Estimating the number of MFI clients moving above US$ 1 a day threshold
Review of information sources and a proposal on method of estimation

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1. Introduction

The task of the Bangladesh Expert Panel is to use microcredit research and national level poverty research to estimate the number of microcredit clients in Bangladesh who were living below US$1 a day at the time of their first loan and who have crossed that threshold, between 1990 and 2007. As noted in the Terms of Reference, the Microcredit Summit (MCS) is not seeking to establish causality between microcredit and poverty alleviation.

With the above perspective, the Lead Researcher is expected to review existing data, conduct additional independent research (using secondary data) based on the recommendations received at the first in-person meeting and draft a paper on the results and report findings back to the entire panel and advisors at the second in-person meeting. It is further expected that the Expert Panel will submit to the Microcredit Summit Campaign a paper outlining the panel's research and estimation of the number of clients in Bangladesh who moved above the US$1 a day threshold (1990-2007).[1]

The following section briefly identifies the various practices in estimating the number of clients crossing the threshold every year. The third section proposes an approach that may be adopted to estimate the time series for Bangladesh. Section 4 identifies various data sources and basic information available to allow estimation of the time series. The note is concluded with an outline on proposed future activity for the exercise.

2. Current Practices

There are several agencies in the microcredit industry, which attempt to estimate the number of clients crossing some threshold income or fulfill a set of livelihood indicators. We discuss these below before outlining the approach of the MCS group reflected in Mark Schreiner and Emilio Hernández's writings.

Grameen Bank reports on the number of their clients who cross a threshold livelihood level every year; no attempt is made to translate these into US$ 1 a day based graduation. The estimates are based on information they gather from sample surveys administered

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[1] The meeting of 23rd April 2008 recommended undertaking of an independent survey, which the MCSC intends to follow up through a second study. This paper compiles secondary information to come up with best possible estimates given the data limitations. Even thought the terminal period is 2007, adverse effects of inflation and slow-down in general economic activities following political changes have not been accounted for in this paper.

every year since 2001 on clients who have been members over the five years preceding the survey.[2] The details, along with the scorecard used to assess poverty status (i.e., who is poor) are presented in Annex 1. Two estimates are obtained from the survey – number of members who graduate during the year of the survey and the cumulative number who had graduated over the preceding five years. The percentages obtained are then applied over total GB coverage.

Brac carried out a longitudinal survey of selected households for the purpose of internal assessment of program impacts. Reportedly, surveys were carried out in three years, 1992, 1996 and 2001. The original sample consisted of 1200 households, among whom 800 were MFI participants and 400 were non-participants. Subsequently, there had been missing households and it is understood that a matched sample of 400 households; unfortunately these were not made accessible.

While ASA reportedly has no such practice, some of the MFIs resort to some crude methods to report on the number of their clients graduating out of $1 a day threshold. One such method is to consider clients borrowing less than Tk. 10,000 per year as poor, and consider the percentage of them borrowing more than the threshold amount in the following year as crossing the threshold of US$ 1 a day. Proshika reported of undertaking occasional surveys where an annual income per household (approximately, Tk. 48,000 in 2002) was chosen as the cut-off point that allowed them to arrive at figures crossing the poverty barrier. It is informally learnt that TMSS also adopts a simple rule for arriving at number of clients going above $ 1 a day every year; but neither Buro Tangail nor SSS has any such practice.

PKSF does not estimate the number of clients crossing a threshold. However in their mapping exercises, PKSF estimates the number of poor clients and percentage of poor households effectively covered by the MFIs. These estimates are derived from a special study undertaken by PKSF in 16 selected upazilas from all (six) divisions, with three sites around a growth point in each upazila. Around 4500 clients were surveyed in 2003 and 2005 to estimate the overlapping membership. The data allowed estimation of 'effective coverage' (1).[3] Estimation of the number of poor households (2) was obtained from small area poverty estimates of BBS. BIDS study (on PKSF-MES) provided estimates on percentages of clients who are poor, which was used, adjusting for the effective coverage (1), to calculate the number of poor clients and the number of poor client households (3). Thus, the percentage of poor households covered by the MFIs was calculated upon dividing (3) by (2). Since summing of individual MFI achievements will exaggerate the estimates in the presence of overlapping membership, it is important to account for the extent of overlaps. This is accounted for in the exercise undertaken later in this paper.

Given a microfinance organization *i* and assuming that *r*, *m*, and *p* (defined below in Section 3) are constant through time, Emilio Hernández and Mark Schreiner define the

[2] The sample in the first year of survey included those borrowing over three consecutive years. This was increased to five years in subsequent survey.

