic activities of household members (e.g. number of economically active household members and types of employment and businesses of household members), or access to productive resources (e.g. land and possibly ownership of motorised vehicles), or the welfare and wealth of households (e.g. type of house construction and ownership of motorised vehicles). As the table indicates, some of the variables are continuous while others are dummies to represent the existence or otherwise of a characteristic.

The dependent variables and their coefficients in the best chosen equation as the predictor of per capita household expenditure are shown in Table 4. With an adjusted correlation coefficient (r^2) of 0.75, the equation explains a large proportion of the variation in expenditure between households. All the coefficients are significant at 95 per cent confidence level and the F value (56.4) shows that the relationship between the dependent and independent variables is significant at 1 per cent confidence level.

Table 3: Econometric analysis: dependent and independent variables and equation forms tested

Independent variables	**Form and additional information**
Number of adults in the household (HHADULT)	Continuous
Number of persons involved in income earning activities in the household (NO_INCOME)	***Continuous***
Type of house construction (DUMROOM)	Dummy. 1 for permanent or semi permanent, 0 for other types
Total amount of land cultivated by household (LANDEQUI)	Continuous. All owned and leased land and half sharecropped land.
Land cultivated per head of household (LANDCAP)	***Continuous.***
At least one household member engaged in off-farm employment (DUMJOB)	Dummy.
At least one household member engaged in business (DUMBUSIN)	Dummy.
At least one household member in "permanent" off-farm employment (D_P_JOB)	***Dummy.***
At least one household member engaged in a "permanent" business (D_P_BUSI)	***Dummy.***
Ownership of motorised vehicle by household (D_M_TRAN)	***Dummy. 1 for ownership (including motorcycle), 0 otherwise.***
Location of households (DUMAREA)	Dummy. 1 for Sadar (location closer to Jessore town), 0 for Bhagarpara.

Note: Bold italics indicate variables included in the selected equation.

Table 4: Independent variables and their coefficients

Independent Variable	Coefficient
Land Per Capita (Acres) [LANDCAP]	440
Number of persons involved in income earning activities in the household [NO_INCOME]	3813
Dummy for household owning motorized transport including motorcycle (Yes=1, No=0) [D_M_TRAN]	12215
Dummy for any member of the household with permanent job (Yes=1, No=0) [D_P_JOB]	5758
Dummy for any member of the household with established business (Yes=1, No=0) [D_P_BUSI]	3474

The independent variables included in the chosen equation are indicators of either the economic activities of household members or access to productive resources and assets. Indicators of household wealth (with the exception of ownership of a motorised vehicle which is a productive asset and an indicator of household wealth) do not appear in this equation. Since indicators of economic activities of households and access to productive assets are likely to be related to indicators of wealth, exclusion of the latter type of variables reduces the possibility of multicollinearity.

5. Threshold expenditure per capita for distinguishing "poor" and "non-poor" travellers

Two of the most commonly used approaches for identifying the poverty threshold expenditure level are "standardised international poverty level thresholds" and the "cost-of-basic-needs" (Kanbur and Squire, 1999, and World Bank, 2002). Evidence from the use of both these approaches in Bangladesh has been considered and compared in this section in arriving at the appropriate threshold expenditure level.

International poverty level thresholds are used by the World Bank for making internationally comparable poverty incidence estimates. There are two thresholds, a lower one of US$1 per person per day and a higher one of US$2 per person per day. These thresholds are based on 1985 purchasing power parity (PPP) estimates. The most recent available recalculations of the thresholds equivalent to the 1985 lower and higher thresholds are US$1.08 and US$2.15 per person per day respectively, based on 1993 data (World Bank, 2001).

The factor required to convert the poverty thresholds in US$ PPPs to local nominal currency equivalents at the time of the study, has been calculated in the following steps:

(i) The latest available Gross National Income (GNI) figures in nominal (US$47.1 billion) and PPP (US$196 billion) values (World Bank, 2001) have been used to calculate the factor for converting the nominal value income to PPP value in US$ terms. This calculated factor is 4.135.

(ii) Next, the factor for converting the PPP value in US$ to nominal value in local currency (Taka) is calculated by dividing the nominal exchange rate of US$ to Taka (US$1 = 57 Taka in 2000) by the factor for converting nominal value to PPP value (4.135) calculated in step (i). The calculated factor is 13.785.

This factor of 13.785 is used to convert the PPP US$ poverty thresholds to Taka in nominal terms. Therefore, the lower poverty threshold of PPP US$1.08 per person per day is equivalent to approximately Taka 14.9 per person per day in nominal terms or Taka 5,434 per person per year (i.e. Taka 14.9 multiplied by 365 days). Using the same conversion factor, the higher poverty threshold of PPP US$ 2.15 per person per day is equivalent to Taka 10,817 per person. The average per capita annual expenditure of the sample of households was Taka 7555 which is close to the middle of the higher and lower poverty thresholds. About 53 per cent and 81 per cent of the sample households fall below the 1993 $1.08 and $2.15 international poverty thresholds respectively.

An alternative approach to assessing poverty incidence is the cost-of-basic-needs (CBN) method in which the cost of a bundle of products defined as providing a minimum for an adequate standard of living is estimated and the income or expenditure of households is compared against it to estimate poverty incidence. Since it is estimated from local data taking account of local consumption preferences and patterns, arguably it is more accurate than the international thresholds.

The lower international poverty threshold has been compared here with evidence from a recently estimated CBN poverty line (BIDS, 1998). For rural localities away from large conurbations, the CBN poverty line estimated by BIDS (1998) was Tk 5573 per person per year. This estimate is very close to the lower international threshold poverty line of Taka 5434 which has therefore been used as the poverty level threshold in the value of time study.

6. Final remarks and qualifications

In summary, the paper describes a rapid appraisal methodology for assessing rural household income levels and poverty assessment. The qualitative assessment through focus groups provides broad indications of the relevant socio-economic variables for predicting household welfare. The quantitative analysis of evidence from the survey of households validates the qualitative results and identifies more precise relationships between household expenditure and selected socio-economic indicators.

In carrying out a rapid appraisal, there is inevitably a trade-off between speed and economy on one side and precision on the other. The adjusted correlation coefficient (r^2) of 0.75 indicates that the equation explains 75 per cent of the variation in per capita expenditure. This will clearly have implications for the predictive power of the relationship. Comparison of the per capita expenditure calculated from survey data and calculated from the estimated equation shows that 77 per cent of the poor were correctly identified by the equation. For the purpose of this study, this level of accuracy was thought to be adequate. More precision and validity can be achieved by increasing the sample size and/or stratifying the sample to better represent population characteristics. Choice of combinations of variables and other diagnostic testing, including testing for multicollinearity, are also essential for statistical validity of the model.

Other lessons from the study are: (a) need for care in the conduct of household surveys, and (b) efforts required to ensure adequate participation in focus groups by women and people representing a range of socio-economic characteristics.

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