[3] From each study site, respondent clients were chosen to represent three broad groups of MCIs, Big, Medium and Small.

formula for the net number of households who rose above $1/day in 1990–2006 as follows[4]:

$$\sum_{t=1990-m_i}^{2006} \sum_{u=t}^{t+m_i} F(u) \cdot (n_{ti} \cdot p_i) \cdot r_i \cdot (1-r_i)^{u-t},$$

where

$$F(u) = \begin{cases} 0 & \text{if } u < 1990 \text{ or } u > 2006 \\ 1 & \text{otherwise} \end{cases}.$$

In the above formulation and in its operationalization, n_t is assumed to be the difference between the number of active members/borrowers at the end of year t and the corresponding figure at the end of year *(t-1)*. In instances where figures on memberships are reported on cumulative basis, one may consider the difference between two years to be the size of new entrants. There is no clear evidence to suggest that all MFIs report uniformly on such figures. In instances where it is the difference in the number of members, one needs to consider dropouts to identify the size of the new entrants in a given year.

Hernández and Schreiner tried to overcome the problem of dropouts by considering average length of membership. In reality, membership with MFIs is often of temporary nature; and members do not necessarily join or leave permanently. Thus, average membership may not be appropriate in estimating the numbers of poor and the ones graduating out of poverty. The authors also addressed the issue of overlapping by putting varying weights to the clients depending on the number of MFIs he/she is a member of. Another limitation of the Schreiner-Hernández exercise commonly identified relates to the assumption of stable parameters over the period between 1990 and 2007. Some of these aspects are addressed in the approach proposed in the following section.

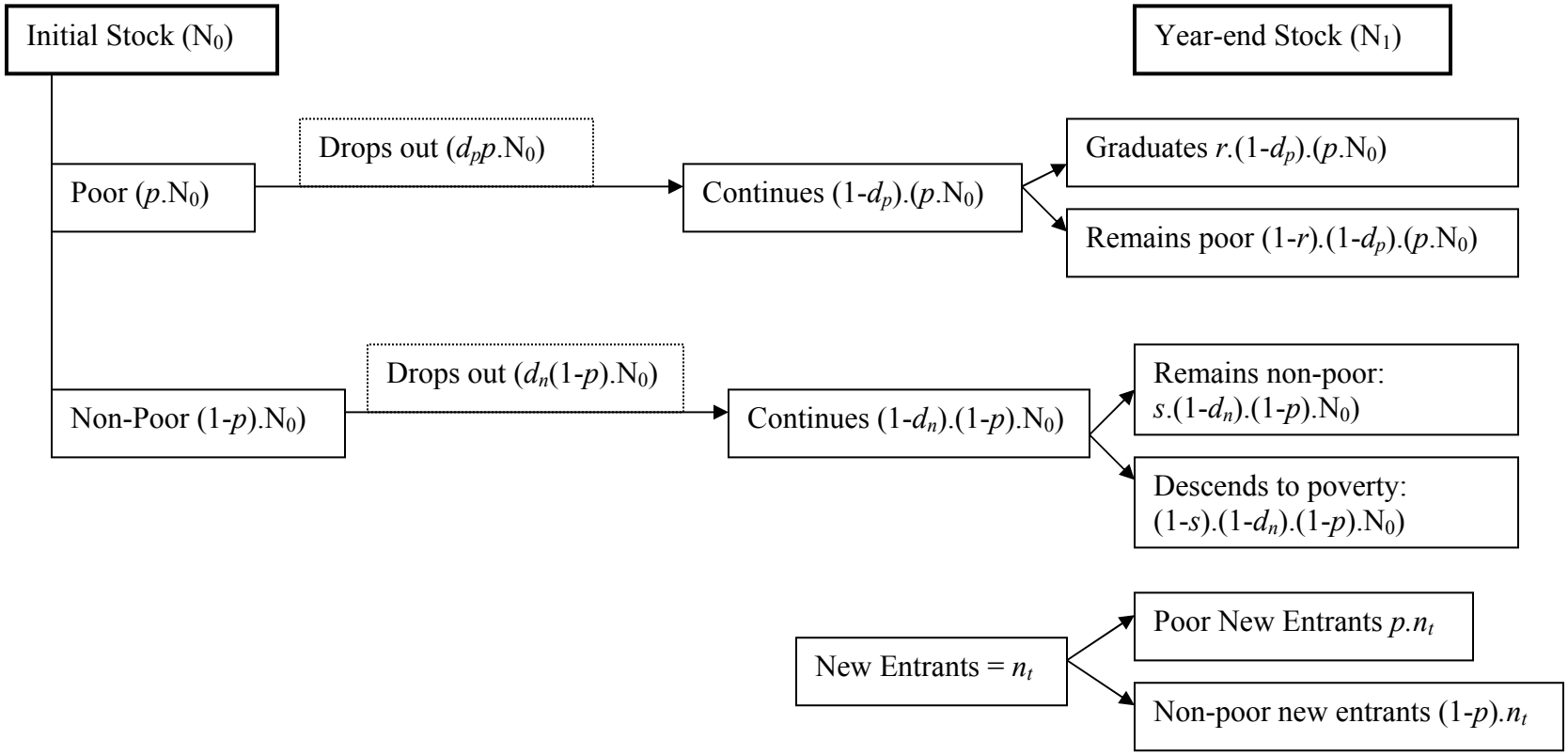
3. Proposed Approach

The proposed approach takes cue from the one developed by Schreiner and Hernández, and fine-tunes some aspects to reflect the situation in Bangladesh. In addition, it attempts to cross-check the estimates with the aggregates that may be derived from national level poverty statistics.

Before going into details of the calculation methods, it is useful to have a look at the process we want to capture in our calculations. The flow of MFI membership from one year to the next is illustrated in Figure 1 below.

[4] See, "Estimating the Number of Microfinance Clients Who Crossed $1/day in 1990–2006: An Example Using World Bank Survey Data for Grameen Bank and BRAC"; November 18, 2007.

Figure 1: Basic Factors Relating Total Membership in One Year (N_0) with Membership in the Following Year (N_1)



For simplicity in exposition, we use the following notations:

p = percentage of all clients who are poor;
r = percentage of poor clients who are moving above US$ 1 a day every year;
s = Percentage of non-poor clients sliding below US$ 1 a day every year;
d = percentage of clients leaving the program every year (assumed to be same for poor and non-poor clients as well);
N_t = number of members/borrowers at the end of year t;
n_t = number of new entrants (members/borrowers) in year t;
m = average length of membership;
x = percentage of overlap (% of clients who borrow from multiple MFIs);
X = intensity of overlap (defined later).

We arrive at the following formula to get the number of new entrants in period t, where, for simplicity, we assume dropout rates to be identical across poor and non-poor groups[5]:

$$N_t = N_{t-1}(1 - d) + n_t$$

or, $$n_t = N_t - N_{t-1}(1 - d)$$

Thus, the first (minor) revision in Schreiner-Hernández formulation is to define n_t by including the drop-out variable (d) explicitly. We dispense with average length of membership since, as Figure 1 shows, the exercise may be undertaken on a year-to-year basis.

When we consider overlapping, complications arise since various MFIs will have clients who are members of varying numbers of other MFIs as well. For simplicity in exposition, we assume the proportion of clients who borrow from multiple MFIs (have multiple membership) as well as the distribution of the latter in terms of the number of affiliations. The construct thus runs across all MFIs. Let x_z be the percentage of total members who have affiliation with (borrow from) z number of MFIs. Thus, x_1 is the percentage of clients who have no other affiliation outside the MFI under consideration, and $(1 - x_1)$ is the percentage of overlapping. We define the overlapping intensity X as follows:

$$X = \sum_{1}^{q} z x_z$$

where q is the maximum number of MFIs with which a client may be borrowing from.

Now, net number of clients can be found out by the gross sum of MFI clients divided by the overlapping intensity X. This can be done at the aggregate level or by applying the aggregate intensity of overlapping to transform (discount) the individual MFI-specific data on net number of MFI clients.

[5] The actual exercise does not require separate definition of n_t.

It is commonly agreed that the parameter values are unlikely to remain stable (fixed) over the years. There is however no easy way to estimate a series on the variables. Two alternative scenarios are considered. The first assumes stable parameter values during the period (1990-2007), and the second allows for variation in these values. In case of overlapping intensity (X), it is assumed to increase linearly from zero in 1990 to 40% in 2007. Since X is defined at the industry level, such assumption may be valid. The same may not hold for the other two important parameters considered to vary across MFIs – percentage of poor among new entrants *p*, the drop-out rate *d* and percentage of poor graduating, *r*. These variables depend on different macroeconomic variables, natural disasters, vulnerability of people living in different regions in the country, etc. In the absence of data to assess these, best guesses have been used in generating the alternative scenario.

Several additional assumptions are made in deriving the number of poor clients moving above US$ 1 a day; and it is important to note these for the limited interpretation of the results derived. First, dropout rates are calculated for total members in a year and are assumed identical for poor and non-poor members. Second, only poor members continuing into the following year are considered in assessing the number moving above US$ 1 a day. While some of the primary data used to derive parameter estimates clearly reveal sliding down of non-poor to poor status. Thus, present calculation considers percentage of non-poor clients sliding below US$ 1 a day every year (*s*) to be zero. The last assumption raises one technical difficulty. If the non-poor remains non-poor and a percentage of the continuing poor clients turn non-poor, the share of total clients who are poor in any given year should be declining unless compensated by large increases in share of poor amongst new entrants. In effect, it is the presence of sliding down phenomenon that often keeps the share of poor in total clients in a year relatively stable; and thus, the latter assumption needs to simultaneously consider the former.

An important step in undertaking the exercise is the compilation of the time series on membership. Since the aggregate data on time series is not available, and even for those MFIs on which data were available, many years were missing. Thus, the exercise involved filling the gaps to reconstruct time series in meaningful ways.

Finally, once total number of MFI clients crossing the threshold of US$ 1 a day is estimated, the figure is reassessed in the light of national level poverty data collected independently by the national statistical system and/or other research organizations. One exercise undertaken is based on HIES data whose income threshold to differentiate hardcore poor roughly corresponds with Schreiner and Hernández's PPP based conversion of $ into Bangladeshi Taka (see Annex3).

4. Data Sources and Method of Calculation

Two sets of information were required for the exercise – total number of members or borrowers in the MFIs every year between 1990 and 2007, and parameter values (such as,

p, *r* and *d*). For the purpose of the former, time series data on membership were more readily available.

Details on data sources are summarized in Annex 4. Emphasis was given to ensure individual MFI-specific information which were available for all major MFIs; and collect sufficient information on the smaller ones to interpolate for the group and for years on which information were not available. The steps taken in undertaking the exercise are narrated below.

Step 1: Grouping the MFIs and Compilation of Time Series

The need for grouping arose because information for all individual MFIs and for all years between 1990 and 2007 were not available, nor does such information exist. MFIs have traditionally been grouped into three based on the number of client s each has – big, medium and small. MRA data considers four groups – and the two smaller groups considered by MRA corresponds to the traditional definition of 'small' that we adapt. Thus, the attempt has been to compile time series for each of the big four MFIs - Grameen Bank, ASA, Brac and Proshika. Attempts were also made to undertake similar compilation for each of the twelve medium (considered large by MRA) MFIs[6]. For many past years, however, one had to do so based on limited information available for some, The group identified as 'small' includes a total of 1030 (or more) MFIs taken from MRA data.[7]

There were primarily four sources of information: (i) individual MFIs whose management shared the information – other than for GB, information remained incomplete varying largely on the extent of coverage; (ii) CDF compilation for recent past (since 2000); (iii) MRA data for 2004 – 2006; (iv) PKSF-MIS data on limited number of MFIs; and (v) some of the previous compilations by the author. In cases where yearly figures were available from two or more sources, these often varied. The details on choice and filling the missing values are discussed in Annex 5.

While the aforementioned grouping was resorted to for compilation of time series, the parameter values were not equally applicable to all members of a group. The latter was applied in cases of medium and small MFIs – but all big MFIs are considered individually.

[6] The 'medium' twelve includes, Palli Daridra Bimochon Foundation, Community Development Centre (CODEC), Shakti Foundation for Disadvataged women, RDRS Bangladesh, CARITAS Bangladesh, Buro, Padakhep Manabik Unnayan Kendra, Thengamara Mohila Sabuj Sangha (TMSS), Society for Social Service (SSS), Peoples Oriented Program Implementation (POPI), Jagorani Chakra Foundation (JCF), Bangladesh Islamic Youth Society (BIYS). MRA does not include PDBF, but includes World Vision in its list of 'large', which we consider to be 'medium'.

[7] Unfortunately, the MFIs reported for various years could not always be matched. Maximum umber reporting in a year was 730, but the total amounted to 1030 accounting for all reportings.

Step 2: Estimation of Parameter Values

The BIDS Study on PKSF MFIs during 1997-2000 was the primary source for estimation of share of poor (*p*), percentage of current members not borrowing in the following year termed loosely as dropout (*d*) and the percentage of the continuing poor members graduating out of the $1 a day threshold (*r*). The lower poverty line of income suggested by the BBS was considered as the cut-off defining the latter threshold. Several aspects of the exercise need highlighting for appropriate interpretation of the results. These are,

- Share of poor (*p*) is based on all members in a given year (and not of new entrants);
- 'Dropout' is a misnomer since many return to the system as it happens in any instance of bank borrowing – but the term helps in tracking figures on current members in a systematic way;
- 'Graduation' rate applies to only the continuing members who had been poor in the preceding year. There are many instances of 'non-poor' amongst the continuing members who are sliding down to 'poor' status. We have purposively separated the two; and have provided results based on alternative assumptions on the latter.
- Ideally, one would like to define 'graduation' as one, which takes a poor household out of poverty for a finite number of continuous years, say, three or more. Comparison of observations on two years fails to provide substantive basis for inference on graduation. Thus, future attempts need to account for sustained improvement in livelihood.

Acceptable series on population by urban and rural locations, as well as poverty estimates for these locations in different survey years (of HIES) have been compiled. Estimates from the current exercise on graduation of MFI poor members have then been crosschecked to ensure that these are consistent with those obtained through national surveys.

5. Summary Findings and Conclusion

This section summarizes the main findings of the exercise. The details are attached in an excel sheet, where some of the assumptions are self-evident. Some of the assumptions have already been spelled out while those pertaining to calculation are summarized in Annex 5. The key findings are as follows:

- Total membership in the MFIs in Bangladesh, without accounting for overlaps, currently stands at 25.346 million. Since 1990, there has been an average (cumulative) growth of 18.07 percent per year in (unadjusted) active membership for the whole industry. There are two alternative estimates on overall intensity of overlaps; 35% and 40% (that is, X equals 1.35 or 1.40), and it is assumed to have linearly increased from zero in 1990. If it is 1.40, number of persons participating as clients of the MFI industry (either as single or multiple members) is estimated to be 18.48 million and the annual growth in this number has been 15.35 percent

per year. In case, the current overlap is considered 35 percent, the corresponding figure is 18.967 million (see 'template final.xls').

- Dropouts from one to the next year varied between 20 to 40 percents; thus, 60 to 80 percents of current members continued their affiliation with the same MFI during the following year. Average share of very poor (below $1 a day) amongst continuing members varied between 57 and 63 percents. One needs to note that such shares included those who continued to remain poor, continuing non-poor members who slid to poor status, and the poor amongst new entrants.
- Movement from poor to non-poor status within a year, expressed as percentages of base population varied widely across years. Such movements clearly tell of the high degree of fluctuations in poverty status over short terms. We therefore resorted to changes over two years, which show that 18 to 24 percents of poor amongst continuing members moved out of $1 a day threshold and 26 to 30 percents of continuing non-poor members slid to poor status.
- We considered two scenarios – one with average parameter values remaining stable over the period other than an increasing intensity of overlaps; and the second scenario considers variable values of the parameters. In the former case, total number of poor MFI members crossing the $1 a day threshold is estimated to be 18.48 million. However, discounting for the sliding down (and taking into consideration net graduation), total number is found to be 3.76 million. In case of variable parameter values, the corresponding figure, not adjusted for sliding to poverty, is 19.70 million. We have not attempted to make guesses on variations in the rates of sliding down for the erstwhile non-poor members. All these are reported (and can be re-estimated with different parameter values) in 'template final.xls'.
- If poor in 1990 grew at the same pace as the population growth rates (differentiated by urban and rural), there would be 11.62 million more poor people by the end of 2005 than estimated in HIES 2005. If one accounted for inter-HIES changes, there would still be an additional 10.62 million poor (see Annex 6). This clearly suggests that there has been net graduation out of poverty taking place over the reference period.

Annex 1
GB Methodology

To check the socio-economic conditions of its members, every year (starting from 2001) Grameen Bank carries out a household survey on a sample of its clients who have been members for the last five years. The survey is completed within February of each year and the report is published in June. The size of sample covered varied in terms of both districts covered and the number of clients surveyed in each of the selected districts (see Table A.1 below). A family is considered to be poor only if they fail to meet the following indicators favorably.

Ten Indicators

1. The family lives in a house worth at least Tk. 25,000 (Twenty Five Thousand) or a house with a tin roof, and each member of the family is able to sleep on bed instead of on the floor.
2. Family members drink pure water of tube-wells, boiled water or water purified by using alum, arsenic free, purifying tablets or pitcher filters.
3. All children in the family over six years of age are all going to school or finished primary school.
4. Minimum weekly loan installment of the borrower is Tk. 200 or more.
5. Family uses sanitary latrine.
6. Family members have adequate clothing for every day use, warm clothing for winter, such as shawls, sweaters, blankets etc. and mosquito-nets to protect themselves from mosquitoes.
7. Family has sources of additional income, such as vegetable garden, fruit-bearing trees, etc. so that they are able to fall back on these sources of income when they need additional money.
8. The borrower maintains an average annual balance of Tk. 5,000 in her savings accounts.
9. Family experiences no difficulty in having three square meals a day throughout the year, i.e. no member of the family goes hungry any time of the year.
10. Family can take care of the members' health. If any member of the family falls ill, family can afford to take all necessary steps to seek adequate healthcare.

Year	No. of Districts Covered	Total Sample Size	% of members Graduating in the Survey Year	Cumulative % of Members Graduating
2001	18	1835970	15.70	42.05
2002	18	1571421	7.60	46.49
2003	18	1616578	8.48	51.09
2004	18	1770151	9.00	55.00
2005	21	1960217	9.49	58.40
2006	36	2059798	11.00	64.00
2007	39	2343842	10.09	65.48

Annex 2
Poverty Monitoring Survey (PMS)

Bangladesh Bureau of Statistics, Statistics Division, Ministry of planning has been implementing the project "Regular and Continuous Monitoring of poverty Situation in Bangladesh" since July 1994 and continued up to May 1999. After that no such survey could be undertaken due to resource constraint of GOB. In March 2004, a quick poverty monitoring survey was conducted under the auspices of GOB funding provision.

PMS Code	Survey Round	Survey Period	Publishing time	# Sample Households	Status
1R1	1	October 1994	January 1996		
2R2	2	April 1995	December 1996	2250	Available, FEI
3R3	3	December 1995	November 1997	3300	Available, FEI
3U1	3	December 1995	November 1997	1200	Available, FEI
4U2*	4	April 1996			Available, FEI
5U3*		April 1997			Available, FEI
6U4		April 1998	May 2000	1200	Available, FEI
		May 1999			
		May 1999			
8UR		March 2004	December 2004		Available, DCI

Note: * indicate surveys on which the reports are not yet available, but the aggregate findings could be obtained from later reports.

Annex 3
Comparison of PPP-based Taka Equivalence of US $1 a day and BBS Income Poverty Lines (Taka per day per person)

Year	US$1_HS	LPL_BBS	UPL_BBS
1991	12.83	14.34	16.96
1992	13.01	15.03	17.78
1993	13.72	15.72	18.61
1994	14.93	16.40	19.43
1995	15.98	17.09	20.25
1996	16.08	17.47	20.70
1997	16.90	17.85	21.15
1998	18.64	18.22	21.59
1999	19.07	18.60	22.04
2000	19.29	18.98	22.49
2001	19.63	19.93	23.61
2002	20.15	20.89	24.74
2003	21.05	21.84	25.86
2004	21.80	22.80	26.99
2005	22.77	23.75	28.11

Notes:
PPP= Purchasing Power Parity; BBS= Bangladesh Bureau of Statistics; HS= Hernandez & Schreiner; LPL= Lower Poverty Line; UPL= Upper Poverty Line.
Figures not shaded in last two columns are linearly interpolated.
Poverty Lines estimated with CBN method. Lower Poverty Line corresponds to 1805 KCal, while Upper Poverty Line corresponds to 2122 KCal per day per person.
Source: BBS, 2005 HIES and Hernandez and Schreiner (2007).

Annex 4
Current Status with Information

Sl.	Description	Status/Comments
1	Grameen Bank	1983-2006; national figures available
2	Brac	1997-2007; division wise available. Annual Reports to be looked into for earlier years
3	ASA	1992-2006, national figures available
4	Proshika	Past compilations of the author, CDF & MRA
5	Buro Tangail	1992-2007, national figures available.
6	PDBF	No response at all.
7	TMSS	1995-2007 from TMSS.
8	SSS	Obtained from MRA.
9	JCF	Obtained from PKSF and MRA.
10	MRA	2004-2006 figures on various MFIs
11	CDF	Selected MFIs 2000-2006
12	PKSF-MIS	1995-2007 on limited number of MFIs
13	PMS, BBS	See Annex 2
14	APT-BIDS	1990-1994; not used
15	HES 1990-91	Used
16	HIES 1995	Used
17	HIES 2000	Used
18	HIES 2005	Used
19	BIDS-PKSF HH Survey	1998-2000 used for parameter estimates
20	BIDS-WB Survey	Not provided.

ANNEX 5

Notes on Various Steps in the Exercise

Basic information on Membership data

- Data were collected from individual MFIs (GB, ASA, Brac, Buro, PDBF, TMSS), CDF (2000-2006), MRA (2004-2006) and PKSF; finally member series for each MFI of the Big 4 and Medium was prepared for whatever years the data were available. Any apparently abnormal point in the series was corrected by replacing the abnormal value by a more plausible value from an alternate source. Year-wise source of data for individual MFIs (Big 4 and Medium 12 only) appear in the file 'data sources.xls'.
- To fill out the missing numbers of members, shares of total members for different groups of MFIs and shares of individual MFIs within each group were first generated based on available data, these were extrapolated (in the file 'member series est.xls', sheet name 'final'); for details please see below.
- Parameters were estimated using PKSF-MES data of 1997-99. The parameters estimated are:

$$d_{i,t,t-1} = DN_{i,t,t-1} / N_{i,t-1}$$

$$p_{i,t} = [CMP_{i,t,t-1} + NMP_{i,t}] / [TCM_{i,t,t-1} + TNM_{i,t}]$$

$$r_{i,t,t-1} = GM_{i,t,t-1} / PCM_{i,t,t-1}$$

Where,

$d_{i,t,t-1}$ = Drop out rate of members of *i*-th MFI, from period *t-1* to *t*

$DN_{i,t,t-1}$ = Number of members who did not actively continue their membership with *i*-th MFI from period *t-1* to *t*

$N_{i,t-1}$ = Total Members of *i*-th MFI in the period *t-1*

$p_{i,t}$ = Share of poor members of *i-th* MFI in the period *t*

$CMP_{i,t,t-1}$ = Number of members who actively continued their membership with *i*-th MFI from period *t-1* to *t* and who are poor in period *t*

$NMP_{i,t}$ = Number of new and poor members registering with the *i*-th MFI in the period *t*

$TCM_{i,t,t-1}$ = Total number of members of *i*-th MFI who continued their membership actively from period *t-1* to *t*

$TNM_{i,t}$ = Total number of members registering with *i*-th MFI in the period *t*

$r_{i,t,t-1}$ = Rate of graduation of poor members of *i*-th MFI from period *t-1* to *t*

$GM_{i,t,t-1}$ = Number of members of *i*-th MFI who were poor in period *t-1* and non poor in period *t* and also continued their memberships actively between the two periods.

$PCM_{i,t,t-1}$ = Number of members who actively continued their membership with *i*-th MFI from period *t-1* to *t* and were poor in the period *t-1*

(Poverty has been assessed based on PPP adjusted $1 a day threshold income level calculated by Mark Schreiner).

- Parameters were estimated for the big 4 MFIs individually, for 6 Medium MFIs (PDBF, SSS, TMSS, Caritas, RDRS, Buro) as a group and all other MFIs were considered as small. [*The other medium MFIs could not be recognized from the MFI codes*.] These parameters were then applied on the member series to get the number of graduates for each year given by

$$GRADUATES_t = r.(1-d).p.M_t \ .$$

Key Assumptions:

- ASA is reported to have started its microcredit programs in 1991; therefore its 1990 member size is taken to be zero.
- Share of Small MFIs in the total has been assumed to be 10% in 1990.
- Overlapping intensity is assumed to be 1 (no overlaps) in 1990 and 1.35 (35% overlaps) in 2007. The values for the intermediate years are linearly interpolated.
- In case of missing proportions for 2007, it is assumed that they remain the same as 2006.

Steps followed in generating missing data on membership

GB

GB could provide a complete member series of 1990-2007.

ASA

1. Calculate [ASA/GB] ratio for the period 1992-2007 and assuming the ratio to be zero for the year 1990, interpolate the value of the ratio for 1991.
2. Get the missing values for ASA for 1991 as ASA = GB * [ASA/GB].

BRAC

1. Calculate [GB/BRAC] ratio for the period 1997-2007 and extrapolate it back to 1990.
2. Get the missing values for BRAC for 1990-1996 as BRAC = GB/[GB/BRAC].

PROSHIKA

1. Calculate [GB/BIG] ratio for the period 200-2007 and extrapolate it back to 1990.
2. Calculate [ASA/BIG] = [ASA/GB] * [GB/BIG]
3. Calculate [BRAC/BIG] = [GB/BIG]/[GB/BRAC]
4. Calculate [PROSHIKA/BIG] = 1 – [GB/BIG] – [ASA/BIG] – [BRAC/BIG]
5. Calculate the missing values for Proshika for the period 1990-1999 as PROSHIKA = GB * [PROSHIKA/BIG]/[GB/BIG]

MEDIUM

1. For missing values (1990-1999, 2007), calculate BIG = GB + ASA + BRAC + PROSHIKA
2. Calculate share of 7 medium MFIs (Buro, PDBF, TMSS, RDRS, SSS, JCF, CARITAS) in the total of 12 medium MFIs as listed above, for the period 2004-2006.
3. Calculate ratio of 7 medium MFIs to BIG for the period 2000-2006 and extrapolate it back to 1990.
4. Calculate MEDIUM12 = BIG * [MEDIUM7/BIG]/[MEDIUM7/MEDIUM12]

SMALL

1. Calculate [SMALL/TOTAL] for the period 2004-2006 and assuming the proportion to be 10% in 1990, linearly interpolate the missing values of the intermediate years.
2. Calculate SMALL = [BIG + MEDIUM12] / [{1/(SMALL/TOTAL)}-1]

Annex 6
Estimates on Graduation of Hardcore Poor during 1990-2005

Table 6.1: Total Population and Growth Rates Estimated from HIES

	Total Population (million)				Population Growth Rates (%)		
	1990	**1995**	**2000**	**2005**	**1990-95**	**1995-2000**	**2000-05**
National	106.31	116.32	124.50	138.46	1.65	1.52	2.15
Rural	92.42	97.08	100.53	104.47	0.90	0.78	0.77
Urban	13.91	19.22	24.00	34.02	6.05	5.07	7.22

Source: HIES 2000 & HIES 2005 Report

Table 6.2: Estimated Number of Graduates From HIES

	HIES Estimated Number of Poor (million)				Projected Number of Poor (using pop growth rates)			Graduation from Poverty (million) [Projected-HIES Estimate]			
	1990	**1995**	**2000**	**2005**	**1995**	**2000**	**2005**	**1990-1995**	**1995-2000**	**2000-2005**	**1990-2005**
National	29.96	29.15	24.90	27.00	32.77	31.20	27.69	3.62	6.30	0.69	**10.62**
Rural	26.30	23.90	18.80	18.70	27.62	24.75	19.54	3.72	5.95	0.84	**10.51**
Urban	3.66	5.24	6.00	8.30	5.06	6.54	8.50	-0.18	0.54	0.20	**0.56**

Source: HIES 2000 & HIES 2005 Report

Additional Supporting Statistics

Absolute Poverty (2122 Kcal/Person/Day)							
	1983-84	**1985-86**	**1988-89**	**1991-92**	**1995-96**	**2000**	**2005**
National	62.61	55.65	47.75	47.52	47.53	44.30	40.40
(million)	58.35	55.27	49.66	51.63	55.28	55.80	56.00
Rural	61.94	54.65	47.77	47.64	47.11	42.30	39.50
(million)	51.05	47.41	43.37	44.81	45.73	42.60	41.20
Urban	67.70	62.55	47.63	46.70	49.67	52.50	43.20
(million)	7.30	7.86	6.29	6.82	9.56	13.20	14.80

Source: HIES 2000 & HIES 2005 Report

Hardcore Poverty (1805 Kcal/person/day)							
	1983-84	**1985-86**	**1988-89**	**1991-92**	**1995-96**	**2000**	**2005**
National	36.75	26.86	28.36	28.00	25.06	20.00	19.50
(million)	34.25	26.67	29.49	30.42	29.15	24.90	27.00
Rural	36.66	26.31	28.64	28.27	24.62	18.70	17.90
(million)	30.22	22.82	26.00	26.59	23.90	18.80	18.70
Urban	37.42	30.67	26.38	26.25	27.27	25.00	24.40
(million)	4.03	3.85	3.49	3.83	5.24	6.00	8.30

Source: HIES 2000 & HIES 2005 Report

Total Population (in million) using Absolute Poverty Percentage							
	1983-84	**1985-86**	**1988-89**	**1991-92**	**1995-96**	**2000**	**2005**
National	93.20	99.32	104.00	108.65	116.31	125.96	138.61
Rural	82.42	86.75	90.79	94.06	97.07	100.71	104.30
Urban	10.78	12.57	13.21	14.60	19.25	25.14	34.26

Source: HIES 2000 & HIES 2005 Report

Total Population (in million) using Hardcore Poverty Percentage							
	1983-84	**1985-86**	**1988-89**	**1991-92**	**1995-96**	**2000**	**2005**
National	93.20	99.29	103.98	108.64	116.32	124.50	138.46
Rural	82.43	86.74	90.78	94.06	97.08	100.53	104.47
Urban	10.77	12.55	13.23	14.59	19.22	24.00	34.02

Source: HIES 2000 & HIES 2005 Report

Annex 7
Estimated Time Series on MFI Membership (ignoring overlaps)

MFI Name	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GB	869538	1066426	1424395	1814916	2013130	2065661	2059510	2272503	2368347	2357083	2378356
ASA	0	77636	143894	256512	268020	404218	561530	805631	894119	1178987	1204938
BRAC	503452	668314	968576	1342776	1624987	1824447	2000068	2393285	2998104	4450819	4595358
Proshika	288019	333783	491829	677131	921513	995459	1039997	1205438	1624312	1540095	2151000
BIG4	1661009	2146158	3028694	4091335	4827650	5289785	5661105	6676857	7884882	9526984	10329652
MEDIUM12	200664	264336	380192	523389	629743	702909	766058	920835	1106984	1361492	1357934
SMALL	206853	334943	573457	918518	1263534	1592995	1941539	2586882	3427839	3998694	4132103
TOTAL	2068525	2745438	3982344	5533242	6720928	7585689	8368701	10184575	12419705	14887171	15819689

MFI Name	2001	2002	2003	2004	2005	2006
GB	2378601	2483006	3123802	4059632	5579399	6908704
ASA	1579372	2136165	2341819	2996660	5988134	6455979
BRAC	4669135	4001315	4286648	4427225	4709009	5606226
Proshika	2645000	2922696	2781255	2768147	2845902	2800413
BIG4	11272108	11543182	12533524	14251664	19122444	21771322
MEDIUM12	1660819	1850136	2093923	2343874	2869103	3320546
SMALL	4398790	4379132	4593903	5069655	6177464	7044233
TOTAL	17331717	17772450	19221350	21665193	28169011	32136102